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PROPORTIONAL LIABILITY: A COMPREHENSIVE RULE TO APPORTION TORT DAMAGES BASED ON PROBABILITY

JOHN MAKDISI†

In many tort cases, actual causation may be uncertain; under existing law a jury may find by a preponderance of the evidence that but for causation was "proved" when in fact it did not exist, or that but for causation was not "proved" when in fact it did exist. To remedy the inefficiencies and injustices arising from this problem, Professor Makdisi proposes in this Article that the tort system dispense with the element of causation in fact and require instead probable causation. Furthermore, as his analysis illustrates, when probable causation is proved, damages should then be allocated in proportion to the probability of causation. After explaining how this approach would better deter inefficiency and promote corrective justice, Professor Makdisi examines misconceptions about and abuses of the current system of proof by a preponderance of the evidence. The Article then identifies steps that courts and other legal scholars have already begun to take in the direction of probable causation. Finally, Professor Makdisi discusses the obstacles to determining an accurate probability of causation and concludes that proportional liability based on probable causation would be very similar to the common use of proportional liability found in other familiar areas of the law.

An essential element of a cause of action in tort traditionally has been causation "in fact" of the plaintiff's harm by the defendant's act or omission. This element is generally defined as *but for* causation: "The defendant's conduct is a cause of the event if the event would not have occurred but for that conduct; conversely, the defendant's conduct is not a cause of the event, if the event would have occurred without it."¹ While this element traditionally must be proved to establish a cause of action in tort, it need not be proved with absolute

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1. W. KEETON, D. DOBBS, R. KEETON & D. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS 266 (5th ed. 1984) [hereinafter PROSSER & KEETON]; see also Calabresi, *Concerning Cause and the Law of Torts: An Essay for Harry Kalven, Jr.*, 43 U. CHI. L. REV. 69, 72 (1975) ("any one of many acts or activities without which a particular injury would not have occurred"). In addition to the above-cited works, for a general discussion of causation rules, see H. HART & A. HONORE, CAUSATION IN THE LAW 103-229 (1959); Borgo, *Causal Paradigms in Tort Law*, 8 J. LEGAL STUD. 420 (1979); Landes & Posner, *Causation in Tort Law: An Economic Approach*, 12 J. LEGAL STUD. 109 (1983); Malone, *Ruminations on Cause-in-Fact*, 9 STAN. L. REV. 60 (1966); Shavell, *An Analysis of Causation and the Scope of Liability in the Law of Torts*, 9 J. LEGAL STUD. 463, 466-68 (1980); Weinrib, *A Step Forward in Factual Causation*, 38 MOD. L. REV. 518 (1975); Wright, *Causation in Tort Law*, 73 CALIF. L. REV. 1735 (1985) [hereinafter Wright, *Causation*]; and

certainty. The law permits the jury (or judge sitting as factfinder) to find that causation in fact exists even when its existence is uncertain, as long as it is proved by a preponderance of the evidence.² For example, if the evidence shows an 80% chance that defendant's negligent act caused plaintiff's harm, the law permits the factfinder to find causation even though there is a 20% chance that defendant's negligence did not cause plaintiff's harm.

This Article proposes that the tort system dispense with the element of causation in fact and require instead *probable* causation in fact. Furthermore, when probable causation is proved, damages should be allocated in proportion to the probability of causation.³ Therefore, if the evidence shows an 80% chance that

Wright, *Actual Causation vs. Probabilistic Linkage: The Bane of Economic Analysis*, 14 J. LEGAL STUD. 435 (1985).

One problem in using *but for* causation to define causation in fact is the case of duplicative causation. For example, A and C start separate fires that are each sufficient to destroy B's house. Although A and C are held liable in tort, a strict reading of the *but for* definition of causation would relieve A and C from liability in this case. In order to include the duplicative causation case within the scope of the *but for* definition, PROSSER & KEETON, *supra*, at 268, suggests a reasonable interpretation of the *but for* rule: "When the conduct of two or more actors is so related to an event that their combined conduct, viewed as a whole, is a but-for cause of the event, and application of the but-for rule to them individually would absolve all of them, the conduct of each is a cause in fact of the event." *But see* Wright, *Causation*, *supra*, at 1780-81 (objecting that the test "would treat totally unrelated conditions as causes"). Implicit in PROSSER AND KEETON's definition is the idea that each actor by his conduct has satisfied all the elements for a tort beyond that of causation. An alternative approach to the problem of duplicative causation is the substantial factor test. *See infra* note 55. This author agrees with PROSSER & KEETON, *supra*, at 269, that the substantial factor test is less desirable than their own interpretation of the *but for* definition.

2. The three prevailing standards of persuasion in litigation are proof by a preponderance of the evidence (most civil cases), proof by clear and convincing evidence (some civil cases), and proof beyond a reasonable doubt (criminal cases). MCCORMICK ON EVIDENCE § 339 (E. Cleary 3d ed. 1984). Richard Posner defines the preponderance test as one which "directs the trier of facts to find in favor of the party (usually, though not always the plaintiff) who has the burden of proof if that party's version of the disputed facts is more probably true than the other party's version." R. POSNER, *ECONOMIC ANALYSIS OF LAW* 520 (3d ed. 1986). And it has been stated that "[a] bare preponderance is sufficient, though the scales drop but a feather's weight." *Livanovitch v. Livanovitch*, 99 Vt. 327, 328, 131 A. 799, 800 (1926).

3. Several commentators have proposed proportional damages in limited contexts. *See, e.g.*, F. HARPER, F. JAMES, JR., & O. GRAY, 4 THE LAW OF TORTS § 20.2, at 102-03 n.25 (2d ed. 1986); Cooter, *Torts as the Union of Liberty and Efficiency: An Essay on Causation*, 63 CHI.-KENT L. REV. 523, 539 (1987); Delgado, *Beyond Sindell: Relaxation of Cause-in-Fact Rules for Indeterminate Plaintiffs*, 70 CALIF. L. REV. 881, 892 (1982); Estep, *Radiation Injuries and Statistics: The Need for a New Approach to Injury Litigation*, 59 MICH. L. REV. 259 (1960); Farber, *Toxic Causation*, 71 MINN. L. REV. 1219, 1221 (1987) (with modifications when the risk is not uniform across the class of plaintiffs); Kaye, *The Limits of the Preponderance of the Evidence Standard: Justifiably Naked Statistical Evidence and Multiple Causation*, AM. B. FOUND. RES. J. 487 (1982); Kelman, *The Necessary Myth of Objective Causation Judgments in Liberal Political Theory*, 63 CHI.-KENT L. REV. 579, 597-600 (1987); Landes & Posner, *Tort Law as a Regulatory Regime for Catastrophic Personal Injuries*, 13 J. LEGAL STUD. 417 (1984); Landes & Posner, *supra* note 1, at 123-24; Page, *On the Meaning of the Preponderance Test in Judicial Regulation of Chemical Hazards*, 46 LAW & CONTEMP. PROBS. 267 (1983); Rizzo & Arnold, *Causal Apportionment in the Law of Torts: An Economic Theory*, 80 COLUM. L. REV. 1399 (1980); Robinson, *Multiple Causation in Tort Law: Reflections on the DES Cases*, 68 VA. L. REV. 713 (1982); Rosenberg, *The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System*, 97 HARV. L. REV. 851 (1984); Shavell, *Uncertainty Over Causation and the Determination of Civil Liability*, 28 J.L. & ECON. 587, 589 & n.8 (1985); Note, *Causation in Toxic Torts: Burdens of Proof, Standards of Persuasion, and Statistical Evidence*, 96 YALE L.J. 376 (1986); Note, *A Suggested Remedy for Toxic Injury: Class Actions, Epidemiology, and Economic Efficiency*, 26 WM. & MARY L. REV. 497 (1985) [hereinafter *Toxic Injury*]. On the use of epidemiological evidence, see Dore, *A Commentary on the Use of Epidemiological Evidence in Demonstrating Cause-in-Fact*, 7 HARV. ENVTL. L. REV. 429 (1983); Hall & Silbergeld, *Reappraising Epidemiology: A Response to Mr. Dore*, 7 HARV. ENVTL. L. REV. 441 (1983); Novick, *Use of Epide-*

defendant's negligent act caused plaintiff's harm, probable causation would be proved and damages would be awarded for 80% of plaintiff's harm. Likewise, if the evidence indicates a 40% probability, damages would be awarded for 40% of plaintiff's harm. This proposal treats what has been considered heretofore an evidentiary concern as a factual concern. The factfinder traditionally has been asked to determine by the weight of the evidence whether causation exists; under this new rule it is asked to determine what the weight of the evidence is as to the existence of causation.⁴

No doubt this is a radical proposal, but it seeks to alleviate a radical injustice. When causation is uncertain there is always a chance that *but for* causation may be "proved" when in fact it does not exist, or that *but for* causation may not be "proved" when in fact it does exist. Because proof does not require certainty in many cases, it is unfair to provide remedial relief as if it did. Furthermore, when the evidence shows a 51% chance of causation in one case and a 49% chance of causation in another, it is unfair to give full relief to the plaintiff in the former case and no relief in the latter. The two cases are practically the same.

The remedy that most accurately compensates the plaintiff for the consequences of the defendant's act is one that includes a consideration of the probability that the defendant's wrong has caused or not caused the harm and

miological Studies to Prove Legal Causation: Aspirin and Reye's Syndrome, A Case in Point, 22 TORT & INS. L.J. 536 (1987); Comment, *Epidemiologic Proof of Probability: Implementing the Proportional Recovery Approach in Toxic Exposure Torts*, 89 DICK. L. REV. 233 (1984). This Article advances the discussion one step further by advocating a comprehensive rule of proportional liability.

4. Probable causation describes the *ex post* probability of causation of harm given information known *after* the harm has occurred. This term is not to be confused with the *ex ante* probability of causation of harm given information known before the harm has occurred. For an example of the latter use of this term, see Shavell, *supra* note 1, at 468-69, and Marks, *Negligence, Causation and Information*, 31 MCGILL L.J. 128, at 135-37 (1985), using this term to describe the problem in *Berry v. Sugar Notch Borough*, 191 Pa. 345, 43 A. 240 (1899). The *ex ante* probability of causation has been described also as "causal link." See Calabresi, *supra* note 1, at 71-72.

This Article does not advocate the concept of damages for mere exposure to the risk of a harm without actual harm occurring. This approach has been proposed by a few commentators. See, e.g., W. LANDES & R. POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* 257, 263, 265-69 (1987) (rewritten from *Tort Law as a Regulatory Regime for Catastrophic Personal Injuries* 13 J. LEGAL STUD. 417 (1984)); R. COOTER & T. ULEN, *LAW AND ECONOMICS* 418-21 (1988); Robinson, *supra* note 3; Rosenberg, *supra* note 3. See *Jackson v. Johns-Manville Sales Corp.*, 727 F.2d 506, 516-22 (5th Cir. 1984) (rejecting a claim for mere exposure to harm), *vacated in part and question certified on reh'g*, 750 F.2d 1314 (5th Cir. 1984) (en banc), *certificate for question dismissed*, 469 So. 2d 99 (Miss. 1985) (en banc), *rev'd on second reh'g*, 781 F.2d 394 (5th Cir.), *cert. denied*, 478 U.S. 1022 (1986); *Gideon v. Johns-Manville Sales Corp.*, 761 F.2d 1129, 1136-37 (5th Cir. 1985) (allowed a claim for exposure to harm when it was included in a claim for actual harm), *discussed in Note, Damages for an Increased Risk of Developing Cancer Caused by Asbestos Exposure Are Only Recoverable If It Is More Likely Than Not that Cancer Will Develop*, 51 MO. L. REV. 847 (1986) (approving the *Jackson* approach). This approach is not advocated because it raises the problem of double indemnity. If those who are exposed to the risk are entitled to recover, what may the plaintiff who actually suffers the harm posed by the risk recover? The authors of W. LANDES & R. POSNER, *supra*, at 268 n.17, have chosen to "ignore the fact that some members of the class [suing for damages from the risk of harm] may decide to opt out and bring their own suit." Also, the expected cost imposed by the risk is a harm while the risk exists, but this harm may pass and the victim restored to a position of no expected cost. To be distinguished from this proposal advocating damages for exposure to risk of future harm is this Article's proposal advocating damages for exposure to risk of past harm. Harm has occurred and causation by defendant's wrongdoing is a probability. Cf. Farber, *supra* note 3, at 1241, 1247 nn.98 & 118 (finding no functional difference between damages for unrealized risks and damages after the risk has materialized but finding a problem with fairness if the unrealized risk never materializes).

that weighs the remedial relief accordingly. A 51% chance of causation is an uncertain situation. It reflects doubt, and the court therefore should award less relief for the plaintiff than if the causation were certain. More precisely, if the expectation of causation of harm in the uncertain situation is 51%, the corresponding expectation of relief should be 51% of the harm caused. This method of valuing the chance of an event is based on the concept of "mathematical expectation," otherwise known as "expected value."⁵

The expected value of a situation is not an ephemeral concept. Although the failure of defendant's negligent act to cause harm to the plaintiff may be "negligence in the air,"⁶ the next section of this Article demonstrates that the chance that defendant's act has caused harm is something different. It provides a sufficiently substantial link between act and harm to require at least (but no more than) partial liability. Liability in proportion to the chance of causation deters inefficiency and promotes corrective justice.

Despite the justification for a proportional liability rule, however, the tort system continues to favor an all-or-nothing rule of liability based on proof of causation rather than on proof of the probability of causation. Section two of this Article examines misconceptions about and abuses of the system of proof by a preponderance of the evidence. Some courts have rejected the use of probabilistic evidence out of hand while others have permitted the use of probabilistic evidence to prove too much. Although the proof of causation approach maintains the appearance of certainty, the result has been to place an unduly heavy burden on the plaintiff with consequent injustice. To alleviate this strain, a few courts have rejected the preponderance of the evidence standard in some cases. They have developed a new standard of proof based on a substantial possibility test. This new standard, however, does not solve the problem, and it produces unfair results as well.

Only recently have courts begun to attack the problem at its source. Rather than focussing on the standard of proof, they have begun to develop a proportional liability rule that directly addresses the proper balance between plaintiff and defendant. Section three of this Article discusses this development and commentary by writers on the subject. Although several writers have commended the steps toward proportional liability,⁷ no one yet has suggested adoption of a comprehensive proportional liability rule in tort law.

Perhaps the failure to adopt a comprehensive rule is a result of some re-

5. The expected value of an uncertain event is the probability of the event multiplied by the value of the event. See C. GOETZ, CASES AND MATERIALS ON LAW AND ECONOMICS 77-79 (1984). If a coin is tossed in the air there is a 50% chance it will come up heads and a 50% chance it will come up tails. If Bob were to offer Kate \$100 before the coin toss if the coin came up heads, the expected value of that offer is \$50. Kate has a 50% chance of enjoying \$100 coupled with a 50% chance of receiving nothing. Likewise, a 60% chance that defendant's negligence caused a \$10,000 harm is valued at \$6,000 (.60 x \$10,000), and a 40% probability generates an expected value of \$4,000. Although the coin toss is forward-looking and the negligent act is backward-looking, the two situations are the same insofar as the result of the act is unknown except for its chance.

6. *Palsgraf v. Long Island R.R.*, 248 N.Y. 339, 341, 162 N.E. 99, 99 (1928) (Justice Cardozo quoting POLLOCK, TORTS 455 (11th ed.)).

7. See *supra* note 3.

maintaining obstacles in the proof of a probability. In many cases determining a specific figure for the probability of causation may be difficult. Assume that the factfinder believes that the probability of causation is between 60% and 80%. If the harm caused was valued at \$1000, the damages should probably be between \$600 and \$800, but one figure must be chosen for liability. The problem of uncertainty in the proof of a probability of causation is discussed in section four of this Article.

This Article advocates an adjustment in the system of proof to accommodate a proportional liability rule linking degree of relief to degree of proof of causation. This proposal is a new application of a familiar concept. In section five a brief survey of the areas of joint causation, comparative negligence, and damages illustrates the use of proportional liability as it already exists in other areas of the law.

I. JUSTIFICATION FOR A PROPORTIONAL LIABILITY RULE

A. *Deterrence of Inefficiency*

Behavior is inefficient insofar as it results in a net loss to society. This loss occurs when the costs of the behavior exceed the benefits. One of the goals of our legal system is to discourage inefficient behavior by causing the decision-maker to suffer (that is, internalize) the adverse consequences his behavior imposes on others.⁸ When the decision-maker bears both the benefits and burdens of his behavior, he will, one expects, behave in a way that maximizes his net benefits and thus in an efficient manner. This goal of deterrence, accomplished through imposition of the costs of inefficient behavior on the decision-maker, underlies the rules for liability in negligence and strict liability.

The negligence standard, provided by Judge Learned Hand's classic formula in *United States v. Carroll Towing Co.*,⁹ first decides what behavior is inefficient and then imposes the costs of that behavior on the decision-maker. There is negligence when the benefit (B) of the conduct is less than the probability (P) of loss (L) from this conduct.¹⁰ In algebraic terms, negligence exists where $B < P \times L$. ($P \times L$) is the expected cost of the conduct.¹¹ When the benefit of the conduct is less than its expected cost, the conduct is inefficient because it produces a net loss for society. The expected cost of this inefficient

8. "In the utilitarian model the essential function of a tort system is efficient risk management in order to reduce the net social costs of accidents, that is, the excess of accident-related costs over activity-related benefits." Robinson, *Probabilistic Causation and Compensation for Tortious Risk*, 14 J. LEGAL STUD. 779, 783 (1985) (citing G. CALABRESI, *THE COSTS OF ACCIDENTS* (1970); Brown, *Toward an Economic Theory of Liability*, 2 J. LEGAL STUD. 323 (1973); Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29 (1972)).

9. 159 F.2d 169 (2d Cir. 1947).

10. "Loss" refers to actual cost. Every time an individual commits a negligent act, she is liable only for the actual injury caused, not for negligence in the air. If no harm results, there is no liability.

11. The benefit from the decision-maker's conduct also may be an expectation. In that case the benefit side of the formula would also consist of a probability multiplied by the benefit expected. One example of an expected benefit is the doctor who experiments with a new procedure that has a certain probability of success.

conduct is imposed on the decision-maker by subjecting him to damages every time an injury is caused by his negligent conduct.¹² When the decision-maker is forced to consider the expected cost along with the benefit of his conduct, he is encouraged, by reason of the loss that he would suffer, to refrain from the negligent conduct. Theoretically under the Hand formula, the rational individual who would be subjected to damages if he were negligent will not act when $B < P \times L$. On the other hand, when $B > P \times L$, the decision-maker's conduct is not negligent and he is encouraged, by reason of the benefit he would enjoy, to engage in the nonnegligent conduct.

Strict liability also generates efficient results. Strict liability does not decide what behavior is inefficient. It imposes liability on the decision-maker for harm caused, whether it is negligent or not. The decision-maker, however, is forced to consider the expected cost of his conduct along with its benefit in a way that produces the same results as in negligence. When the decision-maker would be negligent ($B < P \times L$), he is encouraged to refrain from the negligent conduct because his costs would exceed his benefits. When he would not be negligent ($B > P \times L$), he is encouraged to engage in the conduct even though, contrary to the case of negligence, he is forced to pay its costs. In the latter instance the conduct produces a net benefit for the decision-maker because his expected cost is still less than his benefit.

The following example illustrates the deterrent effect of negligence and strict liability on inefficient behavior. Assume that a landlord is considering the purchase of a \$120 mat for a slippery common hallway and that the mat has a life of one year. Without the mat, it is expected that people will fall six times and injure themselves to the extent of \$100 per fall over the lifetime of the mat. Under these circumstances, either a negligence or strict liability rule would induce the landlord to purchase the mat. If she does not buy the mat, the benefit to the landlord is the \$10 per month she will save from the cost of the mat, while the expected cost is a 50% chance (P) of injury each month¹³ at a \$100 cost (L). The expected cost of \$50 (50% of \$100) per month exceeds the benefit of \$10 per month, and thus the landlord would be negligent not to buy the mat. Under a negligence standard, knowing that she will be liable in damages for any injury caused by her negligence, the landlord thus is encouraged to buy the mat. Under a strict liability standard, the landlord would be held liable merely for causing harm; however, the calculation and resulting deterrence of inefficiency would be the same.

On the other hand, if the price of the mat is \$720, B is greater than $P \times L$ ($60 > .5 \times 100$) and the landlord is not negligent if she fails to purchase the mat, even if people fall and hurt themselves on the slippery floor.¹⁴ Under a negligence standard, because the landlord is not forced to internalize the expected

12. An injury does not always occur from negligent acts, but the expected cost of each act, if correctly calculated, is realized ultimately in the injuries that do occur from some of them.

13. There is a one in two chance of a fall each month if it is expected that people will fall six times during the year.

14. This assumes that the \$720 mat is the cheapest way to prevent falls on this floor.

cost of accidents on his floor, she is not induced to buy the mat. Even if she were forced to internalize the expected cost of accidents on his floor under a standard of strict liability, the landlord would not be induced to buy the mat because the expected cost of damages is less than the cost of the mat. The failure to buy the mat in this case is efficient because the purchase of the mat would involve a greater cost than benefit.

For another example, suppose a user of nuclear energy uses a process (Process Y) that is \$100/day cheaper than another process (Process Z) but also increases the incidence of cancer in each employee from .004%/day (.00004/day) to .006%/day (.00006/day). Assume that the cost to each employee who contracts cancer is \$100,000, that there are 100 employees, that the .00004/day incidence is from nonnegligent causes, and that cancer contracted from Process Y can be distinguished from all other cancer. Process Z does not cause cancer.

In this case the nuclear energy user knows he is negligent when he uses Process Y because the expected cost ($P \times L$) of cancer is greater than the benefit from not using Process Z. That is, the benefit (B) to the user is \$100, which is the amount saved by not resorting to Process Z; the probability (P) of injury to an employee from cancer caused by Process Y is .00002; and the loss (L) is \$10,000,000, which is the \$100,000 cost of cancer to each employee multiplied by 100 employees. Consequently, $B < P \times L$ because $\$100 < \200 (.00002 \times \$10,000,000). In this case the nuclear energy user will be held liable for any cancer caused by Process Y, whether under a negligence standard or a standard of strict liability. Under negligence, liability follows negligence and causation, and according to the Hand formula the use of process Y is negligent. Under strict liability, liability follows causation.

Because damages would be imposed on the user if he used Process Y, he is deterred from using it and encouraged to use Process Z. This result is efficient because the conduct that is deterred would have produced a net loss for society. Conversely, if Process Y is \$300/day cheaper to use than Process Z, the nuclear energy user is encouraged to use Process Y, whether under negligence with no liability for damages or under strict liability with liability for damages that nevertheless are less than benefits received. This result also would be efficient because the conduct that is encouraged produces a net gain for society.

The mat and cancer examples illustrate the deterrent effect of negligence and strict liability. Negligent conduct should be deterred because it produces, by definition, a net loss to society. To make the rule work under the present system, however, there must be some way of proving causation when an injury is caused by inefficient conduct. If causation is not provable, the deterrent effect of negligence and strict liability is thwarted because damages cannot be imposed on the party engaging in inefficient behavior and the expected cost of his conduct is not internalized.

Proof of causation under the present system permits the factfinder to establish the fact of causation on the basis of evidence that it is more probable than not. Once causation is established, full liability is imposed on the defendant. If causation is not more probable than not, the plaintiff fails to carry the burden of

proof and no damages are awarded. This result is inefficient if the evidence supports a probability of causation other than 0% or 100%. A modified version of the first cancer example described above demonstrates the need for a proportional liability rule to obtain more efficient results.

The use of Process Y is negligent because $B < P \times L$ ($\$100 < 200$).¹⁵ Assume that the cancer caused by Process Y cannot be differentiated from the cancer caused by nonnegligent sources. Assume also that it is known that there is a one-third chance that any cancer occurring in employees is caused by Process Y.¹⁶ Under the preponderance of the evidence standard, once cancer exists, the inability to differentiate between the negligent and nonnegligent causes of the cancer results in a failure of proof of causation. The most that the plaintiff can prove after the fact of injury is a 33 1/3% chance that Process Y was the cause of the cancer. *But for* causation is not established through proof of this chance, and the defendant escapes liability under both negligence and strict liability where his inefficient behavior has caused harm.¹⁷ With this result, the nuclear energy user would be encouraged to choose Process Y over Process Z since he is not required to pay for the cancer caused by Process Y. Under the preponderance of the evidence standard, the expected cost of the negligent Process Y is not internalized to the user's decision-making process, and thus he is not deterred from using Process Y.¹⁸ This standard of proof is decidedly inefficient because the failure to use Process Z produces an overall net loss for society.

Likewise, the standard of proof is inefficient when it causes defendant to be liable beyond the harm caused by his own actions. Assume that Process Y is \$600/day cheaper to use than Process Z. Assume also that Process Y increases the incidence of cancer (costing \$100,000) in each of 100 employees from

15. Process Y is \$100/day cheaper to use than Process Z but increases the incidence of cancer (costing \$100,000) in each of 100 employees from .00004/day to .00006/day.

16. The *ex post* inquiry into whether the cancer was caused by the negligent Process Y involves the 100% certainty that cancer exists as opposed to the .00006/day *ex ante* risk of cancer. The *ex post* 33 1/3% probability of cancer refers to cancer caused by Process Y. This *ex post* causal statement is probabilistic because of the lack of evidence to show whether the fact of causation by Process Y did or did not occur. Kelman, *supra* note 3, at 591-93, 598-99 (stating that there is "something of a tradition among devotees of *ex post* accounts of cause to deny that valid *ex post* causal statements are themselves probabilistic"); see also Tribe, *Trial by Mathematics: Precision and Ritual in the Legal Process*, 84 HARV. L. REV. 1329, 1345-46 (1971) (asserting that probability concepts are relevant to both future and past events). As Professor Ball stated:

If the future is uncertain, a great deal of the past is uncertain as well [P]ropositions about past facts are "predictions," on existing information, as to what the "truth" will turn out to be when and if more knowledge is available, and . . . their probabilities can cover the same range as the probabilities of statements about future events. [footnote omitted]

Ball, *The Moment of Truth: Probability Theory and Standards of Proof*, 14 VAND. L. REV. 807, 815 (1961).

17. See Rosenberg, *supra* note 3, at 858 ("the excess risk caused by exposure to a toxic agent frequently does not exceed the background risk; thus, a significant portion of plaintiffs will be unable to prove that it is more probable than not that such exposure caused their disease"); Shavell, *supra* note 3, at 588 & n.4 ("diminished burden of liability" when a party's probability of causation is systematically less than one-half); *Toxic Injury*, *supra* note 3, at 515 ("Even if sufficient evidence exists for the plaintiff to prove injury . . . the high standard of causation defeats most actions").

18. See Rosenberg, *supra* note 3, at 879 ("the rule's undeniable effect is to shield some wrongdoers from liability and force victims to bear their losses fully. Such a rule unjustly enriches the wrongdoer and thus encourages the wrongs it fails to deter").

.00004/day to .00009/day. The use of Process Y is not negligent because $B > P \times L$ ($\$600 > \$500 [.00005 \times \$10,000,000]$). Assume also that the cancer caused by Process Y cannot be differentiated from the cancer caused by other sources, but that it is known that there is a five in nine chance that any cancer occurring in employees is caused by Process Y. Under the preponderance of the evidence standard, once cancer exists, it can be attributed to the defendant because there is a greater than 50% chance that defendant was the cause. *But for* causation is established and under strict liability, albeit not under negligence, defendant is liable in every case of cancer, even when his act did not cause the harm. As a result the nuclear energy user would be encouraged to choose Process Z over Process Y. Process Z is \$600 more costly than Process Y, but Process Y would incur \$900 in damages ($.00009 \times \$10,000,000$). Under the preponderance of the evidence standard, the true expected cost of Process Y is not internalized to the user's decision-making process because he is overcharged and thus overdeterred from using it. The standard of proof is inefficient because it encourages the use of Process Z and produces an overall net loss for society.¹⁹

Proportional liability ensures the proper deterrent effect of negligence and strict liability. If the cancer victims recover damages for their injuries in proportion to the likelihood that the conduct of the defendant caused the injuries, the nuclear energy user will be encouraged to use the more cost efficient process. In the cancer example in which the user opted for Process Y, since the likelihood of causation is one in three, each of the cancer victims among the employees would receive damages under either negligence or strict liability in the amount of one third of \$100,000 (\$33,333). Because the incidence of cancer for an employee is .00006/day and there are 100 employees, the expected cost of damages for cancer is \$200/day. The nuclear energy user now would be discouraged from using Process Y. He would use the more efficient Process Z which costs \$100/day more to use but without the liability for damages from cancer.

In the cancer example in which the nuclear energy user opted for Process Z, since the likelihood of causation is five in nine, damages under strict liability using a proportional liability approach would be awarded to each of the cancer victims among the employees in the amount of five-ninths of \$100,000 (\$55,556). Because the incidence of cancer for an employee is .00009/day and there are 100 employees, the expected cost of damages for cancer is \$500/day. With this result, the nuclear energy user would be encouraged to use the more efficient Process Y; \$500/day in damages is less than the \$600/day increase in cost to use Process Z. By internalizing both the benefits and costs of the situation through

19. See W. LANDES & R. POSNER, *supra* note 4, at 262 (overdeterrence occurs from excessive liability when the legal standard is strict liability as well as when negligence is erroneously defined). The ultimate result from holding a defendant accountable for the results of background risk as well as the risk from its own conduct may be to force it out of business. This phenomenon has been referred to as "crushing liability." Shavell, *supra* note 1, at 465. Shavell does not propose in his article to restrict the extent of liability in such a case because he believes administrative costs would be high and the increment of losses caused by the injurer might often be difficult or impossible to determine. *Id.* at 476 n.35, 499-500. He notes, "In any event, the alternative of restricting the extent rather than the scope of liability has not in fact been adopted as a *general* solution to the particular problem at hand." *Id.* at 476 n.35.

the proportionality rule, the decision-maker again can make the best decision for society.

Awarding damages in proportion to the likelihood of *but for* causation after the fact reestablishes the deterrence function of the negligence and strict liability rules. It provides a means for internalizing the expected cost of the decision-maker's conduct to the decision-making process in the case of inefficient behavior. This approach can be explained further by simply splitting probability (P) into two parts: PC equals the probability after a cancer-related injury has occurred that *but for* causation between the negligence and the injury exists; PL equals the probability before a cancer-related injury has occurred that a cancer-related injury will occur from any cause, whether from the decision-maker's conduct or other causes. With these definitions, P in Hand's formula becomes the product of PL and PC.²⁰ In the example given above, PC is 1/3 (.00002/.00006), and PL is .00006. $PC (.00002/.00006) \times PL (.00006) = P (.00002)$. Hand's negligence formula, therefore, can be restated as $B < PC \times PL \times L$. The right hand side of the formula is society's expected cost because there is a probability of P that a loss of L will occur. Using this expanded formula, one can see that this cost is the decision-maker's expected cost under the proportionality approach because he will be charged with damages in the amount of $PC \times L$ every time a cancer-related injury from any source takes place.²¹ Because there is a probability of PL that such an injury will occur, the decision-maker has an expected cost of $PC \times PL \times L$. Because the decision-maker's expected cost is

20. PL may be split further into P and (PL - P). If P is the probability before a cancer-related injury has occurred that it will occur from negligence, then (PL - P) is the probability before a cancer-related injury has occurred that it will occur from other non-negligent causes [(PL - P) + P = PL]. Once a cancer-related injury has occurred, then the probability that it was caused by negligence is P/PL. Thus, $PC = P/PL$, and $P/PL \times PL = P$.

21. The idea of charging defendant for plaintiff's harm in proportion to the probability that the harm was caused by the negligence ($PC \times L$) is not new in toxic tort jurisprudence when the plaintiff is one of a group that has actually experienced an increased incidence of harm due to the negligently caused cancer. See Shavell, *supra* note 3, at 589 n.8, and Schwartz, *Causation in Private Tort Law: A Comment on Kelman*, 63 CHI.-KENT L. REV. 639, 645 n.14 (1987), for examples in which a proportionality payment is suggested for each person who contracted cancer in such a group ((q-p)/q in Schwartz's example is equal to PC as defined in this Article). See also Rosenberg, *supra* note 3, at 859 n.43. The proportionality rule, however, should not be confined to these cases, but rather extended to apply to a single plaintiff who has contracted cancer in a case where the *ex post* probability of causation by negligence is known but actual harm by the defendant may not have occurred in fact.

Posner suggests that a defendant should be charged for a plaintiff's harm in proportion to "the probability [that the harm] would have been averted by due care." R. POSNER, *TORT LAW: CASES AND ECONOMIC ANALYSIS* at 561 (1982). The probability that harm would have been averted by due care is the probability that harm was caused by negligence. Posner, however, misstates the formula for achieving this proportion when he charges the defendant with damages of $(1 - (PL - P)) \times L$. (Posner's notation is changed to accord with the notation in this Article.) As an example he gives the case of a loss (L) resulting from negligence equal to \$100,000 and the *ex ante* probability of loss if due care had been exercised equal to 40%. Posner concludes that "the proper measure of her loss due to the defendant's negligence was \$60,000 (60 percent \times \$100,000)." *Id.* at 561. This conclusion is true only if the *ex ante* probability of loss with negligence was 100%. Then $P = 60\%$, $PL = 100\%$, and $P/PL = 60\%$. But if the *ex ante* probability of loss with negligence had been 80%, then $P = 40\%$, $PL = 80\%$, and $P/PL = 50\%$. The proper measure of plaintiff's loss then would be \$50,000 (50 percent \times \$100,000). In this example Posner confused the *ex ante* probability of loss caused by factors other than negligence (PL - P) with the *ex post* probability of loss caused by factors other than negligence (1 - PC). In the following year, Posner used the latter probability correctly in a case where the identity of the victim was unclear. See Landes & Posner, *supra* note 1, at 123-24.

equal to society's expected cost, the decision-maker internalizes both the benefits and the costs of the situation and thus is encouraged to decide on the more efficient behavior.²²

B. *Corrective Justice*

In addition to promoting efficiency, the proportional liability rule provides a better scheme for fair compensation of the parties than the prevailing preponderance of the evidence standard. Defendant's wrongdoing and plaintiff's injury ordinarily must bear a cause and effect relationship in order to trigger liability. Causation of harm²³ and the existence of wrongdoing²⁴ justify the imposition of liability, but more is needed. The causation of harm must be linked to the wrongdoing — the question is how and with what effect.

In cases in which the link between causation of harm and wrongdoing is uncertain, the plaintiff is overcompensated every time the probability of causation leads to proof of causation but causation in fact does not exist, and the plaintiff is undercompensated every time the probability of causation does not lead to proof of causation but causation in fact exists.²⁵ Correspondingly, the defendant may pay more (or less) in damages than the cost of the injury she has caused by her conduct. While the proportional damages approach does not cure this problem from the plaintiff's perspective, it does remove the problem of over- or under-compensation from the defendant's perspective. Under the proportional liability rule, the defendant tortfeasor pays for, and only for, the harm it is expected she has caused. Over time, if the defendant were to engage in repeated instances of her conduct, she would actually cause the harm she is paying for, even though the victims of her injury-causing conduct share the damages for their harm with others who have not suffered from her conduct.²⁶

Consider the case in which a negligent act is committed and a hundred injuries occur in conjunction with this act. It is uncertain if the act has caused any one of these injuries, but the probability of causation of each injury by the negligent act is found to be 50%. The factfinder is saying in effect that in fifty out of the hundred situations, it expects that the negligent conduct actually caused the injury, while in the other fifty situations the negligent conduct did not cause it. If relief is denied in each situation for failure to prove causation, the tortfeasor escapes liability for harm that she is believed to have caused in fifty of

22. See Cooter, *supra* note 3, at 539 ("the polluters will face incentives for efficient precaution so long as they are liable for the expected harm (the increased probability of cancer caused by the pollution multiplied by the harm suffered by a cancer victim) they cause"); Rosenberg, *supra* note 3, at 866 ("Under a proportionality rule, the expected liability confronting firms equals the losses attributable to their tortious conduct.").

23. Cf. J. THOMSON, RIGHTS, RESTITUTION, AND RISK 192 (1986) (a discussion questioning the need for causation).

24. Cf. Weinrib, *Causation and Wrongdoing*, 63 CHI.-KENT L. REV. 407 (1987) (a discussion questioning the need for wrongdoing, criticized in Coleman, *Property, Wrongfulness and the Duty to Compensate*, 63 CHI.-KENT L. REV. 451 (1987)).

25. See Delgado, *supra* note 3, at 892-93; Rosenberg, *supra* note 3, at 862-63.

26. See Rosenberg, *supra* note 3, at 866 ("Under a proportionality rule, the expected liability confronting firms equals the losses attributable to their tortious conduct.").

the situations. She is undercharged and the plaintiffs who are injured by her tort are undercompensated. If the proportional liability rule is applied, the plaintiff in each of the hundred situations receives compensation in the amount of 50% of the harm suffered, and the total amount of damages awarded equals the total amount of harm suffered. While it is true that some plaintiffs receive less than the full amount they deserve and others receive a windfall in damages for injuries not caused by the defendant's tortious conduct, at least the award of partial damages in each case under the proportional liability rule charges the defendant with the full amount of the damages that she has caused and would have had to pay if causation had been proved with certainty.²⁷

This example is worth elaborating with some actual figures. If the harm in each of one hundred situations is valued at \$1,000 and in fifty of these situations it can be proved with certainty that the defendant's tortious conduct caused the harm, the defendant is required to pay \$50,000 in damages. On the other hand, if it can only be proved that the probability of causation in each situation is 50% and each plaintiff is awarded \$500 ($P = .5$, $L = \$1,000$, therefore $P \times L = \$500$) damages would also total \$50,000. In both situations, the defendant pays only for the harm she has caused. The only difference is that in the uncertain situation those injured by her conduct share their damages with those who are not. Neither the plaintiffs nor the defendant can complain. The plaintiffs actually deserving compensation receive at least partial damages, which is preferable to receiving nothing.²⁸ The undeserving plaintiffs clearly cannot complain about receiving a windfall. Finally, the defendant cannot complain because the total payment is equal to the actual harm caused.

As a variation of this example, consider the situation where the probability of causation is 60%. If the defendant is required to compensate each of the injured plaintiffs in full although in 40% of the instances she has not caused the harm, she must pay \$100,000 in damages when she has caused only \$60,000 worth of injury. The defendant is overcharged and 40% of the plaintiffs are overcompensated. Under the proportional liability rule, if the defendant is charged only \$600 ($.60 \times 1,000$) in each situation, rather than \$1,000, she pays damages to the extent of the harm she has caused. While it is true that those who are actually injured by the tortious conduct do not receive their compensation in full and the others receive compensation to which they are not entitled under traditional tort theory, a fairer distribution of the damages is not possible given the uncertainty of causation.²⁹

27. See Delgado, *supra* note 3, at 892-94.

28. See *In re Agent Orange*, 597 F. Supp. 740, 838 (E.D.N.Y. 1984) (discussed *infra* text accompanying notes 101-08). In the settlement opinion, Judge Weinstein proposed the proportionality solution to the causation problem in litigated mass exposure cases. He noted that "[w]hile any plaintiff might feel that his or her recovery denigrated the degree of harm, the alternative of receiving nothing is far worse." *Id.*

29. See Note, *Developments in the Law—Toxic Waste Litigation*, 99 HARV. L. REV. 1458, 1622 (1986). It has been argued that the preponderance of the evidence rule (or more accurately, a "maximum likelihood" rule) minimizes the total cost of errors in a set of cases as opposed to equalizing them under a proportional liability rule. Kaye, *supra* note 3, at 496-508. This argument presumes that error cost minimization is more important than error cost equalization, a proposition that is not self-evident. Furthermore, Kaye concedes in a case of stomach cancers that are work-related:

A proportional liability rule is justified by its deterrence of inefficient behavior and its promotion of a fairer scheme of compensation. Yet the tort system continues to favor an all-or-nothing approach to liability based on proof of actual rather than probable causation. The persistence of this approach stems from misconceptions about the nature of proof that are examined in the next section.³⁰

II. MISCONCEPTIONS AND ABUSES UNDER THE PREPONDERANCE OF THE EVIDENCE STANDARD

A. *Nonuse of Probabilistic Evidence*

In a recent article on judicial proof and the acceptability of verdicts,³¹ Charles Nesson argued that to "accept verdicts as the basis for the imposition of legal sanctions, the public must understand verdicts as statements about litigated events and not about evidence presented at trial."³² Furthermore, in order to project verdicts as statements about litigated events, the criminal system "require[s] jurors to be convinced beyond a reasonable doubt and thus apparently call(s) upon jurors to convict only on the basis of a belief about what actually happened."³³ According to Nesson the legal system will achieve the ends of deterrence and acceptability only if juries believe in the events (or at least the public perceives such belief by a jury³⁴) and not merely in the probability of the events.

In a criminal trial belief is required beyond a reasonable *doubt*. Even in some civil cases the finder must be persuaded of the events by clear and *convincing* evidence. Both of these standards refer to a state of the jury's mind and require belief in the events, not merely in the probability of the events. Proof by a preponderance of the evidence in a civil case refers, however, only to the weight of the evidence required to carry the burden of proof.³⁵ The evidence

In the example here, the "unbiased" nature of the expected value rule is appealing. It avoids overcharging the firm, and the increment in the error rate does not seem extravagant at most values of p_1 and p_2 . Where a single defendant faces the possibility of numerous suits from similarly situated plaintiffs and the probability that this defendant is liable is the same in each of these cases, the expected value rule seems superior to the $p > 1/2$ rule.

Id. at 502 (citation omitted). Kaye proceeds to state that the apparent bias of the preponderance standard ($p > 1/2$ rule) is not a concern "[a]s long as the probabilities are distributed across cases and parties in a systematic way." *Id.* Again, this proposition is not self-evident, nor is it supported in Kaye's article by any specific evidence. In fact, Kaye points out that in cases like *Sindell v. Abbott Laboratories*, 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132, *cert. denied*, 449 U.S. 912 (1980), there is a bias under the maximum likelihood rule that justifies use of a proportional liability rule. *Id.* at 509.

30. It has been argued also that proportional liability would likely result in increased litigation and consequently higher administrative costs and that therefore, in the context of most torts, proportional liability is undesirable. Shavell, *supra* note 3, at 604, 606-09. Yet higher administrative costs may be necessary to promote greater justice.

31. Nesson, *The Evidence or the Event? On Judicial Proof and the Acceptability of Verdicts*, 98 HARV. L. REV. 1357 (1985).

32. *Id.* at 1357.

33. *Id.* at 1364.

34. *Id.* at 1360-63.

35. See MCCORMICK ON EVIDENCE, *supra* note 2, at § 339; Ball, *supra* note 16, at 808.

must be preponderant in the sense of weighing more heavily in favor of one side than another. The standard of proof does not refer to the factfinder's state of mind. It refers to a quality of the evidence, its weight, to determine which version of the events is more likely to be true, and it suggests, contrary to Nesson's position,³⁶ that the factfinder does not have to believe that the events are true.³⁷ If the evidence preponderates only slightly in favor of one of the parties, the factfinder may believe in the probability of the events but not be convinced of their truth. In such a case the factfinder is permitted under the present system to find the events true, and the party wins on a likelihood despite the failure in belief.

Nesson's position makes sense in the case of criminal trials. Although events are rarely certain in a trial, it is possible to believe they are true with only a minimal amount of uncertainty and to convict a person on the basis of that belief. One's sense of justice is not offended. If an accused person were convicted not on the basis of a belief in guilt but merely on the basis of a belief in the probability of guilt, one's sense of justice would be offended. In the case of most civil trials the situation is different. Plaintiff and defendant stand more on a par with each other than an accused person stands against the state. The idea of letting twenty guilty people go free to protect one innocent person³⁸ does not pertain in civil trials. To obtain a judgment in a civil trial the plaintiff needs to show merely that defendant's negligent act *probably* caused his harm, not that it *did* cause his harm in the belief of the factfinder.

Some courts appear to disagree with this proposition by refusing to accept probabilistic evidence to establish causation in certain cases. They seem to adopt Nesson's position that belief in the event, not in the probability of the event, satisfies the burden of proof. These cases have denigrated the role of probabilistic evidence in civil trials, but a closer examination of these cases reveals an alternative explanation that is consistent with the continued use of probabilistic evidence in civil trials.

In *Smith v. Rapid Transit*³⁹ plaintiff was harmed by a negligently driven bus on Main Street. She could not identify the bus beyond describing it as a "great big, long, wide affair."⁴⁰ The department of public utilities had issued a certificate of public convenience or necessity to defendant bus company for a route including the place where the accident occurred. The only other bus line in operation at that time did not have a route on Main Street. The jury in this case possibly could have believed that the probability of causation was greater

36. Nesson advocates projecting civil verdicts as well as criminal verdicts as statements about events. Nesson, *supra* note 31, at 1363.

37. See Gold, *Causation in Toxic Torts: Burdens of Proof, Standards of Persuasion, and Statistical Evidence*, 96 YALE L.J. 376, 381 (1986); see also Ball, *supra* note 16, at 818-29 (indicating some of the difficulties with this view). The controversy over whether juries decide or should decide on the basis of "belief in the truth" is discussed in Rosenberg, *supra* note 3, at 872 n.92.

38. "I should indeed prefer twenty guilty men to escape death . . . than one innocent to be condemned unjustly." Sir John Fortescue, *De Laudibus Legum Angliae*, ch. 27 (ed. and trans. S.B. Chrimes 1942).

39. 317 Mass. 469, 58 N.E.2d 754 (1945).

40. *Id.*

than 50%; however, the court directed a verdict for defendant and on appeal the Massachusetts Supreme Court affirmed, concluding that "[t]he ownership of the bus was a matter of conjecture,"⁴¹ because someone other than defendant could have operated the bus. The court quoted Judge Lummus in *Sargent v. Massachusetts Accident Co.*⁴² that it is:

not enough that mathematically the chances somewhat favor a proposition to be proved; for example, the fact that colored automobiles made in the current year outnumber black ones would not warrant a finding that an undescribed automobile of the current year is colored and not black, nor would the fact that only a minority of men die of cancer warrant a finding that a particular man did not die of cancer. . . . [A] proposition is proved by a preponderance of the evidence if it is made to appear more likely or probable in the sense that actual belief in its truth, derived from the evidence, exists in the mind or minds of the tribunal notwithstanding any doubts that may still linger there.

The evidence in *Smith* was probabilistic inasmuch as it presented a fact (defendant bus company's sole franchise) that would have given the jury a basis on which to calculate the mathematical chances that the fact to be proved (defendant's causation of the injury) was true. Even though the mathematical chances might have been found by a jury to be more likely than not, the court refused to allow an inference of causation, because it concluded that the evidence was insufficient to generate a belief in the fact itself.⁴³

41. *Id.* at 470, 58 N.E.2d at 755.

42. 307 Mass. 246, 250, 29 N.E.2d 825, 827 (1940) (quoted in *Smith*, 317 Mass. at 470, 58 N.E.2d at 755).

43. See *De Pass v. United States*, 721 F.2d 203, 206-10 (7th Cir. 1983) (Posner, J., dissenting) (discussing probabilistic nature of all evidence and contending that plaintiff should be allowed to recover based on probabilistic evidence); *People v. Collins*, 68 Cal. 2d 319, 325-26, 438 P.2d 33, 36-37, 66 Cal. Rptr. 497, 500-01 (1968) (reversing conviction in which prosecution relied on mathematics professor to allege that defendant and alleged accomplice fit a description whose chance of being duplicated was one in twelve million), discussed in MCCORMICK ON EVIDENCE, *supra* note 2, § 210, and Tribe, *supra* note 16, at 1334-38, 1342 n.40, 1350, 1355; Birmingham and Dunham, *An Evidentiary Value Reading of Naked Statistical Proofs*, 31 ST. LOUIS U.L.J. 797 (1987); Nesson, *supra* note 31, at 1378-82 (discussing *Smith* and unacceptability of verdicts based on probabilities).

It has been argued that *Smith* is an application of the "strong version" of the preponderance of the evidence standard, requiring some particularistic proof of the causal connection. See Rosenberg, *supra* note 3, at 857 ("some 'particularistic' proof of the causal connection is required"); Tribe, *supra* note 16, at 1341 n.37 (discussing *Smith* and noting that the holding in *Smith* is "entirely sensible if understood . . . as insisting on the presentation of some non-statistical and 'individualized' proof of identity"). Particularistic proof, however, is probabilistic, as illustrated in the following passage by Saks and Kidd, *Human Information Processing and Adjudication: Trial by Heuristics*, 15 LAW & SOC'Y REV. 123, 153 (1980-81):

Similarly mistaken are distinctions between certain kinds of identifications. Descriptions which lead to a probability of correct classification of a person (e.g., "a completely bald man with a wooden left leg, wearing a black patch over his right eye and bearing a six-inch scar under his left, who flees from the scene of the crime in a charterhouse Thunderbird with two dented fenders") are treated as different from the "particularistic" type where a witness says, "Yes, that's the person." Some have argued that evidence that the above description fits only one person in 64 million ought not to be used in the trial of a person fitting that description, because it merely specifies the class to which he belongs and its size; it does not identify him. The latter identification would be more welcome, because it singles out a unique individual. The identifying witness may be confident that the identification is correct, but the fact finder ought to appreciate the inherently probabilistic nature of

Probabilistic evidence was rejected in *Smith* but it has been permitted in other cases. In *Reynolds v. Texas & Pacific Railway Co.*⁴⁴ plaintiff, a corpulent woman weighing two hundred fifty pounds, fell down steps that defendant railway had negligently left unlighted. Although she may have made a misstep, the court concluded that

where the negligence of the defendant greatly multiplies the chances of accident to the plaintiff, and is of a character naturally leading to its occurrence, the mere possibility that it might have happened without the negligence is not sufficient to break the chain of cause and effect between the negligence and the injury.⁴⁵

The factor that distinguishes *Smith* from *Reynolds* may be the high degree of probability of causation in the latter that may have been sufficient to convince a jury that causation actually existed. Another case suggests, however, that this is not the distinguishing factor. In *Cooper v. Sisters of Charity* a sixteen year old boy was struck by a truck while riding a bicycle.⁴⁶ The boy died after an emergency room doctor diagnosed and treated him.⁴⁷ The Ohio Supreme Court held that probabilistic evidence was admissible in court to prove causation of the boy's death by the negligence of the doctor, and liability could be imposed if the probability of causation was greater than 50%.⁴⁸ The thrust of the court's dis-

perception, storage, recall, and identification. Apparently, fact finders (like legal commentators) fail to appreciate this point. They act as though the eyewitness identification is highly accurate, when in reality it may be far more likely than once in 64 million to be in error. Indeed, the probability of correct eyewitness identification has been found to be far lower than commonly assumed.

Gold questions Rosenberg's argument, Rosenberg, *supra* note 3, at 870, that all evidence, even "particularistic," is probabilistic. Gold, *supra* note 37, at 384 n.42. Rosenberg states:

"Particularistic" evidence, however, is in fact no less probabilistic than is the statistical evidence that courts purport to shun. All knowledge of past as well as future events is probabilistic. Inevitably it rests on intuitive or more rigorously acquired impressions of the frequency with which similar events have occurred in like circumstances. "Particularistic" evidence offers nothing more than a basis for conclusions about a perceived balance of probabilities.

Rosenberg, *supra* note 37, at 870. Gold states:

When we see someone slip on ice and fall, we infer that the ice caused the fall partly because we know that people fall much more frequently when walking on ice than when walking on dry sidewalks. Yet our high belief probability about the cause of *this particular pedestrian's* fall depends crucially on individual observation as well. The fact that we see the ice overwhelms any inference we might have drawn from a table listing the relative frequencies of causes of falls. The power of particularistic proof to generate belief probabilities regardless of known fact probabilities requires us to treat particularistic evidence differently from group-based evidence, despite Rosenberg's argument.

Gold, *supra* note 37, at 384 n.42.

In response to Gold's argument one may argue that if statistics were available on the percentage of falls caused by ice in similar situations, we would be drawing an inference from this information to determine the cause of this particular pedestrian's fall. Although we do not have these statistics given in this case, they exist implicitly from the factfinder's experience.

44. 37 La. Ann. 694 (1885), cited in PROSSER & KEETON, *supra* note 1, § 41 at 270 n.54.

45. *Id.* at 698.

46. 27 Ohio St. 2d 242, 242-43, 272 N.E.2d 97, 98-99 (1971).

47. *Id.* at 243-44, 272 N.E.2d at 101-02.

48. See *id.* at 253-54, 272 N.E.2d at 103. In *Cooper* it was found that a greater than 50% probability of causation did not exist. One of the experts at trial testified that "while there is practically a 100% mortality rate without surgery for patients with similar injuries as decedent's, 'there certainly is a chance and I can't say exactly what—maybe some place around 50%—that [the boy]

cussion was that *but for* causation may be established when the chances of causation are merely greater than 50%. The court in *Cooper* permitted the introduction of probabilistic evidence for the purpose of proving causation even though the probability of causation may have been no higher than in *Smith* in which the court excluded such evidence.⁴⁹

A careful reading of *Smith* in contrast to *Cooper* reveals an important distinguishing factor that justifies the difference in treatment of probabilistic evidence between each case. Although both cases contain uncertain evidence of causation, in *Smith* the negligence of the defendant is also in doubt. In *Cooper* the negligence of the defendant is undisputed. *Smith* involves a potentially innocent defendant in a case of wrongdoing harm; *Cooper* involves a wrongdoing defendant who is potentially innocent of causing harm. It is more offensive to attribute to a potentially innocent defendant a wrongdoing harm that he may not have caused than to attribute to a wrongdoing defendant a harm he may not have caused.⁵⁰ *Smith* and *Cooper* suggest that while probabilistic evidence is not acceptable in the former type of case, it is acceptable to prove causation in civil cases where the negligence of the defendant is established.⁵¹

would survive with surgery.'” *Id.* at 247, 272 N.E.2d at 101. From this statement the court concluded:

Dr. DeJong’s opinion that, with surgical intervention, decedent’s expectation of survival was “Maybe . . . around 50%,” in our judgment does not provide a basis from which probability can reasonably be inferred. The use of the words, “maybe” and “around,” does not connote that there is probability; those words, in the context used, could mean either more than 50%, or less than 50%. Probable is more than 50% of actual.

Id. at 253, 272 N.E.2d at 104. The specific holding of *Cooper* was:

In an action for wrongful death, where medical malpractice is alleged as the proximate cause of death, and plaintiff’s evidence indicates that a failure to diagnose the injury prevented the patient from an opportunity to be operated on, which failure eliminated any chance of the patient’s survival, the issue of proximate cause can be submitted to a jury only if there is sufficient evidence showing that with proper diagnosis, treatment and surgery the patient probably would have survived.

Id. at 253-54, 272 N.E.2d at 104; accord *Gooding v. University Hosp. Bldg., Inc.*, 445 So. 2d 1015, 1020 (Fla. 1984) (stating that *Cooper* reflects the majority rule). For a different result under similar facts, see *Thomas v. Corso*, 265 Md. 84, 288 A.2d 379 (1972).

49. In *Cooper* the court permitted the introduction of probabilistic evidence (the doctor’s expert testimony) to prove causation. *Cooper*, 27 Ohio St. 2d at 252-53, 272 N.E.2d at 104. Particularistic proof, as such, was not necessary. The use of medical opinions in cases of this sort cast doubt on the “strong version” interpretation of the preponderance of the evidence standard. See *supra* note 43; Note, *supra* note 29, at 1619 (“Because no particularistic evidence exists in most toxic waste cases, the strong version of the preponderance rule would bar most toxic waste suits.”).

50. But see J. THOMSON, *supra* note 23, at 228-29 (suggesting that one ought not be moved by these differences).

51. Prosser indicates that when the defendant has violated a duty, although the evidence is not exact, the courts “allow a certain liberality to the jury in drawing its conclusion.” PROSSER & KEETON, *supra* note 1, § 41 at 270. In the area of *res ipsa loquitur*, a converse proposition exists: when the defendant is shown to have had control over the object that caused the harm (i.e., the defendant caused the harm) but the nature of defendant’s act is unknown, the element of negligence may be proved with probabilistic evidence.

Nesson contrasts his position favoring an all-or-nothing award with the disfavored position of proportionate damages in a case such as *Smith*. He correctly points out that the proportionate damage rule in a case such as *Smith* does not promote care and safety. Yet as between the case of certain negligence/uncertain causation and the case of uncertain negligence/uncertain causation (e.g. *Smith*), he recognizes that in the former case the rule of proportionate damages and its behavioral message about wrongful activity “seem[s] sensible enough.” Nesson, *supra* note 31, at 1382-85. Nesson does not explore further the value of proportionate damages in the former case.

B. *Inconsistent Use of Probabilistic Evidence*

Although *Cooper* supports the admissibility of probabilistic evidence, it also flags a problem inherent in the legal system's use of that evidence. In *Reynolds* the chance of a misstep by plaintiff in her fall down the railway's steps was so slim that the factfinder could believe that there was actual causation. In contrast, *Cooper* requires the factfinder only to believe in the probability of causation. The problem is that belief in the *probability* of causation is used to prove too much: it is used to prove the *fact* of causation.

Unfortunately, the preponderance of the evidence standard traditionally has been an all-or-nothing approach in which the sufficiency of the evidence establishes the fact of causation, not the probability of causation. This approach fails to consider the range of doubt that may exist in a factfinder's mind between belief in the fact of causation and belief in the fact of no causation. If the weight of the evidence is on the side of one of the parties, that party wins full relief even though the factfinder may not completely believe the fact that the evidence is designed to show. This approach is mistaken, for reasons of efficiency and corrective justice described in section one above. The evidence that only proves a probability should generate remedial relief in accordance with this probability. Because *Cooper* would allow evidence to show a 51% probability of causation, it should allow only a 51% recovery for the harm suffered.

A proportional liability rule would eliminate inconsistent uses of probabilistic evidence by the courts.⁵² This inconsistency can be illustrated by a comparison of the following two examples. Suppose that five pranksters each negligently threw a rock in the direction of a road and a passerby was hurt by one of the rocks but the rock could not be traced to any one of the pranksters. A technical application of the preponderance of the evidence standard for proof of *but for* causation for any one of the pranksters would result in no liability. Fortunately under the present system, by treating all the negligent actors together as one, proof of *but for* causation is established by a preponderance of the evidence, and each prankster would be held liable for 20% of the harm caused.⁵³ But suppose that one prankster negligently threw a rock in the direction of the road as four other rocks tumbled from a cliff and the rock that hit the passerby could not be distinguished. In such a case no ground exists for establishing causation by a preponderance of the evidence, and under our present legal rules the prankster would be absolved from liability.

The act of the lone prankster in the second case is no different from the act of any one of the pranksters in the first case. Liability for twenty percent of the

52. Why probable causation results in full liability in some cases and only partial liability in others has never been fully explained. See Wright, *The Efficiency Theory of Causation and Responsibility: Unscientific Formalism and False Semantics*, 63 CHI.-KENT L. REV. 553, 576 (1987).

53. See *Sindell v. Abbott Laboratories*, 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132, cert. denied, 449 U.S. 912 (1980) (harm caused by drug manufactured by one of several defendants); see also *Summers v. Tice*, 33 Cal. 2d 80, 199 P.2d 1 (1948) (similar facts but finding joint and several liability). These cases address the notion of "alternative liability" (causation by one defendant or another), not joint causation (causation by one defendant with another) or contributory/comparative negligence (causation by defendant with plaintiff). See *infra* text accompanying notes 136-46 for further discussion.

harm caused should be imposed on the lone prankster as well. By so tainting himself with negligence he has assumed the risk of liability for harm that may have resulted (even if it did not necessarily result) from his actions.⁵⁴ He should suffer the consequences of the probability that his wrongful act has harmed the plaintiff. A proportional liability rule would impose a twenty percent liability on the lone prankster.

C. *Substantial Possibility Test*

In some cases the courts have recognized a need to give relief to plaintiffs who can prove a probability of causation, even though that probability is less than fifty percent. The need is legitimate but the means used by these courts have been misdirected. These courts have abandoned the preponderance of the evidence standard in favor of what has been called the substantial possibility test.⁵⁵ The remedy, however, once again does not accord with the facts established by the evidence. Under the substantial possibility test the plaintiff is awarded full damages instead of a proportional recovery.

The substantial possibility test was first articulated in *Hicks v. United States*,⁵⁶ a case in which plaintiff's decedent died eight hours after a doctor negligently diagnosed a massive intestinal hemorrhage as stomach flu.⁵⁷ The trial court found that plaintiff had failed to establish *but for* causation between the doctor's negligence and the death. The United States Court of Appeals for the Fourth Circuit reversed, noting:

When a defendant's negligent action or inaction has effectively terminated a person's chance of survival, it does not lie in the defendant's mouth to raise conjectures as to the measure of the chances that he has put beyond the possibility of realization. If there was any *substantial possibility* of survival and the defendant has destroyed it, he is

54. This risk of liability may be assumed not only for a negligent act. When a person decides to engage in an ultrahazardous activity, he ordinarily takes the risk of all harm that ensues, even if he can prove that he has exercised all due care under the circumstances. Under product liability law a manufacturer assumes the risk that her product may have a defect that causes an injury despite the exercise of due care. Here again the risk of liability for harm that *only may have resulted* from the defect may be assumed.

55. See RESTATEMENT (SECOND) OF TORTS §§ 431-33 (1965); J. FLEMING, *THE LAW OF TORTS* 182-84 (5th ed. 1977); PROSSER AND KEETON, *supra* note 1, at 272; Note, *Increased Risk of Harm: A New Standard for Sufficiency of Evidence of Causation in Medical Malpractice Cases*, 65 B.U.L. REV. 275 (1985); Note, *Proving Causation in "Loss of Chance" Cases: A Proportional Approach*, 34 CATH. U.L. REV. 747 (1985).

The "substantial possibility" test differs from the "substantial factor" test, which has nothing to do with uncertainty. The "substantial factor" test applies in situations in which two or more causes coming together produce a harm, and either one of them alone would have produced the harm. The classic example is the defendant who sets a fire that merges with another fire to burn down the plaintiff's house. See *Anderson v. Minneapolis, St. P. & S. Ste. Ry.*, 146 Minn. 430, 179 N.W. 45 (1920); *Kingston v. Chicago & N.W. Ry.*, 191 Wis. 610, 211 N.W. 913 (1927). As explained in PROSSER & KEETON, *supra* note 1, at 267:

In such cases it is quite clear that each cause has in fact played so important a part in producing the result that responsibility should be imposed upon it; and it is equally clear that neither can be absolved from that responsibility upon the ground that the identical harm would have occurred without it, or there would be no liability at all.

56. 368 F.2d 626 (4th Cir. 1966).

57. *Id.* at 629.

answerable.⁵⁸

The *Hicks* decision provides little guidance as to the meaning of "substantial possibility."⁵⁹ Some courts have treated substantial possibility as meaning "more likely than not." The plaintiff's injury must have resulted "more likely" or "more probably" from defendant's action rather than from any other cause.⁶⁰ Under this interpretation the standard is no different than the greater than 50% probability standard.

Other courts have permitted recovery under the *Hicks* standard when a plaintiff establishes less than a 50% probability of causation. For example, in *Kallenberg v. Beth Israel Hosp.*,⁶¹ doctors prescribed but negligently failed to administer the drug Naturetin to a patient suffering her third hemorrhage from a cerebral aneurysm. Naturetin would have reduced her blood pressure and was considered necessary to prepare the patient for surgery.⁶² According to expert testimony, the failure to give Naturetin was a "producing, contributing factor" to her death. If she had been properly treated, she would have had a "20, say 30, maybe 40% chance of survival" with surgery and surgery could have been performed if proper drugs had been administered.⁶³ The court allowed the evidence to go to the jury, which found that the failure to administer Naturetin was the cause of death.⁶⁴

In some cases, the substantial possibility test has been confused with the language of substantial factor.⁶⁵ In *Hamil v. Bashline*,⁶⁶ the hospital was negligent in failing to locate an electrocardiogram machine, requiring the patient to visit a private physician. The patient died of a heart attack in the doctor's private office. At trial, one expert testified that the patient would have had a 75%

58. *Id.* at 632 (emphasis added).

59. The expert testimony in *Hicks* suggested that the patient would have survived with surgery. *Hicks*, 368 F.2d at 632. Numerous commentators have pointed out that the testimony in *Hicks*, if believed by the jury, would have satisfied the preponderance test. See, e.g., King, *Causation, Valuation, and Chance in Personal Injury Torts Involving Preexisting Conditions and Future Consequences*, 90 YALE L.J. 1353, 1368-69 n.53 (1981); Wolfstone and Wolfstone, *Recovery of Damages for the Loss of a Chance*, 28 MED. TRIAL TECH. Q. 121, 133 (1982); see also Gooding v. University Hosp. Bldg., Inc., 445 So. 2d 1015, 1019 (Fla. 1984).

60. *E.g.*, Fitzgerald v. Manning, 679 F.2d 341, 356 (4th Cir. 1982).

61. 45 A.D.2d 177, 357 N.Y.S.2d 508 (1974), *aff'd*, 37 N.Y.2d 719, 337 N.E.2d 128, 374 N.Y.S.2d 615 (1975).

62. *Id.* at 178, 357 N.Y.S.2d at 509.

63. *Id.*, 357 N.Y.S.2d at 510.

64. *Id.* The dissent noted that the patient's condition was terminal and therefore the doctors' negligence was not the cause of death. *Id.* at 181, 357 N.Y.S.2d at 512. See also *Waffen*, 799 F.2d at 911 (under Maryland law, "the chance of survival need not have been fifty-one percent or more before it was reduced" for the plaintiff to have a cause of action); *Jeanes v. Milner*, 428 F.2d 598, 609 (8th Cir. 1970) (court reversed dismissal of cause of action, disagreeing with trial court's conclusion that the loss of an 11% chance of survival provided an insufficient basis for the jury to find *but for* causation); *Roberson v. Counselman*, 235 Kan. 1006, 1021, 686 P.2d 149, 160 (1984) (substantial possibility question for jury where plaintiffs estimated chance of survival at 40%); *Thomas v. Corso*, 265 Md. 84, 288 A.2d 379 (1972). But see *Alfonso v. Lund*, 783 F.2d 958 (10th Cir. 1986), discussed critically in Note, *Alfonso v. Lund: Loss of Chance Rejected as a Basis for Recovery in Medical Malpractice*, 12 OKLA. CITY U. L. REV. 187 (1987).

65. See PROSSER & KEETON, *supra* note 1, § 41.

66. 481 Pa. 256, 392 A.2d 1280 (1978).

chance of survival if proper treatment had been administered at the hospital.⁶⁷ The Pennsylvania Supreme Court held that evidence of causation was sufficient when (1) "a plaintiff has introduced evidence that a defendant's negligent act or omission increased the risk of harm," and (2) the jury determines that the "increased risk was a substantial factor in producing the harm."⁶⁸

In *Herskovits v. Group Health Cooperative of Puget Sound*,⁶⁹ defendant negligently failed to diagnose a patient's lung cancer. A year later, the condition was diagnosed by another physician. Expert testimony indicated that the patient would have had a 39% chance of survival had the lung cancer been timely diagnosed, but that the delayed diagnosis reduced his chances of survival to 25%.⁷⁰ The court applied the *Hamil* standard and allowed the case to go to the jury on the issue of causation to determine whether the increased risk was "a substantial factor in bringing about the resultant harm."⁷¹ If the jury found causation, full damages would be awarded for the harm caused by premature death.⁷²

Regardless of the terminology, the use of the substantial possibility test demonstrates the perception in some courts of the injustice in refusing relief when the probability of causation is greater than 0% but less than 50%. These courts have decided that 50% need not be the cut-off point for liability when a defendant's negligence has deprived the decedent of at least a "significant" chance to survive. They allow the jury to consider evidence that shows less than a 50% chance that defendant's negligence caused decedent's harm.

The problem with the substantial possibility test is not in the inclination of the courts to ascribe liability in situations when the probability of causation is less than 50%; it is in their ascribing *full* liability in such situations. By failing to distinguish between what is proved and how it is to be proved, the courts have failed to examine the possibility of changing the remedial aspects of their cases.⁷³ They assume that the fact of causation is the "what" to be proved and is not in question for them; thus, they only discuss "how" the fact of causation is to be proved. Because justice requires relief, their conclusion is to alter the standard of proof to provide relief. The result is full liability for less than a 50% chance of causation, and this result is both inefficient and unfair.⁷⁴ If the courts were to adopt a proportional liability rule, they would give relief when justice requires, but only to the extent that justice requires. The proportional liability approach would examine the problem from the perspective of *what* is to be

67. *Id.* at 263, 392 A.2d at 1283.

68. *Id.* at 273, 392 A.2d at 1288.

69. 99 Wash. 2d 609, 664 P.2d 474 (1983).

70. *Id.* at 614, 664 P.2d at 476-77.

71. *Id.* at 617, 664 P.2d at 478.

72. See also the cases cited in note 35.11 of PROSSER & KEETON, *supra* note 1, § 41 (1988 Supp.). The substantial possibility test was not applied by the Washington court, however, in a case of legal malpractice. See *Daugert v. Pappas*, 104 Wash. 2d 254, 704 P.2d 600 (1985).

73. In *Herskovits* Justice Pearson's concurring opinion, joined by three other justices, criticized this all-or-nothing approach and advocated an award of damages proportional to the probability of causation. *Herskovits*, 99 Wash. 2d at 634, 664 P.2d at 487 (Pearson, J., concurring).

74. See *supra* Section One.

proved.⁷⁵

Once the discussion moves from the problem of proving the fact of causation with probabilistic evidence to the problem of proving the probability of the fact of causation, there is no inherent conflict between what is to be proved and how it is to be proved. The preponderance of the evidence standard, as well as the substantial possibility test, are unnecessary to set minimum threshold levels of evidence for proof of the fact. Rather, the evidence is meshed with the result in the case. Following a proportional liability rule would permit (1) the consideration of liability in the case of probabilities less than 50%, and (2) the adjustment of the damage remedy to accord with the probability that is proved. In the same way that the fact of causation generates full liability for the harm caused, the probability of the fact of causation, whatever that probability may be, would generate partial liability for the expectation of harm caused. It is no wonder that in one area of tort law the first steps toward adoption of a proportional liability rule have already been taken.

III. FIRST STEPS TOWARD A PROPORTIONAL LIABILITY RULE

A. *California Cases*

In *Ybarra v. Spangard*⁷⁶ plaintiff suffered paralysis and atrophy of the muscles around his shoulder following an operation involving two physicians, an anesthetist, and a special nurse.⁷⁷ Although plaintiff could not show that any one defendant was responsible for the injury he suffered, the court reversed judgments of nonsuit as to all defendants.⁷⁸ The court invoked the doctrine of *res ipsa loquitur* to allow the jury to find negligence and concluded:

We merely hold that where a plaintiff receives unusual injuries while unconscious and in the course of medical treatment, all those defendants who had any control over his body or the instrumentalities which might have caused the injuries may properly be called upon to meet the inference of negligence by giving an explanation of their conduct.⁷⁹

What was unusual in this case was the insufficiency of the evidence to prove that

75. Charles Nesson recognized the failure on the part of courts to distinguish the "what" from the "how." He stated:

Casting these issues as problems of *proof* serves only to obscure them. The cases [that deal with proportional liability] concern changing the elements of the substantive legal rule; the problem of proof is simply that of generating acceptable conclusions about those elements.

Although the traditional logic of proof rules can inhibit judicial efforts to find liability when the evidence is merely statistical, we should recognize that courts can nevertheless find liability and generate new substantive law by redefining the elements of the legal rule and the sanction so they reflect the statistical nature of the evidence. The current reluctance of the judicial system to impose liability in such situations cannot be overcome by changing the grammar of proof, because this grammar is essential to achieving the projection and affirmation of the law's behavioral norms. Instead, reform must come, and should be welcomed, by bringing about changes in the factual elements that must be proved.

Nesson, *supra* note 31, at 1384-85 (footnotes omitted).

76. 25 Cal. 2d 486, 154 P.2d 687 (1944).

77. 25 Cal. 2d at 488, 154 P.2d at 688.

78. 25 Cal. 2d at 494, 154 P.2d at 691.

79. *Id.*

any one of the defendants had caused the harm. Yet the court used a theory of interpersonal responsibility to hold each of the defendants responsible for the harm caused.

Four years later the court extended the idea of interpersonal liability from a group of medical people working together to a pair of hunters who were hunting together. In *Summers v. Tice*⁸⁰ plaintiff was struck in his right eye and face by birdshot discharged by the shotgun of one of two hunters who were negligent.⁸¹ It was uncertain which of the two defendants had fired the injuring shot, but the court found that defendants were jointly and severally liable and that they should work out for themselves any apportionment of the damages.⁸² Although the general rule is that two or more tortfeasors acting independently of each other are not joint tortfeasors and the plaintiff must establish the portion of damage caused by each, the court found in this case that "the innocent wronged party should be not deprived of his right to redress" when the matter of apportionment is incapable of proof.⁸³

The rule of these two California cases was extended in *Sindell v. Abbott Laboratories*⁸⁴ to a "market share" theory of liability. The idea of interpersonal liability was discarded, and each defendant who was negligent was charged with an amount of the harm proportionate to the probability that it caused the harm among the other defendants.⁸⁵ In *Sindell* the plaintiff developed cancer as a result of a drug, diethylstilbesterol (DES), administered during pregnancy.⁸⁶ The question before the court was whether liability could be ascribed to the major companies that produced most of the drug marketed when it was not more probable than not that any one company produced the drug that caused the cancer in plaintiff.⁸⁷ The court found that not only could the manufacturers be liable, but "each manufacturer's liability for an injury would be approxi-

80. 33 Cal. 2d 80, 199 P.2d 1 (1948).

81. 33 Cal. 2d at 82, 199 P.2d at 1-2.

82. 33 Cal. 2d at 88, 199 P.2d at 5.

83. *Id.* The *Summers* rule has been embodied in the Second Restatement of Torts. 2 RESTATEMENT (SECOND) OF TORTS § 443B(3) (1965) provides as follows:

Where the conduct of two or more actors is tortious, and it has been proved that harm has been caused to plaintiff by only one of them, but there is uncertainty as to which one has caused it, the burden is upon each such actor to prove that he has not caused the harm.

In *Burton v. Waller*, 502 F.2d 1261, 1282-84 (5th Cir. 1974), *cert. denied*, 420 U.S. 964 (1975), the conduct of some of the actors was not negligent and the court refused to follow two Mississippi cases similar to *Summers*.

84. 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132, *cert. denied*, 449 U.S. 912 (1980). For another case adopting the market share approach, see *Martin v. Abbott Laboratories*, 102 Wash. 2d 581, 689 P.2d 368 (1984). See also *Collins v. Eli Lilly, Co.*, 116 Wis. 2d 166, 342 N.W.2d 37 (court rejects market share liability theory in favor of apportionment of liability through comparative negligence), *cert. denied*, 469 U.S. 826 (1984). See generally Fisher, *Products Liability—An Analysis of Market Share Liability*, 34 VAND. L. REV. 1623 (1981); Robinson, *supra* note 3; Comment, *Refining Market Share Liability: Sindell v. Abbott Laboratories*, 33 STAN. L. REV. 937 (1981); Note, *Sindell v. Abbott Laboratories: A Market Share Approach to DES Causation*, 69 CALIF. L. REV. 1179 (1981); Note, *Market Share Liability: An Answer to the DES Causation Problem*, 94 HARV. L. REV. 668 (1981).

85. The case leaves some question whether it was grounded on negligence or strict liability.

86. 26 Cal. 3d at 594-95, 607 P.2d at 925, 163 Cal. Rptr. at 133.

87. 26 Cal. 3d at 598-99, 607 P.2d at 928, 163 Cal. Rptr. at 136.

mately equivalent to the damages caused by the DES it manufactured."⁸⁸ It was not necessary that the plaintiff prove that a particular manufacturer's conduct more likely than not caused the injury.

Summers and *Sindell* imposed liability in each situation on independent tortfeasors as a group even though proof of causation for any one of the tortfeasors was not possible under the preponderance of the evidence standard. These were not the type of cases in which the law traditionally imposes joint and several liability when two or more tortfeasors combine to produce an injury. These California cases directly raised the issue of uncertainty of the causation itself and solved it by imposing liability on both tortfeasors in *Summers* and on each tortfeasor according to the probability of causation among the defendants in *Sindell*. It is but a small step from the *Sindell* "market share" theory of liability to a comprehensive proportional liability rule that determines a single defendant's damages according to the probability that his wrong has caused the harm. If a defendant manufacturer in a *Sindell* situation may be held liable for its market share proportion of the plaintiff's damages, then there is no reason why any tortfeasor should not be held liable for her share of damages to a plaintiff based on the probability that her conduct was the cause of the harm.⁸⁹

B. *Delgado and Rosenberg*

Richard Delgado and David Rosenberg have proposed a proportional damages approach in mass exposure cases.⁹⁰ Both note the inequities of the all-or-nothing rule. Delgado proposes that plaintiffs in mass exposure cases should share damages with other members of the class who have suffered damages from

88. 26 Cal. 3d at 613, 607 P.2d at 938, 163 Cal. Rptr. at 146. The court in *Sindell* required that the plaintiff sue a defendant group that had manufactured a substantial share of the harmful drug. It then allocated damages from each defendant according to its share of the total amount of the drug manufactured by the defendants. A more precise approximation of the expected damages caused by the drug manufactured by each defendant would have been achieved by allocating damages from each defendant according to its share of the total amount of the drug manufactured by defendants and nondefendants alike. The difference between these two formulations, however, becomes insignificant as the size of the defendant group approaches the whole group of manufacturers in the market. See J. THOMSON, *supra* note 23, at 211-15.

89. Richard Wright in Wright, *supra* note 1, at 1817, distinguishes *Summers* from a case of reduced chance of avoiding injury by the fact that in *Summers* "we know that one of the defendants is being held liable for an injury to which he did not contribute." This distinction is artificial. In the case of reduced chance of avoiding injury, either the defendant or the plaintiff is being held liable for an injury for which he is not responsible. If the defendant's wrongdoing actually caused the injury then the plaintiff should not have to bear any of the harm (i.e., the plaintiff should be recompensed in damages), and if there is no causation, defendant should not have to pay damages.

90. Delgado, *supra* note 3; Rosenberg, *supra* note 3; see also Landes & Posner, *supra* note 3; Rizzo & Arnold, *supra* note 3; Robinson, *supra* note 3, at 759-69; Robinson, *supra* note 8.

Mass exposure torts include those involving asbestos, Agent Orange, Agent White, Three-Mile Island, atomic bomb testing, Benedictin, swine flu vaccination, ingestion of aspirin by children with influenza or chicken pox, dioxin, DES, PCB, PBB, and IUD. See Rosenberg, *supra* note 3, at 853; Novick, *supra* note 3, at 540-41. W. LANDES & R. POSNER, *supra* note 4, at 242, 260-69, present the case of a nuclear reactor that wrongfully emits radiation and raises the number of cancers in the area from 100 to 110. It is not known which of the 110 cancers have been caused by the radiation. Landes and Posner examine various methods for dealing with this problem, including proportional liability whereby each cancer victim is given 9% ((110-100)/110) of his damages. They comment, however, that this "is an approach so much at variance with traditional tort law thinking that it could not be adopted without a profound revolution in that thinking." *Id.* at 265.

nontortious causes in exchange for a relaxed burden of proof.⁹¹ He would shift the burden of proof to the defendant to prove noncausation with respect to each plaintiff's injury. To obtain relaxation of the burden of proof, the plaintiff would have to show: (1) injury, (2) that the injury is one that could have resulted from either natural or human causes, acting separately and without synergy, (3) that it is impossible to determine the cause of the injury, (4) that the defendant is the only possible human cause, and (5) that other factors are stable so that the increased number of victims can be accurately calculated.⁹²

Rosenberg's theory is similar. He suggests in mass exposure cases the replacement of the preponderance rule by a standard of proportional liability. Under such a standard, courts would impose liability and distribute compensation in proportion to the probability of causation assigned to the excess risk in the exposed population, regardless whether that probability fell above or below the fifty-percent threshold and despite the absence of individualized proof of the causation connection.⁹³

Delgado and Rosenberg have extended the idea of proportional liability to defendants who have caused a risk of harm to masses of plaintiffs. The next step is to extend it to the individual plaintiff whose injury may have been caused (has a probability of having been caused) by an individual defendant. Delgado and Rosenberg hesitate at this point. Delgado believes that the case of medical malpractice in which an improper refusal to perform an operation decreases the chances of survival from 40% to 25% differs from the case in which members, albeit undetermined, of a class have suffered an undisputed tortious harm.⁹⁴ Rosenberg's article explicitly addresses only mass exposure cases. Indeed, he notes:

The preponderance rule may be adequate for the set of sporadic accident cases in which causal indeterminacy arises randomly and always signifies a substantial chance that the defendant in fact harmed no one. But the rule is neither a rational nor a just means of resolving the systematic causal indeterminacy presented by mass exposure cases involving defendants whose tortious conduct has caused or will cause a statistically ascertainable increase in the incidence of a particular

91. Delgado calls this approach a "reverse-Sindell" doctrine. Delgado, *supra* note 3, at 882-83. In *Sindell* the problem was to identify who of several wrongdoers caused harm to known victims of the wrongdoers. In the mass exposure cases the problem is to identify who are the victims of wrongdoing caused by a known wrongdoer. In both cases causation is a probability based on statistics. See Note, *supra* note 29, at 1621, 1634 (defining the problem in the former as one of legal causation and in the latter as one of medical causation); see also Rosenberg, *supra* note 3, at 856.

Delgado, *supra* note 3, at 900-01, suggests the class action as a vehicle through which damages could be awarded to a class of plaintiffs:

The named plaintiff would thus prosecute a representative suit, and would be bound by the rules normally applied in such cases, including a fiduciary relationship to the class members. The plaintiff class, if successful, would recover an amount corresponding to its combined losses attributed to defendant's actions. This amount would be allocated among the members pro rata, after subtracting litigation costs.

92. Delgado, *supra* note 3, at 899-900.

93. Rosenberg, *supra* note 3, at 859.

94. See Delgado, *supra* note 3, at 889 ("But unlike the surgical victim, the persons in our paradigm [a class of 190 members who suffer injury because of one of two factors causing harm] do not know that human causes are responsible, even in part, for their injury; they merely suspect it.").

disease.⁹⁵

Admittedly, there is a factual difference between conduct that has a given probability of having caused harm to a particular individual and conduct that is nearly certain to have caused harm to some one of a number of individuals, but the difference is not legally significant. Although it has been used to distinguish between the proportionality rule in cases such as *Sindell* and the preponderance standard in other cases,⁹⁶ both types of cases have the same objectives of efficiency and corrective justice⁹⁷ that are furthered by the proportionality approach. Indeed the two types of cases are merely different aspects of the same problem as illustrated in the hypothetical case that follows.

Suppose that a doctor uses a certain negligent procedure one hundred times in a given year. Under a nonnegligent procedure, six of her patients would have suffered injury during the course of the year. Under the negligent procedure employed by the doctor, ten patients do suffer an injury, costing each patient \$1,000. Expert testimony can establish that the increased incidence of injury results from the negligent procedure. In this situation, proportional damages are appropriate according to the commentators advocating the proportional approach in mass exposure cases. Harm has actually occurred and damages should be allocated to each of the ten patients in the amount of \$400 ($4/10 \times \$1,000$), because the injuries caused by the negligence cannot be differentiated from those attributable to nonnegligent causes. On the other hand, if the doctor uses the negligent procedure only once instead of a hundred times and the patient is injured, Delgado and Rosenberg do not advocate recovery. There is no certainty that the doctor has caused harm. Yet in this situation there exists the same probability (40%)⁹⁸ that the patient has been injured by the negligence of the doctor. What difference does it make whether the doctor treats one or one hundred patients in a negligent manner? Each patient who has suffered an injury has the same probability of having received it from the negligence of the doctor.

What would happen if, after the first patient is injured and sues but is unable to recover, that patient is again injured and sues? There is then a 64% chance⁹⁹ that at least one of the two negligent acts of the doctor has caused harm to the patient. Should the patient now be allowed to recover? Suppose three more acts of negligence take place accompanied by harm. There is then a 92% chance¹⁰⁰ that one of the five harms has been caused by the doctor's negligence. If we allow the patient to recover damages at this point after having

95. Rosenberg, *supra* note 3, at 858.

96. See Delgado, *supra* note 3, at 904; Rosenberg, *supra* note 3, at 883; Note, *supra* note 29, at 1626.

97. See *supra* Section One.

98. The determination of this probability is based on the fact that the doctor was negligent and that studies indicate that four in ten cases of harm statistically are caused by the negligent procedure.

99. The chance that the doctor's negligence did not cause either of the two harms is $.60 \times .60 = .36$. See Delgado, *supra* note 3, at 895 n.77 (citing C. MCCORMICK, HANDBOOK OF THE LAW OF EVIDENCE 492-93 (E. Cleary 2d ed. 1972)).

100. The chance that the doctor's negligence did not cause any of the five harms is $.60 \times .60 \times .60 \times .60 \times .60 = .0778$.

refused to allow her to recover the first time, the results are inconsistent.¹⁰¹

Furthermore, it is highly unlikely that the proportionality approach will work as well in mass exposure cases, because of the infinite number of variables presented, as it will in individual exposure cases. As Delgado has explained concerning relief in mass exposure cases:

The principal difficulties will arise from the requirements that there be only one possible human cause, and that the population, mode of risk, and other variables be stable enough to permit a statistical calculation of the increased number of injuries above a background level. Such a suit will be impossible if, for example, the population is shifting or highly mobile, or if the background rate of the disease or injury varies greatly. [Such a] suit will also be barred if there is not one but a multitude of potential human defendants, as might be the case in a region that contains several polluters.¹⁰²

An example of the problem of applying the proportionality rule in mass exposure cases is the Agent Orange litigation.¹⁰³ Vietnam veterans and their families brought suit against manufacturers of Agent Orange and other herbicides containing dioxin.¹⁰⁴ In addition to facing an indeterminate defendant problem, plaintiffs were not able to show a direct relation between their injuries and Agent Orange. Consequently, they relied on statistics to show the increased

101. Though Professor Delgado may have recognized this inconsistency, he does nothing to integrate the case of single-victim causal uncertainty in his theory. See Delgado, *supra* note 3, at 895-96 n.77, 905 n.112.

102. *Id.* at 906-07; see Note, *supra* note 29, at 1618, 1623, 1627. After pointing out the many problems with the proportionality model, Delgado suggests the types of situations in which he feels the model might work in practice: "The requirements . . . would be most easily satisfied in connection with immobile or 'captive' populations, such as members of a workforce, inmates of a mental or penal institution, students at a school, or residents of small, isolated communities." Delgado, *supra* note 3, at 907. In other words, Delgado acknowledges that the proportionality rule in mass exposure cases has an extremely narrow application. Compare this conclusion with that of Professor Rosenberg:

In addition, the centralized corporate sources, statistical predictability, massive scale, and relative uniformity of disease risks indicate that mass exposure cases may be amenable to aggregative rather than traditional case-by-case procedures, and thus less costly to adjudicate—on a per-claim basis—than are an equal or greater number of sporadic accident claims. Many victims may simultaneously have come into contact with a toxic substance from a pollution hazard. Even if the victims' exposure to the toxic substance came about through their separate consumption of some product or service, all or at least large and gradable subclasses of those exposed will be similarly situated with regard to their degree of disease risk, their relationship to the firm, and the circumstances surrounding the tortious conduct. This uniformity of conditions enables courts not only to adjudicate a multitude of mass exposure claims efficiently, but also to increase the net compensation that each claimant receives.

Rosenberg, *supra* note 3, at 855 (footnote omitted).

103. *In re Agent Orange Prod. Liab. Litig.*, 603 F. Supp. 239 (E.D.N.Y. 1985); 104 F.R.D. 559 (E.D.N.Y. 1985); 597 F. Supp. 740 (E.D.N.Y. 1984); 580 F. Supp. 1242 (E.D.N.Y. 1984); 580 F. Supp. 690 (E.D.N.Y. 1984), *mandamus denied*, 733 F.2d 10 (2d Cir. 1984), *appeal dismissed*, 745 F.2d 161 (2d Cir. 1984); 506 F. Supp. 762 (E.D.N.Y. 1980), *modified*, 100 F.R.D. 718 (E.D.N.Y. 1983), *mandamus denied*, 725 F.2d 858 (2d Cir.), *cert. denied*, 465 U.S. 1067 (1984); *In re Agent Orange Prod. Liab. Litig.*, 506 F. Supp. 737 (E.D.N.Y. 1979), *rev'd*, 635 F.2d 987 (2d Cir. 1980), *cert. denied*, 454 U.S. 1128 (1981). See generally Sherman, *Agent Orange and the Problem of the Indeterminate Plaintiff*, 52 BROOKLYN L. REV. 369 (1986) (criticizing the theory of proportional liability advanced by Judge Weinstein in the Agent Orange settlement decision).

104. *In re Agent Orange Prod. Liab. Litig.*, 597 F. Supp. 740, 776-77 (E.D.N.Y. 1984).

risk of harm suffered by those exposed to the deadly herbicide.¹⁰⁵ Although the Agent Orange litigation was settled without reaching the indeterminate plaintiff problem, the court discussed the causation problems in the course of approving the settlement. The court recognized that it was impossible to find with certainty that the harm suffered by individual plaintiffs was caused by Agent Orange.¹⁰⁶ Furthermore, although a proportional recovery approach could be used to solve this problem in some mass exposure cases,¹⁰⁷ there were practical problems with using a proportional recovery approach in *Agent Orange*. First, there were wide differences in the degree to which service personnel were exposed to Agent Orange. Some personnel had frequented areas where the herbicide was sprayed, while others had had only indirect contact through shipping or spraying.¹⁰⁸ Furthermore, servicemen were exposed for widely varying periods of time. An application of the proportionality rule under such disparate circumstances would be distorted and thus inequitable.¹⁰⁹

105. *Id.* at 780, 782-85.

106. Judge Weinstein noted:

While it may be possible to prove, through the use of such proof as laboratory tests on animals and epidemiological evidence, that such harm—for example cancer—can be “caused” by a particular substance, it may be impossible to pinpoint which particular person’s cancer would have occurred naturally and which would not have occurred but for exposure to the substance.

Id. at 834.

107. *Id.* at 838.

108. *Id.* at 817-19.

109. See, e.g., *Wojciechowski v. Republic Steel Corp.*, 67 A.D.2d 830, 413 N.Y.S.2d 70 (1979) (class certification inappropriate to determine whether dust from defendant’s plant was the cause-in-fact of plaintiffs’ damages; individual determinations necessary); *Rosenfeld v. A.H. Robins Co.*, 63 A.D.2d 11, 407 N.Y.S.2d 196, *appeal dismissed*, 46 N.Y.2d 731, 385 N.E.2d 1301, 413 N.Y.S.2d 374 (1978) (class certification denied in IUD case; individual determination required).

Another widely known mass exposure case is the Love Canal incident, where toxic waste materials seeped into a residential neighborhood. Professors Ginsberg and Weiss discussed the problem of determining causation in the Love Canal situation:

[Proof of causation] will be formidable because chemicals released into ground water or the atmosphere may combine with one another to form new compounds, and may change their characteristics or become diluted when exposed to the elements. In addition, the responses which contaminants produce after human ingestion may vary both temporally and in kind from individual to individual, making it difficult to attribute a particular illness to a particular chemical or combination of chemicals. Consequently, where several potentially hazardous substances are present, plaintiffs may be unable to show that their injuries resulted from exposure to one whose source or hauler is before the court or one over which the defendant site owner exercised control. Particularly where disease becomes manifest only after a prolonged period, as in the case of carcinogens, the question of intervening or contributing causes may add to the uncertainty. The difficulty of establishing a direct causal link between one of several substances deposited in 1950 and symptoms of cancer first recognized in 1978 is apparent. If the affected plaintiff is also a tobacco user or worked in a chemical plant, the level of certainty required by the legal system may be impossible to attain.

Ginsberg & Weiss, *Common Law Liability for Toxic Torts: A Phantom Remedy*, 9 HOFSTRA L. REV. 859, 922-923 (1981) (footnotes omitted).

Given the difficulties of a proportional liability rule in toxic tort cases, alternative methods for imposing liability and compensating plaintiffs are enterprise liability, see Note, *supra* note 29, at 1627-30, and administrative compensation, see *id.* at 1631-60. Daniel Farber has proposed that the defendant be charged with the damages of his toxic tort, but that damages be awarded in a way that fully compensates the most likely victims of the harm he has caused when the risk is not uniform across the class of patients. Farber, *supra* note 3, at 1243-51.

Mass exposure cases present a large number of extraneous factors that might interfere with the process of determining probabilities of causation. The number of extraneous factors, however, tends to be more limited in cases in which the wrongful act is more directly linked with an individual plaintiff. For example, in *New York Central Railway Co. v. Grimstad*¹¹⁰ and *Kirincich v. Standard Dredging Co.*¹¹¹ the injuries followed directly upon negligent conduct; the probability of causation could be determined without considering a large number of other factors.

In *Grimstad* plaintiff's decedent drowned after falling off the side of a barge. The court found that while defendant was negligent in failing to equip the barge with life buoys, the negligence was not the *but for* cause of the death. The court reasoned that "there is nothing whatever to show that the decedent was not drowned because he did not know how to swim, nor anything to show that, if there had been a life buoy on board, [he] would have got it in time" ¹¹²

In *Kirincich v. Standard Dredging* plaintiff's decedent fell off defendant's barge, which was not equipped with adequate lifesaving equipment. The trial court found for the defendant, but the appeals court reversed, noting that the decedent had actually reached for the line tossed to him, and *but for* the small size and limited buoyancy of the line, he would have been able to grasp and hold onto it.¹¹³

Grimstad and *Kirincich* present very few factors complicating the analysis whether there is a causal link between the negligence and the injury. The causal link is easier to consider than in a case such as *Agent Orange*. On the other hand, it is by no means certain that a causal link does or does not exist. Landes and Posner suggest that "[t]he difference between the two cases is not that *Grimstad* would have died even if the defendant in that case had taken care and *Kirincich* would have been saved, but that there was a greater probability that care would have been effective in *Kirincich's* case than in *Grimstad's*."¹¹⁴ The problem in these two cases is that the all-or-nothing approach does not reflect how close the cases really are. If a proportionality approach had been applied,

110. 264 F. 334 (2d Cir. 1920).

111. 112 F.2d 163 (3d Cir. 1940).

112. *Grimstad*, 264 F. at 335.

113. *Kirincich*, 112 F.2d at 165. In reaching this conclusion, the *Kirincich* court stated that it chose to follow the wisdom of Judge Learned Hand in a similar case in which a seaman fell overboard in a storm and drowned. *Zinnel v. United States Shipping Bd. Emergency Fleet Corp.*, 10 F.2d 47, 49 (2d Cir. 1925). In *Zinnel* there was no guard rope on the ship to prevent intestate's fall. Judge Hand noted:

There of course remains the question whether they might have also said that the fault caused the loss. About that we agree no certain conclusion was possible. Nobody could, in the nature of things, be sure that the intestate would have seized the rope, or, if he had not, that it would have stopped his body. But we are not dealing with a criminal case, nor are we justified, where certainty is impossible, in insisting upon it.

Zinnel, 10 F.2d at 49.

114. Landes & Posner, *supra* note 1, at 122. Landes and Posner also suggest that in a case such as *Grimstad*, as opposed to *Kirincich*, "the costs of legal proceedings are apt to exceed the allocative benefits from inducing potential injurers to spend additional sources on a amount of care." W. LANDES & R. POSNER, *supra* note 4, at 240.

recovery based on the probability of causation in each case would have produced more coherent results. Proportional damages are particularly appropriate in cases such as these and the medical malpractice cases.¹¹⁵

Why do Delgado and Rosenberg confine their attention to mass exposure cases? It may be that the inclusion of single exposure cases poses a conflict with the existing preponderance of the evidence standard. When there is a greater than 50% chance that defendant has caused some harm within a group of plaintiffs, the preponderance of the evidence standard can be used at least in a general sense to impose liability, even though the chance that defendant has caused harm to a specific individual is less than 50%. In single exposure cases when this greater than 50% chance does not exist, the preponderance of the evidence standard cannot be used even in a general sense to impose liability. The answer to this conflict is to abandon the preponderance of the evidence standard.¹¹⁶

C. *King*

Joseph King offers another perspective on proportional liability.¹¹⁷ In cases of personal injuries involving victims suffering from preexisting conditions, he advocates recovery of damages proportional to the probability that the injury was caused by defendant. But King does not perceive the problem in this case as one of uncertain causation. He treats this situation as a problem of identifying and measuring the actual loss that the defendant has caused, and the actual loss is the loss of a chance of benefit. For example, if defendant's negligent act has diminished a victim's chances of survival from 95% to 5%, it destroys a 90% chance of life. The loss of this chance of life is an actual loss that should be charged against the defendant and may be valued at 90% of the value of the life. According to King there is no need to mix this question with one of causation.¹¹⁸

Taken to its logical conclusion, King's approach would compensate for the loss of a chance of benefit, whether or not the benefit itself lost. Yet King does not actually espouse this view. Throughout his article he offers examples of compensation for a lost chance of benefit only after the benefit itself was lost¹¹⁹ or while there is still a chance that the benefit may be lost.¹²⁰ He does not offer examples of compensation for loss of a chance of a benefit after it is known that the benefit will not be lost.¹²¹ If defendant's negligent act diminished a victim's

115. For example, the proportional damages approach is useful in cases in which it is uncertain whether plaintiff's cancer is of traumatic origin. In one case, for example, plaintiff developed cancer of the larynx after inhaling glass during an automobile collision. *McGrath v. Irving*, 24 A.D.2d 236, 265 N.Y.S.2d 376 (1965). Expert testimony was conflicting as to whether the cancer was caused by the accident. See generally Comment, *Judicial Attitudes Toward Legal and Scientific Proof of Causation*, 3 COLUM. J. ENVTL. L. 344, 349-54 (1977) (describing difficulty of proving traumatic causation).

116. See Nesson, *supra* note 31, quoted in *supra* note 75.

117. King, *supra* note 59.

118. King, *supra* note 59, at 1363-64, 1378 n.85, 1381-87, 1394.

119. See King, *supra* note 59, at 1363-64, 1365 n.38, 1382-83, 1395-96.

120. See King, *supra* note 59, at 1383-85, 1385 n.107.

121. Three situations must be distinguished in this analysis: (1) the destruction of a 90% chance

chances of survival from 95% to 5%, King would maintain that an actual loss of a 90% chance of life had taken place before the life was lost;¹²² however, there is no indication in his article that he would award damages at this point if the loss of life is expected in the near future. Damages would be awarded if, and only if, the death occurred.¹²³

To award damages after one knows the death will not occur is to award damages for "negligence in the air."¹²⁴ King is right to avoid this result. Yet his theory does not make sense conceptually if damages should be awarded for the loss of a chance of a benefit, but are not awarded if the benefit is not lost. Requiring the loss of the benefit itself is an indication that the real injury is not the loss of the chance; it is the loss of the benefit.

The weakness of King's reasoning also is illustrated by his attempt to distinguish the chance of loss as damages to be valued from the chance that defendant caused the loss:

To illustrate, assume that a patient suffering from cancer is killed because a surgical instrument fails due to errors in the manufacturing process. Assume that the chance that the patient would be cured of cancer was only 30%. Under the approach proposed in this article, the loss of that chance would be compensable. But if it did not appear more likely than not that the defendant was the manufacturer of the instrument, the plaintiff would ordinarily be denied recovery for that loss. In other words, proof of a not-better-than-even chance that the defendant caused the loss of the chance of a cure would not suffice. If, however, the plaintiff proved that the defendant was probably the source of the product and thus the cause of the loss, the plaintiff might recover the value of the loss.¹²⁵

The distinction drawn in this example between chance of loss as a detriment and chance of loss as an element of causation is illusory. The chance that the patient would have been cured without the surgical instrument failure is just as much a chance of *but for* causation as the chance that defendant was the manufacturer of the instrument. The 30% chance of cure with proper surgical instruments implies a 70% chance that the patient would die from causes extraneous to the defendant assuming the defendant is the manufacturer of the defective instrument. The not-better-than-even chance that defendant was the manufacturer of the defective instrument means a better-than-even chance that the patient would die from causes extraneous to the defendant assuming the patient had a 100% chance of cure otherwise. Both chances involve *but for* causation; only the for-

of life and the victim dies, (2) the destruction of a 90% chance of life and the victim does not die, and (3) the destruction of a 90% chance of life and it is not known whether the victim will die or not. King's theory only deals with the first and third situations.

122. King, *supra* note 59, at 1378 n.85.

123. The damages after the life was lost would not be 90% of the value of the life. Rather, the loss would increase "because it would then be clear from the facts that the victim was not within the [5%] chance of survival." *Id.* The actual loss would be 90/95 x value of the victim's life.

124. *Palsgraf v. Long Island R.R.*, 248 N.Y. 339, 341, 162 N.E. 99, 99 (1928) (Justice Cardozo quoting POLLOCK, TORTS 455 (11th ed.)).

125. King, *supra* note 59, at 1395 (footnote omitted).

mer assumes defendant is in the wrong (as manufacturer of the defective instrument) and the latter does not assume defendant is in the wrong.¹²⁶

Suppose that the chance the patient would be cured was 100% and the chance the defendant was the manufacturer of the instrument was 25%. That is, defendant was one of four manufacturers who sold instruments to the hospital in which the victim was treated, and all of the instruments were defective. If the instrument used on the victim was to be selected at random from all the instruments sold, was not the defendant depriving the victim of a 25% chance of cure by selling defective instruments? If the victim already had a 75% chance of being harmed from defective instruments other than those of the defendant, then this chance was a preexisting condition and should be treated by King the same as the preexisting condition in the example that decreases the chance of cure to 30%.

King's approach does flag the need for a proportional liability approach, but it confuses causation questions with questions of valuation. His approach does avoid a redefinition of causation as an element of tort, but it does so at the expense of correct definition and understanding. Causation should be redefined to allow for probable causation linked with proportional recovery if efficiency and corrective justice are to be best achieved.

IV. OBSTACLES REMAINING IN THE PROOF OF A PROBABILITY

In the final analysis the problem that continues to haunt the supporters of a proportional liability rule is the difficulty of accurately determining probabilities of causation. This problem ordinarily does not exist under the preponderance of the evidence standard, because the plaintiff needs only to show that causation is more likely than not.¹²⁷ Once the evidence is heard the factfinder may believe without a doubt or with very little doubt that causation has occurred, or that there is some chance (e.g., 80%) that causation has occurred, or that there is some range of chance (e.g., 60%-90%) that causation has occurred.¹²⁸ In each

126. See *supra* text accompanying notes 50-51 for a discussion of this distinction.

127. Beyond the problem of accuracy there is also the problem that the factfinder may not be able to understand the proper way to interpret certain types of statistical evidence. See Saks & Kidd, *supra* note 43, at 127-31 (demonstrating "the gap between the judgments people make intuitively and the probabilities yielded by explicit calculation"). For a study of individuals' ability to understand and use statistical information, see Faigman & Baglioni, *Bayes' Theorem in the Trial Process: Instructing Jurors on the Value of Statistical Evidence*, 12 LAW & HUM. BEHAV. 1 (1988) ("findings lend support to previous research findings that identified individuals' reluctance to use statistical information when making causal attributions"). For a brief summary of Bayes' Theorem which describes how different information should be integrated in determining a probability, see Tribe, *supra* note 16, at 1350-54. Tribe, contrary to Saks and Kidd, believes that while mathematical methods enhance the accuracy of probability calculations, the potential for misuse and misunderstanding outweigh this benefit in the legal process. See *id.* at 1358-77 (discussing the costs of mathematical models). Whether or not Tribe is correct, this problem of misunderstanding is not particular to a system of proportional liability. If it exists, it is a problem in the present system as well.

128. It is the factfinder's belief and not merely the evidence that establishes the probability or range of probability of causation. The dichotomy between belief and evidence on which that belief is based is expressed by Judge Jenkins in *Allen v. United States*, 588 F. Supp. 247 (D. Utah 1984), *rev'd*, 816 F.2d 1417 (10th Cir. 1987), *cert. denied*, 108 S. Ct. 694 (1988):

[S]o long as the evidence will support an inference that defendant's conduct contributed to the victim's injury, even though other inferences can be drawn that it did not, or that his

of these cases the factfinder is permitted to find causation under the preponderance of the evidence standard. Under a proportional liability rule, the factfinder is permitted to find causation (100% liability) in the first case and probable causation (80% liability) in the second case. The third case presents a problem. Because of insufficient information, no one probability can be established unequivocally.

A recent study by Neil Cohen has elaborated on the fact that the less information one has to determine the probability of an event, the greater the range of uncertainty concerning that probability. Cohen explains that the probability derived by a factfinder is based only on partial information;¹²⁹ therefore, it is only an estimate of a true probability that would be based on an analysis of all possible information.¹³⁰ It is a best guess (a point estimate) based on only a sampling of the data. Given this fact, Cohen rejects the unwarranted assumption "that the legal system can and does determine exact probabilities of the facts at issue."¹³¹ Some doubt of the true probability of causation always exists whenever actual causation is uncertain. Depending on the available information, the factfinder "only can state that he or she is certain to some degree, that the true probability is within a particular interval, with that interval becoming wider as the degree of certainty required of the factfinder increases."¹³² In statistical analysis, this gap of uncertainty is called a confidence interval.

Cohen suggests that the preponderance of the evidence standard requires not only that the best estimate of the probability in question exceed the threshold level of 50% but also that all probabilities within the confidence interval exceed 50% as well.¹³³ Because the best estimate of the factfinder is always a guess based on partial information, it is more accurate to provide a range of values, a confidence interval around this guess, so that one can say with a particular level of confidence that it contains the true probability of causation. Under Cohen's proposal, to meet the preponderance of the evidence standard this range

injury was due to other causes, "it is for the finder of fact"—this court—"to draw the most appropriate inference using the court's own best judgment, experience and common sense in light of all the circumstances."

Id. at 413 (footnote omitted); see Green, *The Causal Relation Issue in Negligence Law*, 60 MICH. L. REV. 543, 560 (1962).

129. Cohen, *Confidence in Probability: Burdens of Persuasion in a World of Imperfect Knowledge*, 60 N.Y.U. L. REV. 385, 397-98 (1985) [hereinafter Cohen, *Confidence*], criticized in Kaye, *Apples and Oranges: Confidence Coefficients and the Burden of Persuasion*, 73 CORNELL L. REV. 54 (1987) (with a response in Cohen, *Conceptualizing Proof and Calculating Probabilities: A Response to Professor Kaye*, 73 CORNELL L. REV. 78 (1987) [hereinafter Cohen, *Conceptualizing Proof*]).

130. Cohen, *Confidence*, *supra* note 129, at 398. Presumably, if all possible information were known, the probability of causation would be 0% or 100%. A true probability between these extremes could be reached, however, if "all possible information" were read to exclude the event of causation itself.

131. Cohen, *Confidence*, *supra* note 129, at 394.

132. Cohen, *Confidence*, *supra* note 129, at 399. Mark Kelman has pointed out that belief in the probability of causation may be "with radically different degrees of confidence" based on "radically different levels of 'knowledge'." Kelman, *supra* note 3, at 620. The determination of what the level of confidence should be is beyond the scope of this Article. For a discussion of the value of different levels, see Cohen, *Confidence*, *supra* note 129, at 409-17; Cohen, *Conceptualizing Proof*, *supra* note 129, at 91-95; Kaye, *supra* note 129, at 64-73.

133. Cohen, *Confidence*, *supra* note 129, at 399, 406.

of values should be greater than 50%. Thus, in cases where little information is provided and the confidence interval is quite wide, a best estimate above 50% may be insufficient to satisfy the standard because the confidence interval includes values below 50%.¹³⁴

While Cohen focusses on the preponderance of the evidence standard, his discussion of confidence intervals may be extended to a proportional liability rule. In the same way that the lowest point within a confidence interval should be greater than 50% to satisfy the preponderance of the evidence standard, it should be greater than the probability chosen to assess liability under a proportional liability rule. The plaintiff has the burden of proof. If the factfinder believes that the true probability of causation lies somewhere between 60% and 90%, then the probability of causation may be established by the factfinder at 60%. The plaintiff has not been able to convince the factfinder that the true probability of causation lies above 60%. It may be 60% itself. Thus even with insufficient information to establish one probability in the factfinder's mind, the lowest probability on a range of possible probabilities is sufficient to establish the proportion of damages for which the defendant is held liable.

V. PROPORTIONAL LIABILITY IN OTHER AREAS OF LAW

A. Joint Causation

Although proportional liability has not been advocated as a comprehensive rule when causation itself is uncertain, it has played a role in apportioning damages between defendants who have combined to produce a harm. The wrongful acts of two or more defendants may combine to produce harm to the plaintiff,¹³⁵ or the plaintiff's own negligence may combine with that of one or more defendants to produce harm.¹³⁶ While harm and its cause are certain, the extent of the harm by each of the actors may be uncertain. In such cases uncertainty is an obstacle to the apportionment of damages among the actors, but the movement in the law has been toward apportionment rather than away from it.

Until recently a majority of courts refused to permit contribution among independent tortfeasors joined in a single action when their negligence contributed to a single result.¹³⁷ Most states now permit contribution. Some require apportionment by pro rata shares and others in proportion to the comparative fault of the defendants.¹³⁸ Emphasis has been placed increasingly on the latter

134. Cohen argues that in a case such as *Smith*, see *supra* text accompanying notes 39-43, the point estimate of the probability of liability is greater than 50%, but because of the lack of sufficient information the confidence interval straddles 50%. Cohen, *Confidence*, *supra* note 129, at 406-07.

135. An example is when the plaintiff is injured by the collision of two vehicles.

136. An example is when the plaintiff is injured by the collision of her vehicle with that of defendant.

137. PROSSER & KEETON, *supra* note 1, at 337; see Rizzo & Arnold, *supra* note 3, at 1400-02 (a quick history that emphasizes that the common law nevertheless permitted apportionment through independent contribution suits).

138. PROSSER & KEETON, *supra* note 1, at 338-41; see also Landes & Posner, *Joint and Multiple Tortfeasors: An Economic Analysis*, 9 J. LEGAL STUD. 517, 551 (1980); Robinson, *supra* note 3, at 716 n.12.

approach in recent years as both case law and statutes have limited the scope of joint and several liability and provided for proportionate liability in certain circumstances.¹³⁹

For example, in *Prudential Life Ins. Co. v. Moody*,¹⁴⁰ the Kentucky Supreme Court interpreted a state statute to limit damages against a defendant to the proportion of its liability as determined by the jury. The jury had apportioned liability in the amount of 50% to each of two defendants, but one of the defendants was dismissed on the basis of a five-year statute of limitations. The court found that the plaintiff would still be entitled to only 50% of the damages from the other defendant rather than the full award.

The same kind of problem arises when a defendant's tort combines with an innocent cause to produce a harm that exceeds the harm that would otherwise have been caused by defendant's tort. The defendant is usually held liable only for that part of the harm attributable to his negligence even though exact determination of that part is impossible.¹⁴¹ Thus, in the same way that uncertain contribution to harm is resolved with a proportional damages approach, uncertain causation itself may be resolved.

When uncertainty complicates the determination of a defendant's contribution to the harm, the extent of the harm is usually left to a factfinder's estimate despite the lack of definite and satisfactory proof.¹⁴² In *Hughes v. Great American Indemnity Co.*¹⁴³ defendant's insured drove into a car that had just been involved in an accident. Plaintiff sought damages from defendant for the whole of the harm suffered in both accidents, arguing "that it would be impossible under circumstances such as those prevailing in this case to make proof which would segregate the injuries attributable to the separate blows."¹⁴⁴ The court disagreed and upheld the right of the jury to award partial damages based on the extent to which the plaintiff was injured by the defendant.¹⁴⁵ The court decided that the part of the damages caused by the second collision "do[es] not have to be established with mathematical certainty so long as there is evidence that damages did probably ensue from the second collision and so long as a reasonable basis is established for recovery of those damages."¹⁴⁶ Likewise, uncertainty in the determination of a probability figure need not bar use of the proportional liability rule.

139. PROSSER & KEETON, *supra* note 1, at 56-57 (1988 Supp.). For an argument that apportionment should be made on the basis of relative causation instead of relative fault, see Rizzo & Arnold, *supra* note 3, at 1400-02.

140. 696 S.W.2d 503 (Ky. 1985). See *Howell v. River Products Co.*, 379 N.W.2d 919 (Iowa 1986), and other cases cited in PROSSER & KEETON, *supra* note 1, at 348.

141. PROSSER & KEETON, *supra* note 1, at 349.

142. PROSSER & KEETON, *supra* note 1, at 348-50.

143. 236 F.2d 71 (5th Cir. 1956).

144. *Id.* at 75.

145. *Id.* at 74.

146. *Id.* at 75.

B. *Comparative Negligence*

Besides the apportionment of liability among two or more defendants who have harmed the plaintiff, there is also apportionment between plaintiff and defendant who are both at fault in causing harm to the plaintiff. In most states the all-or-nothing rule of contributory negligence has given way in recent years to the notion of comparative fault, which resulted in the approval of the Uniform Comparative Fault Act by the National Conference of Commissioners on Uniform State Laws in 1977.¹⁴⁷ Although one of the chief objections to this doctrine is the general inability of the law to "measure how much the damage suffered is attributable to the plaintiff's own fault,"¹⁴⁸ it has also been adopted in admiralty law as the best approach in an imperfect world. Thus, in *United States v. Reliable Transfer Co.*,¹⁴⁹ a case in which a ship ran aground, the court stated:

The divided damages rule has been said to be justified by the difficulty of determining comparative degrees of negligence when both parties are concededly guilty of contributing fault. . . . Although there is some force in this argument, it cannot justify an equal division of damages in every case of collision based on mutual fault. When it is impossible fairly to allocate degrees of fault, the division of damages equally between wrongdoing parties is an equitable solution. But the rule is unnecessarily crude and inequitable in a case like this one where an allocation of disparate proportional fault has been made. Potential problems of proof in some cases hardly require adherence to an archaic and unfair rule in all cases. Every other major maritime nation has evidently been able to apply a rule of comparative negligence without serious problems.¹⁵⁰

In *Brisboy v. Fibreboard Corp.*¹⁵¹ the court permitted a jury's finding that a heavy smoker who worked with asbestos was 55% responsible for his own death under Michigan's comparative negligence law. It stated that the risk of developing lung cancer was within the scope of the risk assumed by the smoker and rejected the claim that there was no rational basis for the jury's apportionment of fault.¹⁵² The attempt in these cases is clearly to determine proportions on the basis of the best, albeit imperfect, evidence available.

C. *Damages*

Another area of uncertainty lies in the degree of harm itself. When a contract has been breached, a defendant may lose earnings or profits that cannot be

147. See 12 UNIFORM LAWS ANNOTATED 37 (1988 Pocket Part). Most states have adopted comparative negligence in some form. See PROSSER & KEETON, *supra* note 1, at 471 n.30 (1988 Supp.) (indicating that only six states and the District of Columbia still have contributory negligence).

148. Heil v. Glanding, 42 Pa. 493, 499 (1862).

149. 421 U.S. 397 (1975).

150. *Id.* at 407.

151. 429 Mich. 540, 418 N.W.2d 650 (1988).

152. *Id.* at 552, 418 N.W.2d at 655.

determined with exactitude. Any of a number of events may affect the earnings or profits that defendant would have received had the contract not been breached. When a tort has altered the course of events for the plaintiff, whether and to what extent that course of events would have resulted in a benefit or harm to the plaintiff may be uncertain. Nevertheless, the courts have shown little hesitation in charging a defendant with expected damages despite the uncertainty of the harm caused.¹⁵³ Courts' ability to award damages even when the harm caused is uncertain further illustrates that they could apportion damages when the causation of that harm is also uncertain.

In *Rideaux v. Lykes Bros. Steamship Company, Inc.*¹⁵⁴ a widow filed suit to recover damages for the death of her husband, who was crushed to death under the fall of heavy steel beams caused by the negligence of defendant. Defendant admitted its liability but challenged the amount of damages claimed. The court held that the correct measure of damages "should be equivalent to actual compensation for the deprivation of the reasonable expectation of pecuniary benefits that would have inured to Libelant for continued life as under the evidence could be expected of her husband."¹⁵⁵ The court then determined damages by considering several factors, including age, health, habits, capacities, disposition, and life and work expectancies of the deceased husband.¹⁵⁶ The uncertainty in determining damages based on these factors did not deter the court.

Uncertainty in the determination of damages was also an issue in the breach of a requirements contract in *Locke v. United States*.¹⁵⁷ The court held that recovery would be allowed if a "reasonable probability" of damage could be established, even using "improbable and inferential as well as direct and positive proof."¹⁵⁸ The court reasoned that "[a]ny other rule would enable the wrongdoer to profit by his wrongdoing."¹⁵⁹

The use of probabilities to determine damages in the case of uncertain harm is even more clearly illustrated by the lost-chance cases in contests.¹⁶⁰ In *Mange v. Unicorn Press*¹⁶¹ the plaintiffs sought damages for an alleged breach of rules by the defendant in a Puzzle-Quiz contest. Although there were 23,548 contestants among whom only 210 prizes were awarded, the court followed the rationale "that plaintiff's chances of success would have had some market value especially since there was no risk of out-of-pocket loss offsetting the possibility of gain."¹⁶²

Uncertainty may also exist when defendant's tortious conduct has dimin-

153. Ball, *supra* note 35, at 814.

154. 285 F. Supp. 153 (S.D. Tex. 1968).

155. *Id.* at 156.

156. *Id.* at 156-57.

157. 283 F.2d 521 (Cl. Ct. 1960).

158. *Id.* at 524.

159. *Id.* (quoting *Bigelow v. RKO Radio Pictures*, 327 U.S. 251, 264 (1946)).

160. See *Chaplin v. Hicks*, 2 K.B. 786 (1911); MCCORMICK, HANDBOOK ON THE LAW OF DAMAGES 117-26 (1935); Comment, *Damages Contingent Upon Chance*, 18 RUTGERS L. REV. 875 (1964).

161. 129 F. Supp. 727 (S.D.N.Y. 1955).

162. *Id.* at 730.

ished or destroyed a chance of benefit that already has been diminished by other causes. In *Steinhauser v. Hertz Corp.*¹⁶³ plaintiff suffered schizophrenia following an automobile accident. The court found that although the accident might be found by a jury to be the precipitating cause of the schizophrenia, the defendants would be entitled "to explore the probability that the child might have developed schizophrenia in any event" in order to decrease the damages that would otherwise be owed.¹⁶⁴ The existence of a greater than usual chance that plaintiff would have developed schizophrenia in the absence of the accident would allow an appropriate discount to be made for the harm suffered by plaintiff, even though the future apart from the accident was difficult to predict.¹⁶⁵

The treatment of uncertainty in degree of harm informs the treatment of uncertainty in causation. Uncertainty in degree of harm raises the question of how much harm an act has caused. Causal uncertainty raises the question of whether an act actually has caused harm. If courts are willing to calculate the expectations of degree of harm when degree of harm is uncertain, it should be willing to calculate the expectation of causation when causation is uncertain.

VI. CONCLUSION

The proportional liability rule offers a fairer, more efficient remedy than the preponderance of the evidence standard in cases of uncertain causation. Both the commentators and the courts are moving in the direction of adopting this rule, but no judge or commentator has taken the final step. The explanation for this hesitancy may be that the rule replaces causation with probable causation as an element in tort.¹⁶⁶ Contrary to those who believe that this replacement elides cause from the tort analysis, however, this approach deepens the notion of cause by considering its probability. Causation provides the link between the defendant's wrongdoing and the plaintiff's harm. When that link is believed by a factfinder to be probable rather than actual, the willingness to consider this

163. 421 F.2d 1169 (2d Cir. 1970).

164. *Id.* at 1173.

165. *Id.* at 1173-74; see *Lancaster v. Norfolk & W. Ry.*, 773 F.2d 807, 822 (7th Cir. 1985) (corollary to thin skull rule is that damages must be reduced to reflect the likelihood that plaintiff would have been injured anyway), *cert. denied*, 480 U.S. 945 (1987); *Abernathy v. Superior Hardwoods, Inc.*, 704 F.2d 963, 973 (7th Cir. 1983) (in calculating damages in an eggshell skull case, the trier of fact must make an adjustment for the possibility that the preexisting condition would have resulted in harm to the plaintiff even if there had been no tort); *Dillon v. Twin State Gas & Elec. Co.*, 85 N.H. 449, 457, 163 A. 111, 115 (1932) (although the electric current caused the death, the fact that the victim had lost his balance and started to fall should be considered when determining damages); *McCahill v. New York Transp. Co.*, 201 N.Y. 221, 224, 94 N.E. 616, 617 (1911) (where injury precipitated attack of delirium tremens, "[i]t is easily seen that the probability of later death from existing causes for which a defendant was not responsible would probably be an important element in fixing damages, but it is not a defense"). In *Schore v. Mueller*, 290 Minn. 186, 189, 186 N.W.2d 699, 701 (1971), the court stated:

[A] person who has a preexisting disability is entitled to recover damages for an aggravation of that condition even though the particular consequences would not have followed absent his prior disability, recovery being limited . . . to the additional injury over and above the consequences which normally would have followed from the preexisting condition absent defendant's negligence.

166. See Thomson, *The Decline of Cause*, 76 GEO. L.J. 137 (1987) (discussing moral and legal aspects of causation and fault).

probability and allocate proportional relief reflects a more complete and accurate notion of cause.

Proportional liability is already used in a distorted form in many cases that never reach trial. Settlements are negotiated on the chances of winning, and settlement figures take into account not only the extent of loss to the plaintiff but also the probability that defendant's causation of that loss will be proved in court. The distortion to proportional liability lies in determining the chances of proving *but for* causation by a preponderance of the evidence. With proportional liability the determination of the probability of causation by the defendant is made directly.¹⁶⁷

The substantial possibility test recognizes the inadequacy of the present preponderance of the evidence standard, but it fails to provide an adequate solution. The *Sindell* line of cases has introduced the concept of proportional liability, but the concept has not yet advanced beyond the areas of mass torts. With the modern advances in probability theory, the time has come to adopt a proportional liability rule. Such a rule would deter inefficient behavior and properly compensate the parties. In addition, it would follow strong parallel development in the areas of joint causation, comparative negligence, and uncertainty as to harm caused. Judges who have twisted to find justice in the rigid interstices of the present standard would suddenly be freed to provide justice in a more direct manner under the new rule.

167. See Coons, *Approaches to Court Imposed Compromise—The Uses of Doubt and Reason*, 58 NW. U.L. REV. 750, 751 (1964). Professor Coons states:

The judicial power to compromise between the often harsh alternatives of all-or-nothing has received little consideration as a special problem in our jurisprudence. Its neglect is peculiar in the light of the high incidence of compromise through private settlement—a procedure of peacemaking in which the judge has taken an increasingly active role as mediator. Judicial activism in chambers is matched only by judicial paralysis on the bench. The “fair” decision promoted in private is one unattainable by law. That which the judge thinks just he cannot order. That which in chambers he calls “unjust” he orders and defends with thirty pages of rhetoric. Strange law? Passing strange I’d say—at least it might seem so to a Lunar visitor who shared our logic but not our legal experience.

Id. Professor Gold notes:

Mixtures of liability and damages issues are generally contrary to doctrine, yet it is likely that juries conduct such analyses all the time. In a mock jury study, juries facing ambiguous liability issues returned plaintiffs’ verdicts averaging about 20% lower than juries hearing the same case with clearer evidence of liability, even though the damage evidence was the same. Such “compromise verdict[s],” “where the jury, in doubt as to [liability,] . . . brings in a verdict for the plaintiff but in a smaller amount that [sic] it would have if these questions had been free from doubt” are believed to occur frequently. Some courts have accepted the inevitability, and even good sense, of liability-damages tradeoffs.

Gold, *supra* note 37, at 399-400 n.118 (citations omitted).

