Chapter III *

NEGLIGENCE

A. Introduction

1. Limitations of Discussion

It is not the purpose of this study to cover in detail all of the tort liability problems that will face those operating in the atomic energy field. Many, if not the great majority, of the cases in this area will present typical tort law problems susceptible to solution in the ordinary way according to the usual rules. Established legal scholars have explored and analyzed existing tort rules and have attempted to define and suggest future developments in the law of torts generally. Our purpose in writing this volume is not to second-guess these writers. Rather, we seek to identify for the lawyer and business man those particularly troublesome or unique legal problems that will arise out of atomic energy. In discussing these selected problems it usually will be necessary to work not from direct precedent but from the most nearly analogous cases, including some on the frontiers of tort law. Where established legal rules would seem to provide inadequate or incorrect answers, alternative solutions or courses of action, legislative or judicial, will be suggested.

Not all of the difficult legal problems will be in the areas of negligence, product liability, and strict liability, but the atomic energy entrepreneur and the lawyer advising him will find that these problems will be the most unusual and the hardest to answer. In a real sense negligence, strict liability, and product liability cases cannot be separated into mutually exclusive categories. Nevertheless, it is convenient to analyze the problems under these separate headings. Questions peculiar to the workmen's compensation area will be treated separately, even though many of the problems arising in the area of negligence will be present in workmen's compensation cases as well.

There is a serious question as to whether ordinary negligence rules or strict liability concepts will or should be applied to atomic energy activities. A discussion of this question will be more meaningful if there is an understanding of the results that might be reached under ordinary negligence rules, because the limitations and possible inadequacies of ordinary rules then will stand out in sharper focus. It is for this reason that negligence rules will be discussed first and the question of whether those rules or strict liability concepts should govern the atomic energy area is postponed.

2. Typical Negligence Analysis

Whether the injury be to persons or property, courts and legal scholars generally view negligence actions as involving four elements. To recover damages every plaintiff must establish: (1) a duty of the defendant to use reasonable care, under the circumstances, in his relations with the plaintiff; (2) a breach of this duty by the defendant; (3) causation, both in fact and "proximately"; and (4) a legally recognized loss or damage to persons or property.

Of the four, the problems in causation and damages are the most peculiar and troublesome when considering atomic energy activities. Most of the duty problems will not be unique but there are several troublesome ones to be considered. In analyzing the application of tort principles as to each of these four elements, the peculiar characteristics of atomic energy must be kept in mind.

3. Legally Significant Peculiarities of Atomic Energy Activities

Seldom, if ever, has such a significant scientific development come so rapidly. The existence of the neutron was not generally thought proved until 1932; the first reactor did not "go critical" until 1942. Yet nuclear energy has the potential to cause tremendous changes in our industrial society, if not throughout the world. There is a vast new science and technology with which the general public is quite unfamiliar and for which there are relatively few trained specialists. Even the specialists admit their science is so new that there are many very important concepts which they understand but vaguely or are not aware of at all. A man cannot knowingly be negligent in failing to utilize a principle or concept which he does not know exists. This might lead to the conclusion that, since he did not know of a technique that might have prevented the accident, he was not at fault; lacking fault, in the ordinary
sense, generally there can be no recovery in a negligence action. On the other hand, it is also true that when an activity is known to be dangerous it may be negligent to act in that area unless one is extremely well informed. It is important, from the standpoint of both domestic development and our position of world leadership, that atomic science be developed as rapidly as possible. The rules of law should not impede this progress unduly. Experimentation and boldness, which are necessary for progress, must not be limited by the timidity that almost inevitably follows imposition of too strict duty concepts or too strict a standard of negligence.

Additional legal difficulties may well arise from the fact that the government has surrounded a not insignificant portion of the information and knowledge about nuclear principles with the shroud of secrecy and the red tape of access permits. The person who wishes to avoid this time-consuming and expensive procedure may risk an accident that could have been avoided if all the information known to those persons working for the government or those having access permits had been known to him. This secrecy creates the further possibility that some injury situations may not be susceptible to trial in the ordinary manner because secret government information may be needed to determine facts in a particular accident. This has already been a troublesome problem in some instances.

As pointed out in the technology chapter, the ordinary human senses are not capable of detecting radiation in most situations. Since a person may be seriously overexposed to radiation and be unaware of it for weeks, months, or even many years,¹ the lawyer is going to face some difficult problems in radiation cases, especially with respect to the matter of proof. This fact is going to present some extremely difficult proof problems.

The general public views nuclear science as mysterious and frightening. This is not surprising when it is remembered that the science is so new and that it was first revealed to the public by the A and H-bombs. The veil of government-imposed secrecy and the fact that radiation cannot be detected by human senses adds to this fear. The consequence is very likely to be a great increase of cases in the area of mental disturbance, psychosomatic illness, and nuisance litigation aimed at preventing operation of atomic energy facilities.

Another singular characteristic of radiation is that it is cumulative in nature. What may be a perfectly permissible exposure may contribute to overexposure when added to other radiation, itself either permissible or wrongful. This characteristic will present some difficult proof and damage problems, not to mention duty questions of a type relatively unknown to tort law. It will also have an impact on multiple causation and joint tortfeasor cases. Difficult problems concerning the statute of limitations and conflict of laws doctrines also will arise as a result of this cumulative effect.

Yet another characteristic of radiation is that many of the injuries caused by it can also be caused by other forces, known or unknown. Often it will be impossible to determine the specific causal factor for such conditions as cancer, cataract, and leukemia. In addition, there are many sources of radiation, such as natural background emissions, radioactive debris from bomb tests, radioactive wastes from government operations, and radiation treatment in the course of medical therapy. The effects on the human body and on property are indistinguishable from those arising from industrial use of radiation. This characteristic of lack of identification with the particular source will present some new problems for the lawyer.

It should be noted also that the causal connection between radiation and injury both as to amount and type often is speculative in nature. While scientists in general agree that certain injuries can occur as a result of overexposure to radiation, and in fact that some types of damage are caused by even quite small amounts, they cannot as yet state categorically that a certain amount of radiation in all cases will cause a certain kind of injury to all persons or even to most persons. For the most part, the impact of overexposure to radiation might be described as statistical in nature. The overexposure in most cases increases the incidence of such damage among a large number of persons and, therefore, increases merely the chance of injury to a particular individual.

Another characteristic of radioactive materials is its great flexibility. As pointed out in Chapter I, there are several types of radiation with differing characteristics and injury potential depending often upon the particular way in which the person is exposed to the radioactive material. Likewise there are many different kinds of radioactive isotopes of various elements whose length of radioactivity varies greatly. Perhaps as important legally as any characteristic is the fact that radioactive isotopes of various elements chemically are identical with stable isotopes of the same element and remain radioactive through all kinds
of chemical reactions. Radioactive material, therefore, may remain a potential hazard for great lengths of time while it is processed through numerous extremely complicated chemical changes. Probably no other dangerous material is so insidious in character.

4. Typical Atomic Energy Operations and Tort Liability

Many of the activities in which atomic energy will play a part cannot even be foreseen. There are several types of operations now in use, however, as described in Chapter II. Although there may be legally significant differences between some of these operations, particularly as to duty and breach questions, the most interesting and most difficult tort liability problems are common to most or all of the presently known uses.

Reactor Operations. The question most nearly peculiar to reactor operations is that of whether strict liability will or should be imposed upon the licensee. Application of manufacturer's liability rules, such as when a defective fuel element is supplied, also presents some difficulties. These will be discussed later in the chapters on strict liability and manufacturer's liability respectively. Assuming application of negligence doctrines, the use of foreseeability or proximate cause to determine the extent of the duty owed by the operator will need to be analyzed. To evaluate the extent of the duty the lawyer must consider not only the foreseeability that particular persons or property will be damaged if there is a reactor accident but also the foreseeability that specific types of damage will ensue. The cases concerning off-site liability of a landowner when there are intervening agents, and those dealing with remoteness in time and space as they relate to the duty concept will be helpful in answering these questions.

Little guidance is given by the cases to assist the operator in determining what specific procedures, if followed, will preclude a finding that there has been a breach of the duty to use due care. Suggestions can be made, however, as to some general cautions that should be observed; e.g., an obligation to keep abreast of technological development, a duty to reduce the hazard by giving warning and possibly providing rescue or treatment services, and a duty to make use of new techniques.

2 N.Y. Times, Nov. 30, 1957, p. 37, col. 1, reported worker was accused of deliberate damage to uranium slugs manufactured for the government which might have caused serious harm.

3 For example the AEC has announced a new service to deal with emergencies. AEC Info. Rel. No. A-127, June 10, 1958, "Atomic Energy Commission To Acquaint State and Local Officials with Services Available in Event of Radiation Incident."
made available through radiation. The effect of compliance or non-compliance with government safety standards is of considerable concern to the nuclear industry in determining whether or not the standard of conduct required of the reasonably prudent man has been breached. Also important is the scope of the duty to use due care as it applies to other persons such as firemen and policemen who are on the premises in an official capacity but not pursuant to an invitation of the owner. Equally significant to the entrepreneur will be the question of whether or not he will be vicariously liable for the negligence of third persons both on and off the reactor premises. This includes both transportation and disposal of waste products. The cases dealing with these questions will be treated in considerable detail.

*Fuel Fabrication and Reprocessing Operations.* The legal problems arising from fuel fabrication and reprocessing operations again involve manufacturer's liability and strict liability concepts discussed later. The questions concerning the use of foreseeability to determine duty and those concerning the determination of the existence of a breach of the duty to use due care in reactor operations are equally applicable here. Potential liability arising out of transportation and disposal of radioactive materials will also be of concern.

*Waste Disposal.* Many factors must be taken into account in providing for the disposal of radioactive wastes, whether from reactor operations or from industrial, medical, or research use of radioactive sources. Geological, perhaps meteorological, and even oceanographic calculations must be considered along with the physical characteristics of the waste material. Is it in a gaseous, solid, or liquid form? Is it soluble in water? Does it undergo chemical reaction with surrounding materials? Is it a long or short half-life isotope? What type of radiation is involved? Is the radioactive material likely to concentrate if taken up by plants, or ingested by animals or human beings? Mistakes as to any of these calculations might cause serious injury to property or persons. The answer to these questions as they affect duty and breach problems will not require any different analysis than for reactor and fuel operations.

Aside from strict liability, the most interesting and difficult question is: What should be the legal effect of hiring an independent contractor or the federal government to dispose of the waste material which later causes damage? In determining liability of the one creating the waste material, should a distinction be drawn between using the federal government and a private concern? Should licensing of the disposal con-
tractor by the AEC immunize the producer of the waste material from liability for the former's negligence? What should be the effect on the liability of the producer of the material and of the private concern which carries out the disposal operation if the AEC rules are followed? If they are not followed? These questions need careful consideration.

Transportation of Radioactive Materials. Again laying aside the question of absolute liability, normal tort rules surely will provide answers to many of the questions in transportation cases; e.g., should the standard of conduct imposed on the transportation company be greater or less depending on the method of shipment (air, rail, truck, water), the route chosen (heavily populated areas, etc.), or the type of material (long or short half-life, high or low intensity of radiation, type of radiation such as alpha, beta, or gamma)? Also susceptible to standard treatment are such questions as: Will the doctrine of foreseeability (or proximate cause) protect the shipper or transportation company from remote consequences of a release of radioactive materials; to whom is the duty to use due care owed—persons shipping other goods, the crews or passengers of the transportation company, the general public who congregate around an accident, the rescuers, both official and gratuitous, who come to the scene of an accident; and what must the carrier do by way of checking the character and crating of "hot" shipments to avoid a charge of negligence?

Not so easily answered is the question of what steps the transporting company must take to give warning of the dangerous character of the material while en route. The significance of compliance with government regulations will be of concern to the carrier, just as for the reactor operator and processor. The liability standard to be applied when carrying material somewhat more dangerous than many others is important also. These questions and the most nearly analogous cases are discussed extensively, since little has been written about them.

Industrial, Medical, and Research Use of Radioisotopes. In most cases the tort liability problems arising from such uses as that of cobalt 60 for radiography, strontium 90 for thickness gauges, and iodine 131 for medical diagnosis or therapy either can be dealt with under normal tort principles or are similar to those suggested before in discussing reactor and processor operations or transportation and disposal activities. Most of the duty and breach questions fit into the former, while the effect of government safety regulations and the application of vicarious liability concepts to disposal operations come within the latter category.
The discharge of small quantities of waste material into the air, a sewer system, or a river will present some situations for which existing tort principles do not provide very clear or satisfactory answers. This is true of reactor and reprocessing operations as well as those involving use of radioisotopes. These problems will be treated rather fully in the discussion of multiple causation cases.

B. The Application of Negligence Principles to Atomic Energy Cases

With a few exceptions, such as the Price-Anderson Bill creating a government indemnity program and a few other examples of state statutes discussed in Part III in connection with state regulations, there have been no legislative attempts to solve the tort liability problems involved in atomic energy cases. In the absence of statutory provisions one must turn to analysis of tort cases in other areas of analogous activity, keeping in mind (1) that too-strict application of tort liability may unduly discourage use of these new materials which promise great benefits and (2) that the hazards are considerable, almost unique, and of a kind that often give no warning. As mentioned before, this analysis typically involves a four-fold categorization of the problems, the first of which is duty, including foreseeability and proximate cause.

1. Duty—Foreseeability and Proximate Cause

A complete treatment of the duty question, of necessity, would involve a long, detailed analysis of the relationship between duty concepts, foreseeability, and proximate cause, since today most agree that the latter two terms actually are merely different verbalizations of the same basic duty concepts. Undoubtedly, the discussion would start with an analysis of the famous case of *Palsgraf v. Long Island R. R. Co.* In this case a railroad employee was negligent in assisting a passenger to board the train, causing the passenger to drop a package to the platform. The package contained fireworks which, when the package fell, discharged and shook the platform. This caused a large scale some distance away to drop on Mrs. Palsgraf, who had purchased a ticket for another train. She sued the railroad, claiming that the negligence of the employee caused her injuries and that the railroad, therefore, was liable. The opinions of the majority and dissenting justices exemplify the differences that exist among courts and legal scholars today concerning the scope of duty and to whom it is owed in negligence cases.

*248 N.Y. 339, 162 N.E. 99 (1928).*
As one writer in the field concludes, "The present state of the law is, then, one of troubled waters, in which anyone may fish." Professors Harper and James in their recent treatise indicate that courts and writers have from time to time taken the position that if defendants should anticipate that certain conduct is fraught with unreasonable probability of some harm to somebody, then the duty to refrain from that conduct is owed to anyone who may in fact be harmed by it. These writers then add, however, that the view currently prevailing in this country does limit the duty to do or to refrain from doing a given act to (1) those persons or interests that are likely to be endangered by the act or omission, and (2) harm (to such person or interest) from a risk the likelihood of which may be by act or omission negligent. Because these treatises and the writings of other scholars in legal journals have discussed so exhaustively the relationship between duty, foreseeability, and proximate cause, nothing is to be gained by another treatment here. All seem to agree that, in determining whether defendant owes a duty to protect persons somewhat removed (as to space, time, or other relationship) against injuries not ordinarily to be expected, the policy determination is the same, regardless of whether "duty," "foreseeability," or "proximate cause" terminology is used. It is made by balancing the desirability of compensating injured parties on one hand against the deterrent effect such recoveries will have on normal human activity and especially on development in new areas. The question often boils down to whether the plaintiff should assume such risks and provide for compensation through his own life, health, property, or income insurance or the defendants should provide compensation through a public liability policy.

In discussing the legal problems of atomic energy it seems best to avoid the confusion involved in distinguishing between these three terms. Regardless of which term is used, courts typically do not insist that the defendant be legally liable for every single consequence caused in fact by his negligent act. This is true even when strict liability is applied, apparently because, as discussed later, certain classes of persons and injuries may not be allowed compensation. In analyzing the legal problems created by a new area of activity which presents a danger of serious harm to any person, the first question is to what extent will liability be imposed for all of the harm resulting from this action. It

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7 Id. at 1018, 1019.
is toward the solution of this problem as it relates to atomic energy operations that attention will be directed here. Recognizing that the trend is toward a system of strict liability, and what Harper and James describe as a social insurance philosophy of tort liability, it seems perfectly clear that this question will still have to be answered: Just how far will the responsibility for negligent action be imposed on the wrongdoer when a reasonably prudent man would think that the person injured or the injury (as to kind or amount) was quite remote or indirect?

The great mass of legal writing on this subject apparently can be reduced to nine or ten printed pages, if we accept the work of the authors of the two leading treatises in the area. While Harper and James point out differences between their interpretation and that given by Dean Prosser to the Palsgraf type of case, one cannot help but be struck by the remarkable similarity of their conclusions. We see nothing in the atomic energy area which would call for a different analysis of the scope of duty from that reached in these two treatises. The representative cases discussed in detail in each of these treatises indicate how far courts will go in extending the scope of duty owed by the person using radioactive materials.

Perhaps it is attempting to reduce the irreducible, but it seems fair to say, at least for analyzing atomic energy problems, that there are just two basic questions: (1) is the wrongdoer defendant liable only for those kinds of injury which would be reasonably foreseeable; and (2) is the defendant liable only to those plaintiffs injured by his wrongdoing whom he reasonably could have foreseen might be injured? The authors of both treatises conclude that there are differences among the courts on both of these questions.

As to whether the defendant is liable for unexpected types of injuries to a plaintiff who reasonably might have been foreseen to be injured in some way, Prosser states that “most courts agree that there may be liability for unforeseen consequences, beyond the original risk, to those within the zone of apparent danger.” Harper and James feel that the matter is left in some doubt when one considers all of the decided cases, but in general they agree with the broad statement made by Prosser.

Among the many cases cited to support this broad proposition is Rasmussen v. Benson. There the court permitted recovery for all

9 Prosser 171.
10 Harper & James 1021 ff.
damages claimed even though one item was the sickness and death of the plaintiff resulting from worry over the loss of live stock caused by the poisoned feed carelessly furnished by the defendant. Another example is the famous *Polemis* case, where the court found liability since it was foreseeable that the negligent dropping of a plank into the hold of a ship might do some damage to the ship even if it was not foreseeable that it would cause a spark which would then start a fire which would destroy the ship. There are limits, however, to how far we can carry this idea. Even Harper and James point out that while it is negligent to allow a child to have a loaded pistol, liability will not be imposed for all of the harm which follows. Liability may follow even though it is not possible to foresee the particular persons that may be injured, because it is possible to foresee that injuries may occur if the child discharges the pistol. On the other hand they point out that, while it is foreseeable that the child may drop the gun on somebody's toe or throw it through a window, the gun would be no more dangerous in this respect than any other object of a similar size and weight. They concluded that, while we could anticipate injury to some person from discharge of a firearm and that this would be an unreasonable risk, we could not foresee any unreasonable risk from dropping or throwing the gun. It is therefore possible that only certain types of injuries, even to plaintiffs foreseeably within the zone of danger, will be covered by scope of duty concepts.

The question of foreseeability becomes much more significant when considering the second question: to what injured parties must the plaintiff respond? While the dissenting judges in the *Palsgraf* case (and the decisions in a few other cases) seem to take the position that once the defendant has been guilty of a breach of duty toward some one person he thereafter is liable for all damages to all parties injured as a result of that negligence, generally it is agreed that foreseeability, sometimes phrased in terms of proximate cause, is the criterion by which the courts determine whether the injury to the particular plaintiff is compensable. It seems somewhat illogical to use foreseeability to determine which plaintiffs can recover but not to limit the kind of injury for which a foreseeable plaintiff can recover. In any event it is clear

14 Prosser 170, 171 suggests that the majority view in *Palsgraf* may not be followed in most cases. Cf. Harper & James' explanation at 1024-26.
15 Prosser 171, "There appears to be an essential inconsistency in holding that one who can foresee harm to A is liable for unforeseen consequences to A, and refusing to hold him for unforeseen harm to B."
that at least in many jurisdictions some limitation will be placed by the court upon the types of injuries and the plaintiffs who will be allowed to recover. This determination will be made on the basis of what reasonably could be foreseen. The lawyer dealing with atomic energy cases certainly must keep this limitation in mind, but he also must note the trend toward a greater willingness to hold wrongdoers liable for more and more of the consequences of their wrongdoing. A few of these frontier cases will indicate the scope of this trend.

The Tennessee court in 1940\textsuperscript{16} allowed the jury to decide the question of whether it was reasonably foreseeable that when a customer fell on a defective mat in defendant's store another customer would be hurt in the rush to come to the first customer's aid. Although the question was left to the jury, the test still was whether the result was foreseeable. Two Wisconsin cases show how variable this concept of foreseeability can be in determining the scope of duty. In 1933 in \textit{E. L. Chester Co. v. Wisconsin Power & Light Co.},\textsuperscript{17} the Wisconsin court submitted to the jury the question of whether the particular injury which resulted from defendant's negligence in allowing gas to escape from a broken valve in a gas main should have been anticipated by the defendant. The gas from the broken main seeped through twenty feet of earth and exploded under plaintiff's store building, demolishing it. The court submitted the question to the jury although it recognized that in general all that needed to be anticipated was some injury to the plaintiff. Again in 1952 in \textit{Pfeifer v. Standard Gateway Theater},\textsuperscript{18} the Wisconsin court was faced with a case brought against the operator of the motion picture theater for injury suffered by a plaintiff customer who was struck in the eye by a spitball shot from an unknown source. The alleged negligence was failure to control a group of rowdy hoodlums in the theater. The court decided that the jury should be left free to determine whether or not allowing such rowdyism to continue was negligent because it might result in spitballs being projected with injury to persons such as the plaintiff. The supreme court then went ahead to say that if the jury found the negligence was a "substantial factor" it would then be a matter of law for the court to decide whether or not public policy required that there be liability. In doing so the court overruled the Chester case to the extent that it allowed the jury to limit liability if it finds the injury too remote to be reasonably foreseeable.

\textsuperscript{16} Jackson v. B. Lowenstein & Bros., 175 Tenn. 535, 136 S.W.2d 495 (1940).
\textsuperscript{17} 211 Wis. 158, 247 N.W. 861 (1933).
\textsuperscript{18} 262 Wis. 229, 55 N.W.2d 29 (1952).
An English case involving a major submarine disaster is a good example of the use of foreseeability to limit the scope of duty of a negligent defendant. In *Woods v. Duncan*¹⁹ the shipbuilder and its subcontractor were guilty of negligence in painting over some test holes in torpedo tubes which were designed to show whether or not they were filled with water. In actions brought by widows of civilians who were riding the submarine during the test dive the House of Lords held that the companies were not liable for the deaths that ensued because of the sinking of the submarine when it filled with water. There were questions of whether the submarine officers who were handling the controls were intervening agents, and if the doctrine of *res ipsa loquitur* could be used to prove causation, but the point upon which most of the Lords agreed was that it was not reasonably foreseeable that painting over a test hole in the torpedo tubes would result in the flooding of the submarine to the point where it would sink. The majority felt that the causal relation between the negligence of the defendant and the deaths was too remote to hold them liable for the disaster, although it was a contributing cause-in-fact. They felt that the extraordinary loss of life was outside the scope of reasonable foreseeability and therefore outside the scope of duty owed by the defendant.

In *Mize v. Rocky Mountain Bell Telephone Co.*²⁰ however, the Montana court felt that the defendants should have anticipated that their high tension wire might come into contact with an uninsulated telephone wire which was otherwise harmless. The consequent electrocution occurred at a point many miles distant from the place at which the high tension wire touched a guy wire running from one of the telephone poles to the ground.

Somewhat more closely analogous to the situation that may possibly arise in connection with atomic energy operations are the fire and stream pollution cases. In an early case the Missouri court held the defendant railroad liable on the ground that it should have reasonably anticipated the injury that resulted and that there was no independent intervening agency which would excuse the defendant.²¹ In this case grass on the right of way of the railroad was negligently set on fire. The fire burned the grass for a distance of three miles and then apparently died out. A hard wind revived the dying fire the next day, however, and it finally destroyed the plaintiff’s house some five miles

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²⁰ 38 Mont. 521, 100 Pac. 971 (1909).
away. The court held the defendant liable, noting that high winds were not infrequent in the area and should have been anticipated.

In a much more recent case the New Hampshire court made an interesting distinction that may be applicable to atomic energy situations. In *Beard v. Boston and Maine Railroad*\(^{22}\) the court drew a line between the plaintiffs whose homes abutted the railroad property and those that were located four to six miles distant from the point where the fire was started by the negligence of the railroad. The cause of action arose under a statute imposing strict liability, but on the question of what plaintiffs were to be protected the court seemed to be using the foreseeability test. The court said:

... [The statute] was not intended to apply to all damages . . . regardless of the intervening factors of time, distance, manner of communication and other circumstances which may vary from fire to fire.\(^{23}\)

Two cases involving stream pollution show the conflict in approach one finds among the various courts. In *Hoag v. Lake Shore & Michigan Southern Railroad Co.*\(^{24}\) a train loaded with crude oil was involved in a wreck caused by the negligence of the engineer who failed to notice a landslide on the tracks. The cars burst and the oil caught fire and ran into a nearby creek. The plaintiff’s house, located several hundred feet downstream was damaged. The court held that it would be unreasonable to conclude that the engineer should have anticipated the burning of the plaintiff’s property as a consequence of his negligent failure to keep a sharp lookout. The court mentioned among other things that applying liability to the defendant in this case “would be a severe rule to apply, and might have made the defendants responsible for the destruction of property for miles down Oil Creek.”\(^{25}\) The court felt that the flowing stream was an intervening independent agency, making the cause too remote and hence the imposition of liability unjustified. Three years later a New Jersey court came to the opposite conclusion\(^{26}\) on somewhat similar facts. In this case there was a negligently-caused train collision. One of the trains included twenty-five cars loaded with oil. The oil tanks burst and the contents ignited when they came into contact with the fire of the locomotive; the oil ran into a small creek and thence into a larger river and from there to the

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\(^{23}\) Id. at 471, 472.

\(^{24}\) 85 Pa. 293, 27 Am. Rep. 653 (1877).

\(^{25}\) Id. at 299.

\(^{26}\) Kuhn v. Jewett, 32 N.J. Eq. 647 (1880).
plaintiff's building on the bank of the river. Criticizing the Hoag decision, the court used the following language:

... [W]here a fire originates in the negligence of a defendant, and is carried directly by a material force, whether it be the wind, the law of gravitation, combustible matter existing in a state of nature, or other means, to the plaintiff's property and destroys it, and it appears that no object intervened between the point where the fire started and the injury, which would have prevented the injury, if due care had been taken, the defendant is legally answerable for the loss.\(^{27}\)

The so-called rescuer cases have brought forth some of the most extreme extensions of the foreseeable risk test in determining duty. Certainly similar situations will arise in the atomic energy area. One of the classic cases is \textit{Hines v. Morrow}.\(^{28}\) There the defendant was negligent in allowing a mud hole to remain in the highway. The plaintiff rescuer broke his wooden leg in attempting to tow a stalled car out of the hole. The wooden leg became stuck in the mud and a loop in the tow rope caught on the leg causing it to break. The court said this was foreseeable. Again in \textit{Lynch v. Fisher}\(^{29}\) we find another extension of the foreseeability doctrine. The defendant left a truck on the highway at night without lighting flares. Another car crashed into the unlighted truck and caught fire. The plaintiff, in the role of rescuer of the occupants of the car, returned to the car for a floor mat on which to put one of the victims. The husband of the victim for whom the mat was being procured was temporarily deranged by the accident and shot the plaintiff in the leg with a pistol. The court held the truck owner liable because it was foreseeable that a car might crash into it and that somebody might come to the rescue, even though the particular consequences resulting in injury to the plaintiff could not be foreseen. The court said this was immaterial.

If this kind of injury is within the scope of duty owed by a negligent defendant, it is not difficult to conclude that a rescuer of victims in transportation accidents where radioactive material is being transported would be allowed to recover for any radiation injuries he received in attempting to rescue crew or passengers. The courts now seem to hold that rescuers at least are foreseeable plaintiffs in such situations.\(^{30}\)

An interesting duty concept somewhat related to the rescue cases is

\(^{27}\) \textit{Id.} at 651.


\(^{29}\) 34 S.2d 513 (La.2d Cir. C.A. 1947).

\(^{30}\) Prosser 173.
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found in *L. S. Ayres & Co. v. Hicks*,\(^\text{81}\) where a boy’s finger was caught in an escalator in the defendant store. The court held that the defendant was liable although there was no negligence in the construction of the escalator. The defendant was held liable because it was slow in coming to the assistance of the boy and stopping the machinery so that he could be released. The court said there was a duty to come to the assistance of a person who had been injured by an instrumentality under the defendant’s control. This case raises a question as to the extent of the duty resting on a person controlling a radiation source who in a non-negligent, and therefore non-liable, manner exposes another to radiation. Perhaps there is a duty not only to stop the exposure as soon as possible, but also to see that the victim is at least warned of the need for specialized medical care. This latter suggestion, of course, is an extension of the facts in the *Hicks* case, but even treatment may be required if it should prove necessary to give immediate and specialized care to minimize the radiation injury.

The reasoning of the Arkansas court in a case decided ten years ago\(^\text{82}\) certainly would seem to be applicable to situations that can be anticipated in the atomic industry. In this case the defendant, a chemical company, had sold a weedkilling spray to be used in dusting crops with an airplane. The spray traveled downwind a considerable distance and damaged the crop on the plaintiff’s farm. As will be discussed later,\(^\text{83}\) the main concern of the court was as to whether or not the defendant was negligent in not having conducted research to determine how far wind could carry its spray. The case, however, also stands for the proposition that distance and the intervention of natural forces do not prevent the imposition upon a defendant of a duty of due care to a remote plaintiff.

Harper and James emphasize the similarity of the inquiry when determining what action is so unreasonably dangerous as to constitute a lack of care and what is the scope of the duty owed. They then point out:

Neither inquiry stops with what might be called the physical range of foreseeable harm, or with mere proximity in time or space. In both we look to see what natural forces and what human conduct should have appeared likely to come upon the scene, and we weigh the dangerous consequences likely to flow from the challenged conduct in the light of these interven-

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\(^{81}\) 220 Ind. 86, 40 N.E.2d 334 (1942).

\(^{82}\) Chapman Chemical Co. v. Taylor, 215 Ark. 630, 222 S.W.2d 820 (1949).

\(^{83}\) See text *infra* at note 54.
tions. And in this inquiry foreseeability is not to be measured by what is more probable than not, but includes whatever is likely enough in the setting of modern life that a reasonably thoughtful man would take account of in guiding practical conduct. Just as this broadening of the quest adds to the risks which may make conduct unreasonably dangerous, just so does it add to the range of duty. Dynamite caps carelessly left accessible to children may be long hidden or taken many miles before there is an explosion. An automobile made defectively in Detroit may be sold in Seattle or Miami before it brings harm. The victim of the explosion or the defect is none-the-less within the class to which the duty is owed.\textsuperscript{84}

For each example they cite two cases upholding their conclusions.

The application of this kind of reasoning to atomic energy cases seems very likely. This means that the peculiarities of atomic energy, which will cause long delayed injuries, at great distances from the negligent act and possibly occurring after many chemical transmutations, will not prevent imposition of a duty to use due care toward all those parties who reasonably could have been foreseen as likely to come in contact with the radioactive material.

It is the conclusion of the present writers that in those cases where strict or absolute liability is not applied, atomic energy cases, insofar as the scope of duty is concerned, will be decided in accordance with the normal rules, although the fact situations will call for application of those rules in somewhat different situations than have been known heretofore. It seems rather clear that the courts will not impose a duty on defendants as to all persons that may possibly be injured by radioactive substances negligently released. Whether stated in terms of scope of duty, foreseeability, or proximate cause, some such limitation seems very likely. It is even possible that a court, as a matter of social policy, will place such a limit on possible plaintiffs so as not to impede unduly the development of a new industry. It seems equally clear, however, that the range of plaintiffs to whom the atomic energy entrepreneur will be liable is extremely broad, and that time, space, and transformation characteristics of radiation sources will not place any very serious limitations on the rights of injured persons to recover.

2. Breach of the Duty to Use Due Care

In establishing his right to recover from a particular defendant the plaintiff must show not only that the defendant owed a duty to protect

\textsuperscript{84} Harper & James 1019-20.
plaintiff against the type of injury sustained, but he also must show that the defendant's actions were negligent in the sense that they did not meet the standard of conduct legally required in such circumstances.

Frequently in analyzing the breach question courts will use the word "duty." They may say there is a "duty to use due care," or there is an affirmative "duty to warn" or to take advantage of new techniques. In these cases, however, courts are using it to state that the reasonably prudent man in the circumstances, either would not do certain things or would do others, and if defendant fails to meet this duty it constitutes a breach of the required standard of conduct. It is not enough, of course, merely to state that there is such a duty; the standard of conduct must be defined and this is a fact to be found by the jury or the court if there is no jury. At the appellate level this means that the inquiry is whether or not there is sufficient evidence to support the finding below.

a. General Principles Concerning the Standard of Conduct

There have been many attempts to define what is meant by negligence. One of the earliest definitions by a legal scholar states that it is "conduct which involves an unreasonably great risk of causing damage." The Restatement calls it conduct "which falls below the standard established by law for the protection of others against unreasonable risk of harm." Harper and James summarize it as failure to do "what the reasonably prudent person would do under the circumstances." Prosser, after quoting the above, along with many other statements by courts and legal scholars, emphasizes the need for taking particular circumstances into account when he says, "The conduct of the reasonable man will vary with the situation with which he is confronted. The jury must therefore be instructed to take the circumstances into account; negligence is a failure to do what the reasonable man would do 'under the same or similar circumstances.'"

Much has been written about what the reasonable man is and what constitutes a standard of conduct sufficient to avoid the charge of negligence. Very little of the literature is of any value to the lawyer advis-

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86 Restatement, Torts §282 (1934).
87 Harper & James 902.
88 Prosser 125.
89 Prosser uses 50 pages beginning at Prosser 124. Harper and James use 120 pages, beginning at Harper & James 896. See also dozens of law review articles on all phases cited in each treatise on various phases of the concept of the reasonable man.
ing clients in the atomic energy business. The questions of whether defendant or his agents are blind, insane, drunk, of tender years, or have normal intelligence, memory, and perceptive abilities are not likely to be involved in radiation cases. In any event it is difficult to believe that a jury pays much attention to these distinctions lawyers have concocted to describe that hypothetical person, the reasonably prudent man, that "ideal-normal" being (if there can be such a combination).40

(1) Specific Standard Not to Be Found in the Cases

It would be helpful to the atomic energy lawyer if one could distill from the cases some specific standard of conduct expected of persons using dangerous material, compliance with which would give immunity from tort liability. Such analysis would be of great help to the nuclear entrepreneur in establishing operating procedures. Unfortunately, after searching literally hundreds of cases, the writers have found nothing of any real significance establishing what is the standard expected of the reasonably prudent man. Certain general cautions will be suggested which have significance in establishing safety procedures, but it is impossible to state what constitutes due care in general—it always must be related to the specific facts of each individual situation. The authors have come to the conclusion, although with disappointment, that the treatise writers are correct when they state that the proper rule, and the one that almost always is followed by the courts is that the standard of conduct legally required "depends upon the circumstances." Prosser states it as follows: "Although the language used by the courts sometimes seems to indicate that a special standard is being applied, it would appear that none of these cases should logically call for any departure from the usual formula. What is required is merely the conduct of the reasonable man of ordinary prudence under the circumstances, and the greater danger, or the greater responsibility, is merely one of the circumstances, demanding a greater amount of care." 41 He then con-

40 In Herbert, Misleading Cases in the Common Law (2d ed. 1927), cited in Prosser 125, the author characterizes the reasonably prudent man as "this excellent but odious character [who] stands like a monument in our Courts of Justice vainly appealing to his fellow-citizens to order their lives after his own example."

41 Prosser 147-48. For cases using language about the high degree of care, see, e.g., Read v. Lyons & Co., [1946] 2 All E. R. 471 (munitions factory—dictum); Rakowski v. Raybestos-Manhattan Inc., 5 N.J. Super. 203, 68 A.2d 641 (1949) (discussed infra note 175); Merlo v. Public Service Co., 381 Ill. 300, 45 N.E.2d 665 (1942); and Chase v. Washington Water Power Co., 62 Idaho 298, 111 P.2d 872 (1941), both dealing with electric utility power lines, discussed infra Chapter IV. See also language in Chapman Chemical Co. v. Taylor, supra note 32.
cludes that while some courts talk in terms of degrees of care, really all they are saying is that the circumstances require somewhat greater precautions on the part of the defendant, but that it is still the same standard; i.e., what the reasonably prudent man would do under the circumstances. Harper and James put the concept in somewhat different terms, but essentially it amounts to the same thing. They conclude that it is impossible to state in general what will be considered negligent or not negligent. Instead they say there are three factors which must be weighed in each case in determining whether or not the standard of non-negligent conduct was met by the particular defendant in the particular circumstances. These three factors are: (1) the likelihood of harm; (2) the seriousness of the potential injury; and (3) the value of the interest to be sacrificed. They conclude that the amount of caution required tends to increase with the likelihood that the conduct will cause damage to others. They also conclude that the amount of care demanded will increase with the seriousness of the injury that will result if an accident happens.

The first two factors must be balanced, though, against the third, that is, what is sacrificed if we are to avoid the risk created by the danger. Their conclusions are consistent with those drawn by Prosser and are aptly summarized by them in a quotation from an old Nebraska opinion. The case involved injury to children from playing on a railroad turntable, and the court said:

The business of life is better carried forward by the use of dangerous machinery; hence the public good demands its use, although occasionally such use results in the loss of life or limb. It does so because the danger is insignificant, when weighed against the benefits resulting from the use of such machinery, and for the same reason demands its reasonable, most effective and unrestricted use, up to the point where the benefits resulting from such use no longer outweigh the danger to be anticipated from it. At that point the public good demands restrictions. For example, a turntable is a dangerous contrivance, which facilitates railroading; the general benefits resulting from its use outweigh the occasional injuries inflicted by it; hence the public good demands its use. We may conceive of means by which it might be rendered absolutely safe, but such means would so interfere with its beneficial use that the danger to be anticipated would not justify their adoption; therefore the public good demands its use without them. But the danger incident to its use may be lessened by the use

of a lock which would prevent children, attracted to it, from moving it; the interference with the proper use of the turntable occasioned by the use of such lock is so slight that it is outweighed by the danger to be anticipated from an omission to use it; therefore the public good, we think, demands the use of the lock.\textsuperscript{48}

There are a few situations in which the courts have tried to work out, as a matter of law, certain standards of conduct which, if met, will immunize the defendant from a charge of negligence, or, if not met, will establish negligence. The cases in which anything like a set of standards has been worked out, however, involve situations having no application to atomic energy operations. Usually they have involved railroad crossing situations, such as the rule to stop, look, and listen. Sometimes, in automobile or pedestrian cases the courts have laid down absolute rules defining negligent action. None of these has any application to the complicated scientific and engineering activities which will be involved in the atomic energy business. Actually, most of the cases merely state what the defendant did or failed to do, and the jury, or the court, as the case may be, concluded that this either was or was not negligent. Since most of the cases speak in these general terms, all that can be concluded is that what was held to be negligent conduct in any specific case will be held to be negligent again only if exactly the same set of circumstances arise. This latter condition means there is no practical value whatsoever in using these cases to determine whether or not a person’s actions in a new situation meet the legal standard. A plaintiff has to show only that the defendant’s conduct in the particular circumstances was not up to the prescribed standard; he does not have to show what would have constituted proper conduct. Courts have been reluctant to do more than conclude in a particular case that the standard of due care was or was not met without any real discussion of why this was so, other than that the reasonably prudent man under the circumstances would or would not have done it this way. We agree with the treatise writers that each case turns on its own facts and that a given set of circumstances seldom if ever arises a second time.

It is true that Mr. Justice Holmes apparently felt that detailed minimum or maximum standards of conduct could be worked out by the courts over a period of years as situations occurred and reoccurred.\textsuperscript{44}


\textsuperscript{44} "A judge who has long sat at nisi prius ought gradually to acquire a fund of experience which enables him to present the common sense of the community in ordinary
Desirable as this would be from the standpoint of the potential defendant, the conclusion of the treatise writers that this is not what the courts have done seems justified. While much of the discussion in the treatises deals primarily with the question of whether it is for the court or the jury to determine negligence, it seems quite clear that the same conclusion would be reached whether the judge or the jury makes the final decision. It is generally agreed, of course, that the jury in the usual case should make the decision. 45

We see nothing in the atomic energy area to cause the application of any different rules for the standard of care than the one described above. The character of radioactive material, both as to its potentiality for harm and as to the likelihood that harm will result from its use, does not seem to call for the application of any different rules concerning the required standard of conduct. In some cases, where the material is very dangerous and well might travel long distances, last a long time, and expose many people, extraordinary precautions will have to be taken. Where the danger is very slight surely the courts will find that much less by way of precautionary steps will be required. Because we have knowledge of the unusual characteristics of radioactive materials, however, it behooves the person using them to think seriously about the degree of risk involved and what precautions can be taken without undue impediment to the effective utilization of their many beneficial characteristics.

(2) Some General Cautions to Observe

Although it is impossible to establish affirmatively what will be considered reasonable, perhaps it will give perspective to the atomic energy lawyer if we consider what courts have stated about the degree of caution that must be used if one is to avoid a charge of negligence. Sometimes courts speak of the need to use a high standard of care, but they seem to be saying merely that under the circumstances, because the instances far better than an average jury. He should be able to lead and instruct them in detail, even where he thinks it desirable, on the whole, to take their opinion. Furthermore the sphere in which he is able to rule without taking their opinion at all should be continually growing." Holmes, The Common Law 124 (1881).

45 In Detroit & M.R.R. v. Van Steinberg, 17 Mich. 99, 120-21 (1868), Judge Cooley remarked, "The case, however, must be a very clear one which would justify the court taking upon itself this responsibility. . . . The difficulty in these cases of negligent injuries is, that it seldom happens that injuries are repeated under the same circumstances; and, therefore, no common standard of conduct by prudent men becomes fixed or known."
substance or situation may be quite dangerous, a reasonable and prudent man would use greater precautions, not that there is a higher basic standard of due care. For our purposes there are three groups of cases indicating at least certain kinds of precautions which might be required of persons dealing with radiation hazards.

(a) An Obligation to Keep Abreast of Technological Developments—Use of Experts

The concept most likely to be troublesome in atomic energy negligence actions is the requirement that users of dangerous material keep abreast of available safety techniques and methods of evaluating hazards. This is a new and rapidly developing science about which there is a great deal to be learned, even as to the fundamentals. Especially for the users of high level radiation sources within the intermediate range of radioactive half-lives, it is important to keep up to date as to safety techniques.

An application of the general idea that one must keep up with the times is found in the decision in *The T. J. Hooper* case. The loss of two coal barges in a storm was held to be the result of the defendant's negligence in not equipping his tug with a radio receiving set which would have enabled the master to keep in touch with the shore and learn of the approach of the storm in time to have taken shelter. Judge L. Hand concluded that radio was a well known device in 1928 and could have been installed quite cheaply. He reached this conclusion notwithstanding the fact that of all the tug lines, only one used radio receivers on its boats.

The degree of foresight that may be required in the name of what is reasonably foreseeable and what is a reasonable device for the prevention of accidents is illustrated by *Marsh Wood Products Co. v. Babcock & Wilcox Co.*, a Wisconsin case decided in 1932. In this case the construction company (which is now in the business of constructing atomic reactors) was held liable for the injuries resulting from the explosion of a boiler tube. The tube had exploded under the pressure of eighty pounds of steam although it was designed to withstand one hundred-fifty pounds. Plaintiff's evidence consisted chiefly of the testimony of a university professor of metallurgy. He had prepared samples of the tube for a microscopic examination to discover the texture

46  60 F.2d 737 (2nd Cir. 1932).
and structure of the steel and thus to ascertain its soundness. He testified that his examination of the steel indicated that there were impurities which well may have caused the rupture. The defendant in the case selected the highest quality steel available in the industry, made the usual hydrostatic test at a pressure of a thousand pounds to determine soundness, and found no leaks. The plaintiff's witness stated that he thought a microscopic examination was required if one was to be sure that the steel was sound. He admitted, however, that he knew of no single manufacturer or seller of tubes who made such an examination during the course of the manufacturing operations. In deciding whether this evidence justified submission of the question of due care to the jury the court stated:

Is this evidence sufficient to permit the jury to find that the failure to institute the metallographic examination by defendants constitutes negligence? We have concluded that it is sufficient. It represents the judgment of recognized experts in the field as to the requirements of the art in which they are experts, and it is our conclusion that the jury might accept the opinions as establishing the reasonableness of instituting this test and the necessity for its institution in order to discharge a duty of due care. The fact that it was not the practice of tube manufacturers generally to use these tests, and that such an examination is not incorporated in the specifications of the American Society of Mechanical Engineers, or required or provided for in the Wisconsin Boiler Code, is certainly strong evidence against the position taken by the Professors McCaffery and McKay, but it does not dispose of their evidence as a matter of law. . . . Obviously, manufacturers cannot, by concurring in a careless or dangerous method of manufacture, establish their own standard of care.

In Trowbridge v. Abrasive Company of Philadelphia, plaintiff sued for damages caused by disintegration of an abrasive wheel. Here again the defendant followed the practice of the industry and tested only the centrifugal stress of its products. No test was made of the stress of vibration and impact or shock on grinding wheels and the possibility of disintegration from these forces. Again a university professor testified that adequate equipment for testing these stresses could and should have been designed for the abrasive industry since there was sufficient basic knowledge in other industries to make such tests feasible. A verdict of $150,000 was upheld.

48 Id. at 218-19.
49 190 F.2d 825 (3d Cir. 1951).
These cases are very important for our purposes, not only because they indicate the necessity of making use of the best possible safety devices so long as they are economically feasible but also because the cases involved the use of expert witnesses to establish what is a reasonable course of conduct under the circumstances. It is clear that the same kind of expert witness will be needed in most radiation cases.

It should be remembered in considering this problem that it is not enough that the defendant use his own best judgment or that he believes he has acted with reasonable care. Beliefs or desires to act reasonably are never a defense. It is also true that in general one must comply with the customary practices of a particular industry or area of activity to avoid a charge of negligence, and that compliance with those customary standards in many cases will justify a finding that the defendant acted with due care. The cases discussed above make it perfectly clear, however, that compliance with the customs of the industry will not necessarily be sufficient, but is merely evidence bearing on the question of what circumstances require by way of reasonable conduct. The cases also clearly demonstrate that, in dealing with material which calls for extra precautions and special knowledge, one must take advantage of advice that can be obtained from recognized experts in the field and that the standard of care usually will be the standard suggested by the experts. Certainly the cases described above follow this principle.

One other case warrants discussion at this point, not only because it indicates the kind of imagination that may be required of a defendant but also because it illustrates the questions that may arise when expert witnesses are used. The defendant in *Air Reduction Co. v. Philadelphia Storage Battery Co.* furnished tanks of oxygen under pressure to the plaintiff and provided a manifold to control the release of the gas. Fire broke out while the oxygen was being delivered through the manifold and the plaintiff's factory was destroyed. The experts produced by the plaintiff testified that a steel surface, especially if it was bored, when exposed to oxygen under pressure created a likelihood of fire. They also testified that the use of brass, copper, or cast pipe of any material would reduce the danger. In spite of the fact that the defendant's experts gave testimony leading to the opposite conclusion, the court

51 See cases cited at Harper & James 978, n. 5.
53 14 F.2d 734 (3d Cir. 1926).
upheld the jury's verdict for the plaintiff. This case again indicates the degree of foresight and the kinds of precaution for which the defendant may be held responsible. It seems to be exactly the kind of situation that may arise in the atomic industry where much is still to be learned about the science.

This case, of course, deals with a manufacturer's product liability, and the negligence questions arising in such cases are discussed more fully in Chapter V. These cases do furnish some general principles, however, which undoubtedly will control cases that do not involve product liability. Many of them do illustrate the degree to which the courts may hold a defendant responsible for following out a line of research directed toward minimizing the risks inherent in the use of materials which can cause serious injury. The Chapman Chemical Company case\(^{64}\) (involving the spread of weedkiller dust for several miles so as to destroy the plaintiff's crops) and the Pittsburgh-Des Moines Company case\(^{65}\) (concerning the failure of a new design of tank to hold liquefied gas) illustrate the proposition that, when dealing with a material known to have a great potential for harm, one is under an obligation to use extreme caution and explore all feasible means of reducing the risk of injury.

All these cases demonstrate that it is not enough to have acted in good faith or to have depended upon the opinion of just any expert. They also make it clear that when experts differ as to what is a reasonable standard of conduct the defendant probably will have to run the risk of submission of this issue to the jury. In some cases at least it will be necessary to go beyond the present custom of the industry in taking precautions. There is no reason to think these principles, developed chiefly in manufacturer's liability cases, will not be applied to negligence cases generally. It is recognized that radioactive materials are dangerous. The publicity that attended the dropping of the original A-bombs in Japan and the many testings of A- and H-bombs since then have made the general public aware of the dangerous potential of radioactive materials. No one can plead ignorance of its dangerous qualities. Since the potential for harm is relatively great, the courts very likely will find, perhaps as a matter of law, that the handling of even small quantities of these materials without the advice of experts is negligence. Certainly a jury would be permitted to so conclude. In fact, this would

\(^{64}\) Supra note 32.

seem to be justified by the policy decisions which Congress made in enacting the Atomic Energy Act of 1954—that this material is potentially very dangerous and should be handled with due regard for the public health and safety.

(b) Duty to Reduce Hazard After Accident—Obligation to Warn and Treat

The above cases, and others noted in the product liability chapter, deal with what one might call a duty to discover dangers and to evolve precautionary techniques when using new and hazardous substances. The law of negligence ordinarily does not impose an affirmative responsibility upon a person to use all reasonable efforts to save others from injury or to reduce injury which the person himself did not assist in creating. The escalator case 56 dealt with a situation where at least the defendant was responsible for the creation of the machine which did the injury and which the defendant had invited the public to use. This kind of case may indicate that the operator of an atomic reactor, even if he should not be held strictly liable, may be held to a standard of conduct which will minimize the losses occurring in the event of a non-negligent discharge of radioactive material endangering persons or property. While a categorical answer cannot be given, it would not seem unreasonable for a court to conclude that such entrepreneurs, should the accident happen and endanger many lives, must take proper precautions to reduce the resultant injury even though they are not held legally responsible for the accident itself. This may dictate that the reactor operator prepare plans to give warning of the danger should it arise, to cooperate in the evacuation of personnel if this seems wise under the circumstances, and to direct the decontamination procedures that may be required should a serious reactor burn-up occur. While the danger may be somewhat less in other activities involving the discharge of radioactive material into streams or into the air from other operations, the same basic principle would seem to apply. *The user of radioactive materials may be required not only to give warning of the discharge and consequent danger but also to participate in the steps needed to minimize the resultant injuries.* In the event of a serious reactor incident, it might be best not to warn people of the potential danger since such warning could cause panic. Certainly attempting the evacuation of a large city within the space of a few hours before a radioactive

56 *Supra* note 31, where the defendant was held liable for not acting fast enough in aiding a boy caught in the escalator.
cloud covers the city might cost more lives than keeping people within their houses. This is not the kind of decision that should be made by default, however, on the theory that if one refuses to recognize a danger it may go away. It should be a decision deliberately reached, in consultation with public officials who would, of course, have to participate in any such evacuation plan. Even persons who use radioactive materials in industrial or research operations where the potential for harm is much less should consciously make the same kind of decisions and work out disaster or accident plans with appropriate public officials, such as, city water departments or highway police.

(c) Duty to Use New Radiation Techniques

Radioactive material not only has a great potential for harm but also an even greater potential for good by way of assistance in research efforts. This fact itself creates an interesting problem which might be described as the other side of the coin. As mentioned above, although the law ordinarily does not require affirmative action by one not responsible for the creation of a dangerous situation, there are certain situations in which it recognizes that the relationship between the parties dictates that one of them take reasonable steps to prevent, minimize, or eradicate a dangerous situation. The most obvious example of this is the duty of the doctor to take reasonable steps to cure his patient. Even though he is not responsible for the patient's becoming ill, he is under an obligation to take such reasonable steps as other doctors would take under the circumstances. Most of the malpractice cases have involved an affirmative action of the doctor which increased the injury. There seems to be no reason, however, why a doctor should not be held negligent if he fails to make proper use of new diagnostic or research techniques which radioactive isotopes make available to him. One cannot foresee at the present time just what uses of radioisotopes will become common practice in the medical profession, but it is not difficult to predict that many uses will become generally accepted. The use of radioactive iodine $^{131}$I to detect the malfunctioning of the thyroid in a new infant while still in the mother's womb (thereby preventing cretinism) may be one example that someday will fit in this new category. The location of brain tumors and the treatment of hyperthyroidism by the use of such materials certainly is becoming more common, even though as yet it is not so well established in the medical community.
that it would be considered a lack of professional skill to fail to use it.57

The situation here contemplated is more like the case where a patient goes to a doctor under the assumption that he needs treatment, and the doctor makes a faulty diagnosis. *Kuhn v. Banker* 58 comes close to illustrating this affirmative duty. There the doctor properly set part of a broken femur bone in the patient and a union apparently formed. The doctor was held guilty of negligence, however, for failing to use an X-ray photograph to determine the reason for the patient's complaint at a later time that there was a grinding sensation in her hip where the broken bone was located. The court clearly suggested that the attending physician was negligent in failing to use an X-ray photograph in these circumstances. The court held, however, that since no evidence was offered to show that the ultimate failure of the break to heal was caused by the failure to diagnose the case correctly there was no proof of proximate cause; therefore the directed verdict for the defendant was upheld. There are a number of other cases in which the court held in one way or another that failure to use X-rays as a diagnostic technique would constitute negligence under the proper circumstances.69

Even though the defendant is in no way responsible for the plaintiff's dangerous position, these cases perhaps support the proposition that, because of the status relationship (in this case that of doctor-patient), the defendant is obliged to take account of new devices, information, or techniques which will make those services more adequate for the needs of the plaintiff. This responsibility might arise in connection with the designs, architectural plans, or scientific advice60 used in a building, machine, or material going into the construction or operation of a reactor. Notwithstanding the fact that the malpractice cases indicate a very broad range of permissible judgment in which the professional person will not be held liable for a wrong judgment, it is possible that the courts may hold that the service must be rendered with imagination and with some ability to foresee the usefulness of new techniques.

57 See T. J. Hooper case, *supra* note 46 (tug company liable for loss of barges in storm for failure to install radios); Marsh Wood Products Co. case, *supra* note 47 (storage tank manufacturer liable for failure to use metallographic surveys of boiler tube steel); and a case reported in the N.Y. Times, June 15, 1955, p. 63, cols. 1, 2, in which a California couple initiated suit against Cutter Laboratories and a local retail distributor as a result of their four-year-old son's contracting polio after vaccination. 58 133 Ohio St. 304, 13 N.E.2d 242 (1938). 59 115 A.L.R. 298 ff. (1938). 60 Prosser 132-33 cites dentists, attorneys, engineers, accountants, druggists, X-ray operators, oil well shooters, threshers, and restaurant operators as other skilled trades where one must use a certain minimum of skill and knowledge.
Radiation as a source of energy or as a research tool surely will present many such possibilities.

In discussing the standard of conduct required, Prosser makes one statement which might be interpreted as indicating the existence of an affirmative duty not unlike the kind suggested here.

In many situations, a failure to disclose the existence of a known danger may be the equivalent of misrepresentation, where it is to be expected that another will rely upon the appearance of safety. The surgeon who remains silent when he discovers he has left his tools in the patient's anatomy, the landlord who leases defective premises, the landowner who permits a licensee to enter without warning of hidden perils, the seller or supplier of a chattel who fails to disclose its dangerous nature or its concealed defects, each may be liable to the person with whom he deals, or to others to whom harm is to be expected through that person's reliance.\(^{61}\)

Again, in discussing the duty concept Prosser points out from other cases that when a person voluntarily assumes a certain relationship to others, there may be the duty of affirmative conduct. After stating that in most of these cases the person held liable had made the situation worse than it was before, Prosser says:

In four cases involving gratuitous repairs by landlords, any such requirement has been rejected, and the defendant has been held to the obligation of reasonable care in his undertaking, although the plaintiff has not been further endangered, misled or deprived of other help.\(^{62}\)

Although these statements, and the cases cited in support of them, do not go quite as far as is suggested in our analysis above, recently they have been interpreted by the 4th Circuit Court of Appeals in a very broad manner. The decision comes rather close to the kind of affirmative duty we are suggesting. In *Union Carbide & Carbon Corp. v. Stapleton*,\(^{63}\) the court held the defendant corporation liable for failing to inform the plaintiff employee that a routine medical examination had indicated an inactive tuberculosis spot on his lung. After stating that there was no evidence that the tuberculosis which the employee had throughout the period of his employment was caused in any way by the fault of the company or the company doctors (there was no assertion of malpractice nor of negligent failure of the company to carefully select

\(^{61}\) Prosser 146.

\(^{62}\) Id. at 187.

\(^{63}\) 237 F.2d 229 (6th Cir. 1956).
a qualified physician), the court held the company liable for not hav­
ing notified the employee of these periodic findings of an inactive
tuberculosis spot. Finding that the disclosure could have been made
most conveniently by personnel other than the doctors who made the
examination and that the information was of a sort which they cer­
tainly could have given to the employee, the court said:

Failure of the appellant to disclose to Stapleton what its
records showed his condition to be was clearly a violation of
its duty to exercise ordinary care for his safety. By remaining
silent, the appellant permitted Stapleton to rely upon a tacit
assurance of safety despite its knowledge of the existence of
danger. . . . To warn Stapleton of a known but hidden de­
fect on its property would have been appellant's clear duty.
. . . Its duty to warn him of the known but hidden danger
here was no less clear. 64

Admitting the validity of the company's argument that it was under no
obligation to make a physical examination and that it should not be
penalized for voluntarily undertaking more than its legal duty, the
court nevertheless said:

But, when it undertook to do so, Stapleton was entitled to and
did rely on the expectation that he would be told of any
dangerous condition actually disclosed by that examination.
The appellant was therefore liable for injury to Stapleton
caused by its negligent omission to advise him of his tubercu­
lar condition. 65

The court relied upon the statements from Prosser quoted above, but
this does not seem completely justified. The case, however, indicates a
situation in which a status condition quite unrelated to any obligation
to give aid to or protect the plaintiff in the way contemplated neverthe­
less may impose a duty upon the defendant to take some kind of affirm­
ative steps to give any knowledge he has of potential dangers. The
court's emphasis upon the reliance of the plaintiff that a dangerous con­
dition would be reported to him suggests the possibility that an unex­
pected affirmative duty may result from status conditions that at first
glance would not seem to require any action by the potential defendant.
This reasoning might be applied to all who use radioactive material
which exposes another even though such users were not legally liable
for the exposure itself.

64 Id. at 232.
65 Id. at 232-33.
b. Effect of Statutory or Administrative Rulings

The liability of a person handling radiation sources cannot be determined fully without a consideration of the impact of statutory and administrative health and safety regulations. The number and scope of such statutes and regulations, both federal and state, is considerable. These rules and regulations will have considerable effect on the decision as to whether or not the defendant has been negligent.

All of the writers on the subject seem to agree that this problem breaks down into two kinds of cases: (1) those in which the statutes specifically provide civil liability for a breach of the statutory standards or the administrative regulations issued thereunder; and (2) those in which the statute provides only a criminal penalty or simply prohibits action with an injunctive type of enforcement that in no way deals specifically with the problem of tort liability of the violator. For our purposes there is no need to discuss the first category because the federal statute dealing with health and safety matters in atomic energy contains no provisions on possible civil liability from a failure to comply with one of the health and safety regulations of the AEC. There is one catch-all penalty provision, however, making it a crime to violate any of the regulations of the AEC. This certainly would include safety regulations. All other criminal penalty provisions very clearly are directed at violations involving danger to national security. In this respect the federal statute is like the Federal Food and Drug Act, not the Federal Safety Appliance Act. A reading of the entire legislative history of the Atomic Energy Act of 1954 has produced not a single

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66 Infra Part IV.
67 Infra Part III.
70 Id. at §§221, 222, 224-31.
72 Harper & James 994, n. 1, citing statutes and cases. There is not even an indirect indication of a legislative attempt to provide a standard of conduct for civil damage cases such as that in the legislative history of the Federal Safety Appliance Act and the provision that any employee injured as a result of a violation of the safety requirements of the act should "not be deemed to assume the risk thereby occasioned."
reference to the question of the effect of federal health and safety regulations on civil liability. Nor is there anything in the legislative history or the provisions of the Price-Anderson government indemnity amendment which gives any hint whatsoever of a congressional intent on this question. We are presented, therefore, with the second situation: What will be the effect of federal health and safety regulations on civil damage suits arising in the atomic energy areas subject to federal regulation? The same general rules apply to a violation of a state statute (and regulations issued pursuant thereto) if violation is made criminal or subject to administrative enforcement, but nothing is said about civil liability.

In a sense all of the federal health and safety standards are administrative in character as are many of the standards set up under state statutes, so it is important to note the distinction that some courts draw between statutory and administrative standards. Some give greater weight to statutory standards, yet all writers on the subject seem to agree that the important issue in both cases is whether to apply a rule of "negligence per se" or one of only "evidence of negligence." This same distinction is observed when considering cases in different states when both are dealing with only statutory standards. The real issue in most cases is whether violation of a standard, whether statutory or administrative, is "negligence per se" or only "evidence of negligence." For our purposes, therefore, hereafter the distinction between statutory and administrative standards is ignored except where it is mentioned specifically.

One further major point should be kept in mind when considering this problem. Although most of the cases have dealt with the question of whether failure to comply with a statutory standard imposes absolute liability, is negligence per se, or is only evidence of negligence, there is another group of cases, in which the defendant pleaded compliance with the statute or administrative standard as proof, either conclusive or presumptive, that he has met the requirement of acting as a reasonably prudent man under the circumstances. As pointed out later, this possibility has considerable significance for the person handling radioactive materials.

73 Probably the equivalent of 5,000 pages in an ordinary book when hearings are included. There are some references to health and safety matters but nothing referring to this question.
74 Insurance amendments discussed infra at end of Part III.
75 Morris articles, supra note 68; Harper & James 987-1014.
(1) Failure to Comply

Except in a few odd or anomalous cases which all writers criticize, mere proof that the defendant (or the plaintiff where contributory negligence is pleaded as a defense) has failed to comply with some regulatory or administrative rule of conduct and that the plaintiff has suffered injury is not sufficient to establish a breach of the standard of conduct which constitutes negligence. There must, of course, be a cause-in-fact relationship between the defendant’s action and the plaintiff’s injury. This is true in every negligence case regardless of whether or not there has been breach of a statutory requirement. Almost all courts agree that no weight should be given to the fact that the defendant breached a statutory standard if the standard was not established to protect the particular class of persons that includes the plaintiff, or if the standard was not created to guard against the particular injury suffered by the plaintiff. The leading case in this area is *Goriss v. Scott* where the court refused to hold that the defendant’s violation of the statute requiring carriers by water to provide separate pens for stock was any evidence of negligence in caring for the sheep which were washed overboard in a storm. It was clear that the act was directed at keeping sheep or cattle from being exposed to disease on their way into the country.

In many American cases this doctrine has been applied in situations arising under various types of regulations. Examples are, statutes controlling the length of time that trains may obstruct crossings, regulations determining where motor vehicles may stop or park when the regulations are directed at traffic problems such as delay and congestion but are not intended to prevent collisions, provisions requiring licenses for automobile drivers or physicians where the driver or physician actually was competent and met the normal standards of conduct even though he had no license, or Sunday laws which are meant either to observe a religious day or provide a day of rest but not to prevent vehicles which may be involved in accidents from going on the highway, or to prevent business men from fraudulently misrepresenting goods that they sell. While the policies underlying statutes setting up such standards of conduct occasionally are very narrowly construed, in gen-

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77 The odd cases are cited by Harper & James 96, nn. 6, 7, 8.
78 [1874] L.R. 9 Ex. 125.
eral the courts give them rather broad construction so long as the hazard actually created comes within the general scope of the harm legislated against and there is a cause-in-fact relationship between the defendant’s breach of the standard and the plaintiff’s injuries. A recent English case illustrates this liberal interpretation trend. The statute required that roofs in mines should be made secure. Apparently it was directed at preventing injuries from falling roofs. In this particular case the cause of the injury was somewhat different. Before the plaintiff came to the place of injury the roof had fallen, and the pile of debris caused the cart in which he was riding to be derailed. The House of Lords overruled the Scottish court’s decision which held that this was a different kind of harm from that intended to be covered by the statute. The House of Lords thought that the statute was directed toward preventing personal injury generally; therefore, since the failure to shore-up the mine roof properly was the cause of the plaintiff’s injury, the defendant lost his argument to the effect that the obstruction on the road was too remote from the negligent breach of the statutory standard. There are many American cases which would accord with this kind of broad construction of the statutory purpose in setting up a standard of conduct.

The other generally recognized requirement in treating violation of a statutory standard as negligence is that the person injured must fall within the class of persons meant to be protected by the statute. A good example is a statute which makes illegal normal business activity on Sunday. If a train running on Sunday kills a cow on the tracks, the mere fact that the statutory prohibition against running trains was breached is not sufficient to allow the owner to recover damages from the railroad. An even more graphic example of this proposition, perhaps, is the statute which requires that trains blow whistles when approaching crossings. Even if the whistle is not blown and a cow is killed, it seems rather clear that the statute was not intended to warn cows. Another example is the blackout statute enacted for the protection of the public at large and not for an air-raid warden attempting to put out a light showing in violation of the statute. This statutory purpose limitation is also applicable to the issue of contributory negligence, at least in most courts today.

There is another kind of case in which violation of a statutory stand-

81 Cases are collected in Prosser 154, Harper & James 1004.
82 Harper & James 1004.
ard will not be taken as evidence or proof of the defendant's negligence toward the plaintiff. While there is some difference of opinion among writers as to the exact theory for this exception, there is general agreement that the courts will excuse certain violations of statutory standards. Some of the cases involve situations where the defendant was not at fault and yet violated the statute, such as, in driving on the highway at night without tail lights which had gone out under circumstances beyond the driver's control, or driving on the lefthand side of the street where it was impossible to meet the statutory standard of driving on the right because of temporary obstruction, or when an emergency arises not within the control of the defendant and the only reasonable course of action is to do something in violation of the statute, or taking some precautionary measure that is even better than that required by the statute even though the statute itself is not complied with.

A very interesting excuse-violation argument was made in *Ursprung v. Winter Garden Co.* The regulation of the superintendent of buildings, requiring a guard around an elevator shaft, had not been published since there was no legal requirement for publication. The court excused the defendant on the ground that there was no proof that he knew of the existence of the code. One writer suggests that there are real possibilities for more frequent use of this kind of defense.

One of the distinctions most often discussed is whether violation of the statutory or administrative standard is negligence *per se* or only evidence of negligence. Writers seem to agree that the weight of authority still is in favor of negligence *per se*. There is a very respectable minority, however, which holds that it is only evidence of negligence, and there is some indication that the trend of authority is in this direction. The reasons for and against each rule are presented very well by Harper and James. For the most part, writers who have given serious consideration to the problem agree that the rule should be one of evidence of negligence only. When one takes into consideration the number of exceptions that must be worked out by the courts when they supposedly follow a negligence *per se* rule, the evidence of negligence

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83 Prosser 158; Harper & James 1004 et seq.
84 183 App. Div. 718, 169 N.Y.S. 738 (1918), discussed in Morris, supra note 76 at 151.
85 Morris, supra note 76 at 146-47.
86 Early writers thought this; see Prosser 161; Harper & James 997; Morris, supra note 76 at 146-47.
87 Harper & James 1013. But see contrary suggestion by Kaplan, supra note 71 at 47.
only seems the preferable one. Undoubtedly one of the reasons why some writers take this position is because the negligence *per se* rule often defeats the plaintiff when he is accused of contributory negligence on the ground that he violated some statutory standard. It is true that the negligence *per se* rule often imposes liability on the defendant or prevents the plaintiff from recovering in a situation where the violation is without fault or negligence in any realistic sense.

As mentioned before, the fact that the standards may be administrative rather than statutory does not change the result except in some jurisdictions. As Morris indicates in his excellent article, there are several jurisdictions in which it is held that violation of administrative regulations is negligence *per se*. He points out that actually the difference between the rule of negligence *per se* and the rule of evidence of negligence only probably is of little significance in most cases. As long as violation can be considered evidence of negligence it is admissible, and this is as far as the plaintiff's lawyer usually needs to go because it allows him to submit the case to the jury. It is quite unlikely that jurors will make very much of the subtle distinction between the two rules. Morris even suggests that as a matter of trial technique plaintiffs' lawyers, except in the most extreme cases, ought to avoid asking an instruction calling for negligence *per se* rules to be applied. His theory is that this does not really change the jury's attitude and it does run the risk of a reversal on appeal if the appellate court follows the rule that violation is only evidence of negligence rather than negligence *per se*.

It is safe to generalize that the practical result in most cases is that violation of a statutory or administrative standard makes a *prima facie* case of lack of due care. This leaves open the possibility that the defendant may be able to show in his particular case that the violation of the rule should not be considered negligence, as suggested later in discussing the validity of administrative rules. It is our opinion that defendants should be forced to accept the burden of showing affirmatively why their failure to comply with the administrative regulations should not be treated as negligence in the particular case. Although some writers on the subject avoid using the *prima facie* case terminology in drawing their conclusions, in effect they reach an equivalent result. The Minnesota court in the recent case of *Lynghaug v. Payte* expressly applied the *prima facie* rule where a car owner had unknowingly failed to keep his muffler in such condition as to prevent the escape of carbon

89 Morris, *supra* note 76.
monoxide into the interior of the car, as the statute required. The court said:

In the absence of excuse or justification, liability follows as a matter of law if, upon proof of violation, the negligence is the proximate cause of the injury. The burden of going forward with the evidence and establishing excuse or justification or such other defense as may be available shifts to the defendant.90

It should be remembered, of course, that adopting the prima facie case rule cuts both ways; while in many cases it will help the defendants avoid liability by allowing them to show why their action was not negligent in spite of the violation of the rule, in other cases it will help the plaintiffs avoid a defense of contributory negligence per se when they violate some administrative or statutory rule of conduct. Harper and James even go so far as to suggest that where the rule is one of negligence per se a double standard ought to be used so that it is only evidence of negligence when used against a plaintiff to show contributory negligence.91 Their avowed position, that all tort law ought to be regarded as a method of compensating as many plaintiffs as possible and distributing the risk of injuries as widely as possible, is probably their real reason for wanting to eliminate the negligence per se rule. Dean Prosser agrees with their conclusion that the rule should be evidence of negligence only.92

The evidence of negligence rule allows a greater degree of flexibility so that account may be taken of individual differences between cases. Such a rule certainly will cause much less theoretical difficulty for courts when they are faced with the cases which have given rise to the many exceptions to the rule of negligence per se. Also it seems eminently more satisfactory in a fast developing field such as atomic energy where statutory and administrative standards are likely to become quickly outmoded and inadequate.

Attacking Administrative Regulations

The federal standards of conduct applicable to atomic energy activities are all administrative in form rather than statutory. The same is true of most of the state standards. Nevertheless consideration should be given to the possible differences between the rules applying to the two

90 247 Minn. 186, 195-96, 76 N.W.2d 660 (1956).
92 Prosser 162, n. 83.
kinds of standards, *i.e.*, statutory and administrative. One of these differences is that departure from statutory standards found in criminal laws may result in imposition of a type of absolute liability. No such cases have been found where the violation is of administrative standards only.\footnote{Morris, \textit{supra} note 76.}

The most significant distinction between the two, however, is that the defendant sometimes may attack the soundness of an administrative standard. There are a few statutory standards so ridiculous (*e.g.*, a six m.p.h. speed limit)\footnote{Prosser 154, n. 3.} that a court might not enforce them. For the most part, though, once a statute which includes a specific standard has been enacted, no court will undertake to reverse the judgment of the legislature as to what is the proper standard of conduct. This is not quite so true where the standard is established by an administrative regulation.

When an administrative ruling has been violated, a good argument can be made in a damage suit that it is invalid or unsound on grounds other than those suggested thus far as excuses for non-compliance. Morris gives an excellent statement of the argument.\footnote{Morris, \textit{supra} note 76 at 152 ff.} When an attack is made upon the validity of an administrative safety rule in a proceeding to enforce it, the question decided by the court is quite different than when its validity is attacked in a damage suit. In a proceeding to enforce the rule it can be argued that the measure is so unreasonable as to be arbitrary and therefore invalid either because it is not authorized by the statute or because it is unconstitutional. Courts in such cases, however, will not invalidate the measure so long as an honest and reasonable administrator might adopt such a rule. A considerable degree of discretion is left to the administrator in such cases even though it might be proved quite easily that a sounder measure could have been promulgated. On the other hand, in a damage suit based upon proof of negligence because of violation of an administrative safety rule, expert witnesses might agree that the particular safety measures taken by the particular defendant were actually better precautions than those prescribed by the administrative rule. They at least might testify that the administrator's rule was not the general standard of safety adopted by those who deal with the matters which were the subject of the lawsuit. To make the violation of an administrator's rule under such circumstances absolute proof of negligence in a damage action seems quite unjustifiable.
Another factor that influences courts when the administrative regulatory program is being enforced directly is concern that the upsetting of one rule may weaken the whole regulatory program and make the administrative process quite ineffective. This consequence does not follow from a holding in a particular damage suit that a particular violation of the administrative rule does not constitute negligence *per se*. Finally, it should be noted that when there is a direct action to enforce an administrative rule it nearly always involves a specific determination by the administrative agency that the particular defendant actually has violated the regulation. On the other hand, in a damage suit based upon violation of the regulation, the administrator typically will have made no specific ruling that the defendant's conduct was a violation of regulation. It is not nearly so easy for the court as for the administrator to take into consideration the possibility that there was *practical* compliance with the administrative regulation. To this may be added the argument (also applicable when making violation of a criminal statute negligence *per se*) that in the administration and enforcement of statutory or administrative regulations, the prosecutor or administrator can use common sense in deciding whether the particular action of the defendant under the particular circumstances really amounted to a violation in substance of the statute or administrative standard of conduct. There is no similar restraint on a plaintiff who is making use of the violation to prove the defendant's negligence, since his only desire is to recover damages in the particular case.

Notwithstanding the foregoing possible arguments there is in fact very little actual authority allowing such attacks to be made upon administrative rulings. On the other hand Morris failed to find any cases holding that defendant's proof of the unreasonableness of the administrative ruling is inadmissible. The possibility of using such a defense in an atomic energy case should not be overlooked by counsel. In an area that has developed as rapidly as has the technology of atomic energy, it would not seem at all unlikely that with new developments a sounder safety measure might be found than the one promulgated by the administrative agency on the basis of prior information. If competent experts can demonstrate the greater soundness of the new practice followed by the particular defendant, there would seem every reason to hold that the defendant's conduct was not negligent even though he was in violation of the administrative regulation.

96 Id. at 154-55.
Invalid Statute or Administrative Regulation

Another matter that arises in connection with the use of violation of either statutory or administrative standards of conduct as proof of negligence is the use to be made of such rules or standards of conduct when the statute or administrative order itself is held invalid. All writers seem to agree\footnote{Id. at 152. Prosser 160, n. 66, 162, n. 81; Harper & James 1001-14.} that if the standard of conduct is invalidated because it is so arbitrary as to be a lack of due process, or is not authorized by the statute, the regulations should not even be admitted as evidence. On the other hand, it is also true that the statutory or administrative standard may be invalidated on a ground that in no way attacks its validity as a general statement of the conduct to be expected of a reasonably prudent man under the circumstances. The invalidity may be because of failure to observe some procedural requirement for the enactment of a statute, or some technical procedural flaw in adopting the regulation. If the contents of the regulation have been made generally known or at least are known to the particular defendant at the time he acted, all seem to agree that the safety standard should be admitted at least as evidence of negligence.

Effect of Federal Pre-emption

One other possible ground for invalidity of a state standard, not mentioned in any of the cases nor by writers in this field, is that of federal pre-emption. There may be several reasons for finding that pre-emption invalidates a state rule, and its use as evidence of negligence should depend perhaps on the reason. Pre-emption may be found because of an actual conflict between the federal and state standards. On the other hand it may arise from the federal government's taking over a general regulatory area even though the specific federal regulations have not been adopted and made effective yet. If the latter is the case, the probative value of the invalid state-imposed standard as evidence of negligence is not diminished, although it may be if there is an actual conflict between the two governmental standards.\footnote{See discussion of federal pre-emption generally, infra Part III, Chapter V, Section E and specifically discussion infra under damages in nuisance. See also infra discussion in text at note 699 ff.}

A closely related consideration is involved when the administrative regulation, while valid, has no application to the particular defendant. This happened in a California case,\footnote{Polk v. City of Los Angeles, 26 Cal.2d 519, 159 P.2d 931 (1945).} where the plaintiff was killed while trimming trees, when he came into contact with a worn spot in the insulation of the line of the defendant.
power company. The company apparently had not followed the practice of making frequent and thorough inspections of its lines as required by the regulatory commission which controlled such practices on the part of privately owned power companies. The company was city owned and therefore not within the jurisdiction of the commission. On appeal the court assumed for purposes of argument that there was no authority of the commission over this power company but nevertheless held that the standard of care set down in the commission's regulations was admissible to prove the standard required of all similar utilities.

Standards Set by Unofficial Bodies

A question not unrelated to those discussed above arises when the defendant has departed from the standards set down by a national safety group. In the area of radiation hazards there is such a committee, the National Committee on Radiation Protection and Measurement, which has been very effective over a long period of years in the promulgation of radiation safety rules. Certainly the safety regulations suggested by this national committee should be received in evidence on the negligence question. There is precedent for this in several cases in which the National Electrical Safety Code published by the United States Bureau of Standards has been received in evidence to prove departure from a reasonable standard of conduct. In the usual case, violation of the code suggested by the national committee probably would be accepted by the jury as rather conclusive proof of negligence.

(2) Compliance as Proof of Non-Negligent Conduct

Governmental safety standards have significance in tort actions not only when they have not been complied with but also when they have been followed by one accused of negligence. Many of the considerations already discussed as important in determining the effect of non-compliance are equally applicable when compliance is asserted as proof of non-negligent action. In addition, while the leading treatises almost ignore the problem, Morris has made an excellent general analysis of this aspect of the problem both as to criminal statutes and administrative

100 For references to the recommendations of this committee, see infra notes 139-43 of Part III, Chapter 5.
101 Morris, supra note 76 at 157.
102 Prosser 163, 164 and Harper & James 1014 devote one short paragraph to this aspect of the problem.
103 Morris, "The Role of Criminal Statutes in Negligence Actions," 49 Col. L. Rev. 21, 42 (1949).
regulations. Nevertheless, the matter will be so vital in radiation damage actions that consideration of the application of these general concepts to radiation cases is warranted here. Extensive administrative regulation of safety matters at both the federal and state levels already exists, and most users are willing to abide by them. Use of compliance to show non-negligence should be very frequent.

In considering the effect of such standards it is important to keep in mind that most of the safety measures dealing with radiation hazards involve a judgment based on the balancing of society's interest in the rapid development of this promising new field against the known fact that injuries to specific persons and genetic damage generally are an almost inevitable result of any use of radiation. Likewise important in considering the weight to be given to compliance is the fact that the development of new knowledge is very rapid in this field as indicated by the substantial reduction in the maximum permissible exposure standard in recent years. In the light of these facts, what significance should be attached to compliance with governmental safety standards in tort actions?

It is not possible to reduce all of the cases to a set of simple rules, generally accepted and sufficiently complete to answer even most of the cases likely to arise. Nevertheless, a few general statements can be made with considerable assurance. One is that in many cases courts have accepted compliance with a criminal statutory standard as more or less conclusive proof that the defendant did not act negligently. On the other hand, numerous cases have held that a criminal statute states only a minimum standard and, therefore, it always is possible for the plaintiff to show that compliance with this standard does not meet the standard of conduct dictated by negligence rules. The same is true of administrative regulations. Again, as indicated before in the discussion of failure to comply with such standards, it seems to be agreed generally that proof of compliance with criminal statutory or administrative standards certainly should be accepted as some evidence of having used due care but that it ought not to be accepted as conclusive proof. Existing treatments of the subject do not discuss the effect of compliance with a civil statutory standard but there would seem to be no reason for

104 Morris, supra note 76 at 157 ff.
105 See supra Chapter I, subsection on genetic damage.
106 See Part III, Chapter V, subsection C.
107 Morris, supra note 103. See also cases cited in sources cited infra note 108.
108 Id. at 45, n. 80; Harper & James 1914, n. 66; Prosser 164, n. 1.
109 Prosser 164, n. 2.
treat this case differently from that in which there is non-compliance. Possible distinctions were discussed in the last section and are applicable here.

The present writers feel that, in general, compliance with governmental radiation regulations should be accepted in negligence cases as evidence of having acted reasonably but should not be used as conclusive proof because there are too many variables in such a rapidly developing field. We would apply this rule generally to civil statutory and administrative regulations as well as criminal. Because there has been so little written about the significance of compliance with administrative regulations, it will be helpful to examine some representative cases. We also suggest that there are certain radiation situations in which compliance should be treated as conclusive proof of non-negligence.

In an Arkansas case, *Southwestern Gas & Electric Co. v. Deshavo*, a telephone company and a power company were found to have acted with due care in the construction of their lines. Farmers felled a tree where the lines crossed, however, and caused the telephone line to become charged. When sued by a telephone operator who received a shock while using the line, the companies argued that they had complied with the utility regulations for the construction of intersecting lines and could not be held liable. The court held that once compliance was shown the burden was on the plaintiff thereafter to prove that particular acts or conditions created by the companies amounted to negligence. This seems to treat proof of compliance as establishing non-negligence unless something other than the mere creation of the condition by the defendant is shown. There are many general radiation regulations of this same sort, both state and federal, so there are many situations in which the rationale of the Arkansas case could be used by one defending a suit for negligent injuries to another person.

An interesting use of compliance with administrative regulations was made by a plaintiff to meet a claim of contributory negligence in *Rinehart v. Woodford Flying Service, Inc.*, a West Virginia case involving a landing accident at a local airport. While a flying contest was being conducted at a local airport the usual landing rules had been changed. The defendants contended that the plaintiff's pilot, under the circumstances, should have circled the field until he saw how the planes were

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landing and taking off. The court found, however, that the plaintiff’s pilot had complied with the ordinary regulations dealing with landings and, therefore, he had acted correctly and was under no duty to deviate from these regulations and observe local conditions to determine that a different practice for landing was being followed. The court even rejected the defendant’s offer of testimony of officials of the federal government, whose regulations the plaintiff had followed, to show the meaning of the regulations in such situations. The court said the regulations were not ambiguous and the plaintiff was justified in following them. Compliance here amounted to a rule of conclusive proof.

Opportunities to use this type of reasoning should arise often in radiation cases where someone has been exposed to radiation but in a situation where the amount of radiation received, or the circumstances in which it was received, does not violate applicable health and safety regulations. The compliance can be argued to prove reasonable conduct by the defendant, or a lack of contributory negligence by the plaintiff.

Perhaps of greater significance for the reactor operator are cases like Johnson v. Maine Central Railroad, where a government commission had directed the defendant railroad to place warning signs and a flashing signal in a certain way at a particular grade crossing. The commission also had regulated the speed of trains over this crossing and the defendant had complied with all the orders. The court approved the directed verdict for the defendant railroad; stating that the administrative instructions and the compliance with them was conclusive proof of the use of due care. The analogy is very close to that of a reactor license, which the AEC, with the advice of its Advisory Committee on Reactor Safeguards, issues only after determining that the location, construction, design, and proposed operating procedures of the plant are such as to provide the necessary protection of the public health and safety. In respect to these matters, the government agency makes an express finding, in a specific case, concerning a designated radiation device or use of radioactive material to the effect that the defendant’s actions are consistent with due regard for public health and safety. If the reasoning of the Maine court should be followed, there could be no finding of negligence in design and operation plans:

Cases such as Panama Mail Steamship Company v. Davis, also illustrate the rationale that may be used in some radiation situations. In this case public health service officials had inspected the ship after fumi-

112 141 Me. 38, 36 A.2d 884 (1944).
118 79 F.2d 430 (3d Cir. 1935).
gation by poisonous gas and certified that the holds were safe. A stevedore ordered into the holds by the ship's officers was injured because one of the holds actually was not safe. The circuit court held that judgment for the stevedore was erroneous because the steamship company reasonably had relied upon the health officials' pronouncement that the holds were safe. Much reliance was placed upon defendant's good faith and acceptance of the health officials' determinations as justification for finding the company not negligent.

These cases do not present a situation quite like that arising from the fact that the AEC has made the radiation exposure for government contractors' employees considerably stricter than the old standards which still are applicable to licensees operating their own facilities. It seems clear that the reason for the delay in imposing the stricter standards on licensees is to give them a reasonable time in which to adjust their safety programs. Here, then, is a case where expert opinion indicates that the safer course is to reduce exposure limits; yet, on balancing all the equities, stricter standards should not be imposed at the present time on private licensees. In view of our present lack of knowledge as to exactly how damaging small doses are likely to be over a long period of time, the Commission's exposure regulations cannot be said to fix definitively the point at which radiation becomes unacceptably dangerous. The Commission's finding, however, apparently is a deliberate attempt to balance such factors as the dangers, the necessity for promoting development, and the expense of safety precautions. Taking into account all the interests involved, the standards admittedly are a reasonable compromise. In most cases at least, there will be a reliance by the defendant upon the standards established by the government agency. On the other hand, it is known that there is very good opinion that a stricter standard is a safer course of conduct. Where the AEC has made a deliberate judgment on the specific issue of maximum exposure levels, it may be that this is a case in which a judge should hold that compliance with the requirement is conclusive proof of compliance with a reasonable standard of conduct.\(^\text{114}\) For a state court not to accept such a determination by a federal agency in an area where the federal body has the powers to issue rules and regulations may be considered unconstitutional state action because of federal pre-emption.\(^\text{115}\)

In general, however, it is important to recognize that mere compli-

\(^{114}\) Such a view is suggested in Morris, *supra* note 103. Harper and James criticize this view.

\(^{115}\) See Part III, Chapter V, subsections E2b (1) (a) (i) and (ii)
ance with a statutory or administrative standard often should not be treated as conclusive proof of due care. There are cases\textsuperscript{116} indicating that in a particular situation it should have been clear to the defendant that bare compliance with a statutory standard or administrative regulation is not what a reasonably prudent man would do under the circumstances. Undoubtedly, this would be true if the defendant’s radiation expert was aware of the fact that the administrative regulations clearly were too lax or that they did not fit the particular situation. This will be true as our knowledge of radiation increases and we discover new dangers not known at the time the pertinent administrative regulations were issued. It seems quite likely that in this kind of case the new and higher standard of care, agreed on by experts in the field, will be applied. Similarly, certain emergencies might arise as to a particular employee or member of the public whose previous exposures made any further exposure inadvisable. Such exposure as permitted by the general regulations might be negligence in these circumstances.

\textit{Administrative Silence}

Another situation closely related to this limitation is the case where an attempt is made to use the fact that the administrative rules are silent on the point as evidence of the fact that a particular safeguard is not needed. There will be cases, of course, in which a failure of the government agency to order a safeguard to be taken is a deliberate decision that it is not needed. There will be other situations, however, in which silence merely means that the point has not been considered and, therefore, it has no significance in determining whether or not due care requires such action. This idea is exemplified in one of the leading railroad cases, \textit{Grand Trunk Ry. v. Ives},\textsuperscript{117} involving the question whether the absence of a crossing flagman constitutes negligence on the part of the railroad. The commissioner was authorized to require crossing flagmen but had not ordered one at the particular crossing where the accident happened. Apparently, the situation at the crossing was such that it was quite reasonable to think that a flagman would be needed. The court held that the commissioner’s order which did not include a direction for the employment of a flagman could not be accepted as an administrative determination that one was not needed. In many cases the mere fact that the administrator has passed on some aspect of a particular installation does not mean that he has passed on all aspects.

It also is possible that the administrator’s regulation may not take

\textsuperscript{116} Prosser 164; Harper & James 1014.

\textsuperscript{117} 144 U.S. 408, 12 S.Ct. 679 (1891).
account of a particular situation that may arise. This is illustrated by a case in which a power company, although it had conformed to the clearance rule of the National Electric Code, had not given warning about an installation that was dangerously close to some construction work which its employees knew about. The company was found to be negligent notwithstanding its compliance with the Electric Code.\textsuperscript{118} There would seem to be no reason why the same rule would not apply in the case of a statutory or administrative ruling concerning radiation safety.

There also are cases in which the plaintiff has been allowed to attack the soundness of an administrative rule, compliance with which is used by the defendant as proof that he used due care.\textsuperscript{119} This is quite like permitting the defendant to attack the soundness of a standard when the claim is made that his non-compliance is proof of negligence. On the other hand, if the regulation is attacked because of a lack of jurisdiction over a particular defendant, this should not make invalid its use as evidence of what is reasonable. So long as the regulation sets up a reasonable standard of care for this type of situation the court well may hold that the defendant is still entitled to a verdict because he has proved compliance with the standard of care expected of a reasonably prudent man; \textit{i.e.}, by showing compliance with the administrative standard.\textsuperscript{120}

c. The Care Owed to Licensees and Others

The liability of owners and occupiers of land to various classes of persons who come on the land is a question about which there is considerable confusion as to analysis and terminology as well as conclusions in decided cases.\textsuperscript{121} As some of the opinions in recent cases and all the legal writers point out, the old arbitrary distinctions drawn between licensees, trespassers, invitees, the public, and employees are not very helpful in the decision of actual cases. The cases support the general conclusion that even as to trespassers the old familiar rule of no duty to use due care so long as the defendant takes no affirmative action, is being modified, imposition of liability depending upon the kind of trespasser and whether or not there is some kind of expectation of con-

\textsuperscript{118} Mississippi Power & Light Co. v. Whitescarver, 68 F.2d 928 (5th Cir. 1934).
\textsuperscript{119} Morris, \textit{supra} note 76 at 164.
\textsuperscript{120} Id. at 165.
tinued trespass. Certainly as to licensees the rule seems to be shifting toward imposing somewhat greater liability on the owner of the land. There are many cases, however, in which the courts even today draw a rather fine line between the standard of conduct owed to a licensee and that owed to an invitee, particularly if the invitee is on the premises because of some possible pecuniary benefit to the occupier of the land. There is nothing unique in the atomic energy situation which calls for any different analysis from that already available in the literature. To the extent that the courts of the state in which an atomic energy installation is located draw the lines sharply or not at all for most purposes, the same should and probably will be done in cases which involve radiation injury.

There are two situations, however, in which applicability of existing rules to radiation injury cases may impose some unusual standards of conduct on the atomic energy entrepreneur. His lawyer should be particularly careful to take account of these possibilities in planning the owner's course of action.

*Duty to Warn*

One of these involves the duty of the owner or occupier of land to give warning concerning unusual types of hazards that may not be detected or observed by the visitor or the danger of which the visitor might not be expected to appreciate. As to these hazards there seems little reason to believe that the courts will make any substantial distinction between licensees and invitees as such. They are much more likely to decide the cases on the basis of whether, under the particular circumstances, the defendant acted unreasonably in not notifying the visitors of the specific danger. 122 Most of the cases which have dealt with this problem have involved situations much more mundane than radiation hazards. Nevertheless, the rationale of these decisions seems quite applicable to radiation cases.

A typical example is a 1951 Delaware case, *Maher v. Voss.* 123 There the injured woman was an invited guest in the home of the plaintiff. In going to get her coat in what she thought was a closet she injured herself when she fell down a stairway. The defendant's motion to dismiss on the ground that the plaintiff was a licensee only and that therefore no affirmative duty was owed to her was denied. The court said that the old and familiar rule of non-liability did not apply even to a gratuitous licensee if the defendant knew of the dangerous condition and had

122 Harper & James 1473; Prosser 459.
123 46 Del. 418, 84 A.2d 527 (1951).
reason to believe that the licensee might not discover the condition or realize the risk. The court also said that it would be negligent for the possessor of the land to permit the guest to remain on the land without making the condition reasonably safe or warning her about it. The court then concluded:

The complaints in these cases charge that defendants' negligence consisted of a failure to warn Mrs. Maher of the true nature of the "closet," which is averred to be a grave hazard to one ignorant of its character, when defendants should have known that their guest might be entrapped by it. Under the rules stated above, it cannot be said that the complaints are so clearly defective in showing actionable negligence as to warrant a dismissal thereof. 124

The court concluded that it could not say as a matter of law that it was beyond the "realm of reasonable foreseeability" that the guest would not realize the danger or appreciate its real extent.

Assumption of Risk

Keeton, in his excellent article, 125 points out the second situation to be noted by the nuclear lawyer. He warns that even as to dangers that are realized by the plaintiff there are cases in which failure to act upon his knowledge of the danger still will not constitute contributory negligence so as to prevent recovery from the defendant. He points out that in these cases the assumption of risk argument no longer constitutes a defense for the possessor of land. He says:

The idea is sometimes advanced that, for relief to be denied, the full extent of the danger must be as open and obvious to the plaintiff as it is to the defendant. Apparently, therefore, the mere fact that the plaintiff is in a position to be aware of the existence of an appreciable chance of falling is not sufficient to deny relief if the defendant was in a better position to understand the full extent of the damage. It is doubtful that this idea has been fully utilized. It would seem generally that proprietors ought to know more in most instances about the dangers of a particular kind of construction or a particular type of floor than most users and that there would be very few cases where recovery would be denied as a matter of law on the ground of assumption of risk. 126

The applicability of this doctrine in atomic energy cases seems quite likely. Whether in a particular case it will be found that the plaintiff did

124 Id. at 423-24.
125 Keeton, supra note 121 at 642 ff.
126 Id. at 647, 648.
or should have realized the full extent of the risk may depend on whether or not he is experienced and knowledgeable as to radiation hazards. Certainly there are likely to be many visitors who will be in no position to understand the nature or extent of the hazard present. Under the rules suggested by these cases probably it will be a jury question as to whether defendant acted with reasonable care in failing to give any warning at all or in giving the kind of warning he did. One result might be reached as to a physicist or nuclear engineer and another to a sightseer or other guest who has no knowledge of radiation hazards. This would be particularly appropriate since the ordinary senses of man do not detect the presence of danger by sight, sound, smell, or touch in the usual radiation case. Moreover, as heretofore pointed out in the discussion of radiation technology, what may be a dangerous or harmful dose to one person may not be to another, and the visitor may be in no position to make such a distinction. For example, consider the presence of a visitor who is a pregnant woman. It is well known that irradiation of the embryo during the gestation period creates a significant possibility of serious injury. Depending on the circumstances, including the amount of radiation to which such a visitor might be exposed accidentally, it might be safer for the occupier of land where radiation sources are present to deny access to women of pregnable age.\footnote{Infra note 1068.}

**Warning to Public Officials**

In considering the duty to warn visitors, those concerned with radiation hazards should take into account the problem of liability to public employees who come on the property as a matter of right but not in any realistic sense at the invitation of the landowner. There are many persons in this class—postmen, meter readers, inspectors, firemen, policemen, etc. For our purposes, the obligations owed to firemen and policemen present the most interesting legal questions.

While the physical danger presented by the situation in *Shypulski v. Waldorf Paper Products Company*\footnote{232 Minn. 394, 45 N.W.2d 549 (1951).} is quite different from the hazards inherent in radiation exposure, the reasoning of the court would seem to be equally applicable to the case of a fireman fighting a fire on premises where radiation hazards are present. During the course of inspecting the defendant's building to make sure the fire had been extinguished entirely, a concrete block wall in the factory collapsed and seriously injured the plaintiff fireman. The plaintiff alleged that the wall was so constructed that it could not withstand lateral pressure in any
amount, that it therefore constituted a trap which was dangerous to anybody in the warehouse, and that these facts were known to the defendant. All during the time the firemen were present there also were present officers, agents, and employees of the defendant company observing the actions of the plaintiff and other firemen. After rejecting the old analysis which placed firemen and similar persons in the category of licensees or perhaps even trespassers rather than invitees, and accepting the Prosser thesis that such persons have a status sui generis, the court then said:

Since firemen have the unique status just described, it follows that the duties owed to them may properly be unique. . . . Even the rule that firemen must accept premises as they find them has been described by this court as being a hard rule. It is apparent that both in Minnesota and elsewhere the trend of decisions is to avoid extending these harsh rules beyond their present limits, and, at least, in the case of the “wilful or wanton” rule, the tendency is to whittle it away with exceptions. At the same time, a respectable body of authority has developed to support the rule that firemen are entitled to be warned of hidden dangers known to the landowner or occupant. . . .

Certainly, no meritorious reason can be advanced to justify the view that a property owner, with knowledge of a hidden peril, should be allowed to stand by in silence when a word of warning might save firemen from needless peril. The burden of a duty to warn of hidden perils falls lightly upon the landowner in comparison with the cost of his silence, which is frequently measured in the lives and limbs of firemen and in the sorrow and suffering of their families. Although firemen assume the usual risks incident to their entry upon premises made dangerous by the destructive effect of fire, there is no valid reason why they should be required to assume the extraordinary risk of hidden perils of which they might easily be warned. Two courts at least have held that firemen do not assume such risks, and, for the reasons already stated, we regard that holding as sound. . . .

In spite of the recognized split of authority on the question presented in this case, we believe that the better rule by far is that landowners and occupants alike owe a duty to firemen to warn them of hidden perils where the landowner or occupant has knowledge of the peril and the opportunity to give warning.\textsuperscript{120}

\textsuperscript{129} Prosser 460-62.
\textsuperscript{130} Supra note 128 at 397-402.
The court approved the overruling by the lower court of defendant’s demurrer to the complaint and held that the complaint stated a cause of action.

One of the cases cited in support of its ruling by the Minnesota court is a very interesting New York Court of Appeals opinion, *Jenkins v. 313-321 W. 37th St. Corp.*, dealing with responsibility of the landowner to give warning to firemen of unusual hazards. The plaintiffs were New York firemen who were seriously injured when gasoline which had collected in a closed basement room exploded as the firemen were fighting a fire in the room. The first explosion, which started the fire, occurred when the building superintendent was in the room, and he also was present when the firemen arrived and entered the building. The gasoline apparently had seeped into the sump pump in defendant’s sub-basement from storage tanks in a neighboring building through an old underground rivulet. There was no suggestion that the defendant was in any way negligent in creating the dangerous condition. The superintendent had known of the condition, however, and had warned his superiors of the strong odor of gasoline. The court stated that the presence of small quantities of gasoline ordinarily would not constitute an unusual hazard, but that its presence in a closed room in which a fire was burning did constitute a situation which the jury might find to be an unusual hazard. The court concluded:

If such a danger existed to the knowledge of the defendant or its agent, the defendant was under a duty if it had opportunity to give warning of the peril.

This affirmative proof, together with the undisputed fact that while the superintendent was in the sub-basement an explosion had occurred, warranted a finding by the jury that defendant or its agent in charge had notice of the unusual hazard into which the firemen unknowingly walked. Opportunity to warn the plaintiffs of the peril might be inferred by the jury from the fact that the superintendent was on the premises when the firemen arrived and knew of their arrival.

The court ordered a new trial, however, because of an error in the admission of evidence concerning impeachment of the testimony of a witness.

This type of case, involving an unusual type of hazard, is to be distinguished, however, from the kind of case where the hazard even from

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182 *Jenkins v. 313-321 W. 37th St. Corp.*, *supra* note 131 at 401, 402.
a dangerous substance such as gasoline could not be considered unusual. For example, everyone knows that gasoline tanks in a burning car are likely to explode,\textsuperscript{138} or that structural conditions of a building (such as a porch) may become dangerous with natural deterioration or improper construction and may cause injury. A court may find that such danger is not an unusual hazard from an inherently dangerous substance.\textsuperscript{134} It also is possible that a court will hold in such cases that, if the gratuitous licensee is actually aware of the peril he may not recover, as a recent New Jersey case held.\textsuperscript{135} The Minnesota court, however, recently held that merely because a dangerous condition might be open and obvious during daylight hours, this fact does not immunize the owner from a liability if at other times, such as darkness, the dangerous condition would not be obvious, provided that the owner had reason to believe that the licensee might come on the premises under such circumstances.\textsuperscript{136}

Applying these principles to radiation cases, while distinctions may be made, depending on the intensity and type of radiation sources present in the building, in the usual situation it would seem quite likely that the court would find that radiation materials constitute an unusual hazard, particularly since their presence will be known only if there is warning or if the fire department furnishes its fire fighters with radiation detection instruments. Actually, during the course of fighting a fire, it is quite possible that even if the fire itself does not release radioactive material from its proper containers (such as thickness gauges, experimental equipment or supplies in research laboratories, or possibly even from a reactor container) the firemen themselves in the course of fighting the fire may cause the radioactive material to spread. This may create serious hazards, at least to those fighting the fire, if not also to others in the vicinity. It is our opinion that under these circumstances it is very likely that courts will hold that there is a duty to give fair warning.

Moreover, the character of the danger is such that the techniques of protecting personnel from radiation hazards will require sufficient advance notice to prepare the fire fighters for the unusual situation. It would not be surprising to find a court saying that the owner of the

\textsuperscript{136} Taneian v. Meghrigian, 15 N.J. 267, 104 A.2d 689 (1954).
\textsuperscript{136} Malmquist v. Leeds, 245 Minn. 130, 71 N.W.2d 863 (1955).
property had to go further than simply giving notice at the time of a fire to the firemen who arrive at the scene. The radiation danger present at a fire is illustrated by the explosion a few years ago in the Sylvania plant in Bayside, New York. It would seem not unreasonable to require users of radioactive material to keep fire departments advised of the presence of the radioactive material. Undoubtedly it would be wise for fire departments to plan for the emergencies which may arise from the existence of radiation hazards. That the obligation to give adequate warning is not to be lightly regarded or easily discharged by the defendant is indicated by a New York case, Schwab v. Rubel Corporation, in which the plaintiff was allowed to go to the jury on the question of whether the warning given by defendant's employees was adequate when all he did was to warn one of the firemen of the existence of a dangerous dismantled elevator shaft. The court held that it was for the jury to decide whether warning one fireman was sufficient or whether more should have been warned.

The rule is usually stated as requiring the warning which a reasonable and prudent person would give under the circumstances. It usually is suggested that it is not realistic to require that the danger be called to the attention of everyone fighting the fire. This would place too heavy a burden upon the defendant. It also would be wise as a general precaution to post conspicuous warnings of potential radiation hazards, at least in the dangerous areas of the building, if not throughout the building. In emergency situations, such as is the case when fire occurs, this quite likely would not be considered sufficient, but the court might hold that this much at least is required for purposes of warning not only inspecting firemen, policemen, or similar officials, but also visitors to the premises, whether licensees or invitees.

In view of the above cases the person having possession of radioactive materials would be well advised to control very strictly the persons

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187 For an extensive report concerning this 1956 fire caused by the double explosion of thorium, see N.Y. Times, July 3, 1956, p. 1, col. 2, and p. 15, col. 2; July 4, 1956, p. 37, col. 1; July 7, 1956, p. 33, col. 4; July 11, 1956, p. 54, col. 5; and July 12, 1956, p. 51, col. 3.

188 286 N.Y. 525, 37 N.E.2d 234 (1941).

189 Moscow Tire & Rubber Co. v. Lansinger, 15 Ohio App. 310, aff'd 108 Ohio St. 377, 140 N.E. 770 (1921). A general warning by way of a manager's shout, "Get out of here," was held insufficient to meet this standard in Lamb v. Sebach, 52 Ohio App. 362, 3 N.E.2d 686 (1935). A recent case beautifully exemplifying the need for labeling dangerous material is United States v. Marshall, 230 F.2d 183 (9th Cir. 1956); a sheriff was hurt while helping fight a fire in a tank car which had not been labeled to indicate its dangerous contents.
allowed in the vicinity of the radioactive material and the conditions under which such presence is permitted.

d. Decided Radiation Cases and the Standard of Conduct

Except for cases where a doctor is charged with malpractice in treating patients, very few cases have dealt with radiation injuries specifically. Our discussion of the breach of the duty to use care would not be complete, however, without a consideration of these few. With the rapid growth of the use of radioactive isotopes in medical diagnosis and treatment the rules of law applied by the courts in malpractice cases involving the use of X-rays will assume increasing importance. In addition, even the malpractice cases may prove useful as analogies in other radiation injury situations.

(1) Medical Malpractice Cases

The courts apparently agree that the use of X-rays for medical purposes is to be governed by the same principles that govern physicians and surgeons in general. There is no reason to believe that a different standard will be applied if the radiation source is a radioactive isotope rather than an X-ray machine. The statement of the general rule in *Lett v. Smith* is fairly representative:

"A person undertaking the use of X-rays is held to the same measure of responsibility as in administering other forms of medical treatment. He impliedly contracts with the patient that he possesses the ordinary skill and learning of members of his profession and that he will exercise reasonable skill, care and diligence in his treatment."

Perhaps the statement by Justice Rutledge in *Christie v. Callahan* is a somewhat more informative statement of the rule.

The physician is not an insurer of health. He undertakes only for the standard of skill possessed generally by others practicing in his field, and for the care which they would give in similar circumstances. He must have latitude for play of reasonable judgement, and this includes room for not too obvious or gross errors according to the prevailing practice of his craft. Generally the standard must be shown by experts and

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140 The only non-X-ray case we found was Hubach v. Cole, 133 Ohio St. 137, 12 N.E.2d 283 (1938).

so must the departure from it. But there are cases in which the result of medical or surgical treatment, considered in the light of the circumstances attending and following it, may warrant an inference of negligence. 142

This statement is made immediately following one recognizing that the advantages are with the physician, particularly when he is a specialist, because other physicians are reluctant to testify against their colleagues in negligence cases.

As pointed out by the court in Kuttner v. Swanson 148 the rule means that the doctor must have knowledge reasonably to be expected of a man of his profession and must use that knowledge carefully in the particular case.

Use of New Ideas

While no cases have been found which actually turned on the point, courts occasionally have referred to the fact that a physician must use the ordinary care and skill of his profession, "giving due consideration to modern advance and learning." 144 Usually this is not a critical issue because it is assumed that ordinary care involves use of new knowledge generally known to the profession. Certainly one cannot read the many X-ray cases based upon malpractice charges in which the plaintiffs have succeeded without concluding that in most cases the finding of negligence was based upon the failure to use new knowledge developed over the years. By implication these cases seem to hold that a failure to take account of new developments constitutes a lack of due care. If it is true that failure to take advantage of new techniques such as X-rays for diagnosis of fractures is negligence, 145 there is no reason why the opposite should not be true. As new information is gained as to the situations for which radiation cannot be used safely, doctors should be found negligent if they ignore this new knowledge.

Geographical Standards

A question more closely related to the obligation to become familiar with new developments is whether it is justifiable to use a local rather than a national standard for measuring reasonable professional skill. Many statements in the cases of the general rule concerning the requisite professional care and skill are to the effect that the standard is the

care used by persons of equivalent training "in the local community."\textsuperscript{146} Yet in none of these cases was the question carefully considered by the court. Some cases, however, indicate that locality is not to be considered and it is submitted that this is the better view for the courts to adopt, at least in radiation cases. The court in \textit{King v. Ditto}\textsuperscript{147} did not state that locality is not a fact, but it did hold that in this particular case compliance with local standards did not prevent a finding of negligence. The reasoning of the court in the more recent case of \textit{McElroy v. Frost} is preferable in the light of general information about radiation and particularly because of the development of specialization and the use of journals to keep practitioners up to date. The court there said:

The medical testimony relative to the nature, extent and cause of plaintiff’s injuries has been set out above. It is true the witnesses were not from the same community but, with one exception, the medical evidence in plaintiff’s behalf came from specialists in their particular field. It is a matter of common understanding that a proper method of treating human ailments by X-ray would not vary from place to place or state to state. What is the best practice in one place likewise would be the best in another. This reasoning is the basis of the decision in \textit{Giles v. Tyson}, Tex. Civ. App., 13 S.W. 2d 452, cited by defendant, wherein it is expressly held that an expert in the use of X-ray can testify to what is proper use thereof, since such proper use would be the same whether in New York or Texas. Such reasoning provides a complete answer to the argument advanced in this respect.\textsuperscript{148}

\textit{Standards for Specialists}

In addition to the geographical factor, a further question arises as to whether or not the specialist in radiology will be expected to use more skill than the average practitioner if he is to avoid a charge of negligence. The court in \textit{Kuttner v. Swanson}\textsuperscript{149} seems to reject this contention. The contrary was specifically held by a Canadian court in \textit{McCaffrey v. Hague}, the court stating:

It is clear from the evidence that the defendant miscalculated the dosage; it was of too high intensity and too long exposure. This finding is on the defendant’s own evidence. A


\textsuperscript{147} 142 Ore. 207, 215, 19 P.2d 1100 (1933).

\textsuperscript{148} 268 P.2d 273, 279, 280 (Okla. 1954).

\textsuperscript{149} \textit{Supra} note 143 at 821.
higher degree of skill is required from one who holds himself out to be a specialist as the defendant did. . . .

Use by General Practitioners

Closely related to this question is that of whether or not the use of radiation by the general practitioner constitutes negligence. In *McElroy v. Frost*, one expert even testified that X-ray treatment was too dangerous for a general practitioner to use. He testified that it was not justified in the treatment of a skin disorder of the scrotum until other treatment had failed. With the increase in medical specialization this will become a growing problem, even though general practitioners will resist attempts to limit their right to practice any medical technique. Certainly at this stage of development in the use of radioisotopes and with our growing knowledge of the proper use of X-rays, much can be said for the contention that only radiologists are trained to determine the proper dosage and take the proper precautions to safeguard against overexposure. With the development of new techniques for reducing the damaging effect on tissue from radiation, it is important to make use of experts who will keep up with all developments.

Even if there is no requirement that only experts should handle radioactivity, there can be very little doubt that the trend toward increased specialization will have an effect upon the standard of care and skill to which the general practitioner must conform. There are two reasons for this. First, the writing and teaching of the specialists, who generally are responsible for new developments, inevitably cause the accepted standard of care to change. Second, there is an obvious tendency on the part of plaintiffs in malpractice cases to call upon specialists to testify as expert witnesses. In no case have we found that a defend-

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161 *Supra* note 148.
152 Our private conversations with radiologists lead us to believe they generally think so and many competent internists apparently do refer such treatment cases to radiologists.
163 See N.Y. Times, March 9, 1958, p. 41, col. 2, wherein it was reported that radiation poisoning may be curbed by chemicals, if given victim soon enough; and N.Y. Times, Aug. 13, 1958, p. 1, col. 3, reporting that pills (AET compound) capable of halving the biological effects of a radiation dose may be available soon for experimental use on humans. See also N.Y. Times, Nov. 20, 1958, p. 39, col. 1, reporting possibility that parathyroid extract may be helpful, especially if taken just before exposure to radiation. The French report they have had success using bone marrow transplants, N.Y. Times, Feb. 17, 1959, p. 4, col. 3. See examples of new developments of information as to internal dose, soil disposal, drinking water, neutron detection techniques, and laundering of protective clothing, reported in *Health Physics*, Vol. 1, No. 2, Sept. 1958.
ant general practitioner was permitted to challenge testimony on the
ground that the witness was a specialist, not a general practitioner.
Where expert witnesses have been challenged successfully the reason
given is that they did not practice in the same geographical area as the
defendant. Even this geographical distinction now seems to be vestigial
with respect to the use of X-rays and radium. Theoretically the expert
witness is supposed to testify regarding the general and accepted prac­
tice in the profession which is the standard to which the physician must
conform, but it would be unrealistic to assume that his testimony will
be unaffected by his special knowledge. It also would be unrealistic to
ignore the fact that the jury is more likely to be impressed by such testi­
mony than by that of other general practitioners. These influences
would seem to indicate that, out of the mechanics of trial procedure,
there may come a substantive change in the standard. The general prac­
titioner well might be advised against undertaking irradiation treatment
for the more serious ailments in the vital areas of the body, unless
referral to a specialist is not feasible.

On the other hand it is perfectly clear that considerable room must be
permitted for differences of opinion or judgment so long as reasonable
care has been used in making that judgment. The court in Butler v.
Rule rejected the contention that in the use of an X-ray machine the
highest degree of care should be exercised, and quoted the following
language with approval:

"The law thus requires a surgeon to possess the skill and
learning which is possessed by the average member of the
medical profession in good standing, and to apply that skill
and learning with ordinary and reasonable care. He is not
liable for mere error of judgment provided he does what he
thinks is best after a careful examination. He does not guar­
antee a good result, but he promises by implication to use the
skill and learning of the average physician, to exercise reason­
able care, and to exert his best judgment in the effort to bring
about a good result." 154

In that case the decedent received X-ray treatment of a twelve-month
sarcoma on the left groin because surgical treatment was no longer pos­
sible. The X-ray treatment resulted in a third-degree burn that was very
painful and death followed in three months. The court reversed the
judgment for the plaintiff because of the trial court’s instructions con­
cerning the high degree of care.

Again, in Hasen v. Mullen 155 the court decided that a carefully

154 29 Ariz. 405, 416, 242 P. 436 (1926).
155 Supra note 144.
formed judgment that a bold course of intense X-ray treatment was re­
quired did not constitute a lack of due care. In this case X-ray treat­
ments were administered over a ten-month period, arresting a danger­
ous condition that would have led to death. The only alternative was an
extremely difficult operation. Although the disease was cured, plaintiff
suffered X-ray burns as a result of the treatment. The court reversed a
judgment for the plaintiff on the ground of insufficient evidence to sup­
port a verdict of negligence since the defendant doctor reasonably could
have concluded that bold measures were needed to treat a dangerous
condition. Apparently medical authorities agree that very aggressive
treatment for serious illnesses sometimes is called for in spite of the
fact that X-ray burns may result. A malignant growth treated too
lightly may become somewhat immune and later doses will have to be
much greater if they are to be effective. 158

There is an additional protection for medical practitioners in a mal­
practice case. The courts usually take the position that the area of dis­
cretion and judgment is broad enough to include the right to follow a
given treatment procedure so long as there is a respectable minority of
competent doctors that would follow it even though another procedure
would be followed by a majority of practitioners. 157

Contracting for Higher or Lower Standard

In some circumstances, for example when the doctor gives express
assurances that specific results can be achieved, the doctor may in effect
contract for a higher degree of care and become almost an insurer.
Thus in a California case the doctor was held to his assurances that no
scar would result from the use of radiation treatment of swollen glands
on the plaintiff's neck. 158 The moral for the expert is, "Do not make
promises as to results."

Equally significant is the converse possibility that a patient may con­
tract to relieve the doctor of the risk of a negligence action where the
doctor warns the patient of the danger involved in the use of repeated
X-ray treatment. In one case, Gross v. Robinson, 159 after three attempts

156 Dunlap, "Medicolegal Aspects of Injuries from Exposure to X-Rays and Radio­
157 Blankenship v. Baptist Mem. Hosp., supra note 146 at 148; Wemett v. Mount,
supra note 146 at 313; and Harper & James 169, n. 20.
158 Crawford v. Duncan, 61 Cal. App. 647, 215 P. 80 (1923). The only real defense
was when the two year statute of limitations began to run. See also Stewart v.
Rudner, 349 Mich. 459, 84 N.W.2d 816 (1957), where the court said a contract was
made to use caesarian section delivery and failure to do so made the doctor liable for
damages for a stillborn child. If our understanding of obstetrics is right the case was
very shaky on the causation question, which was not even discussed by the court.
159 203 Mo. App. 118, 218 S.W. 924 (1918).
to take X-ray pictures with a defective machine the doctor warned the plaintiff of the danger of further exposures. Nevertheless, being requested by the patient to take a diagnostic picture, further exposures were made and serious injury resulted. The court intimated that in proper circumstances the patient might assume risks but that in this particular case he did not assume the risk that the doctor would be negligent. The court concluded that there was evidence that the doctor was negligent in not realizing that his machine was faulty and that repeated use created a serious danger.

Some General Cautions—Accurate Measurements and Records

Just as is the case with breach of duty generally, few specific precautions can be suggested to avoid the charge of negligence in the use of radiation. It seems perfectly clear from such cases as McElroy v. Frost, however, that treatment and even diagnostic use of X-rays (the same standard surely will be applied to the use of radioisotopes) has become a very exacting science in which guess work and approximation are not sufficient. In that case the court found it significant that the defendant physician used an ordinary yardstick to measure the distance between the patient and the machine and an old alarm clock to time the exposures rather than the automatic devices available on other machines. The court likewise criticized the fact that the defendant often left the patient unattended during treatment periods. According to expert testimony, the exposure of the scrotum to 2460 roentgens was enough to cause permanent sterility and the development of a fatal cancer.

One positive precaution that would seem to be indicated for a physician who uses radiation in the treatment of patients is indicated in Thomas v. Lobrano. The plaintiff sustained extensive injuries, diagnosed as “bilateral auxiliary chronic radiodermatitis” (burned armpits). The facts were somewhat complex but the failure of the defendant physician to keep an accurate record of doses and times of exposure played a very significant role in the conclusion of the court that the evidence of negligence clearly was sufficient to support the jury’s judgment for the plaintiff. With respect to the failure to keep adequate records the court said:

> It is a matter of common knowledge that the use of x-ray treatments is highly dangerous and it follows that the careless or inefficient administration of x-ray therapy is susceptible of

160 Supra note 148.
disastrous consequences. It is true that Dr. Lobrano contends that records are relatively unnecessary to his administration of x-ray therapy. We not only question the correctness of this assertion but we are convinced that the record of the instant case is completely destructive of any claim of justification for such a conclusion. In the light of the established fact that the x-ray department of the Sanitarium accommodates an average of between 20 to 40 patients per day for photographs and treatment, we think the failure of the physician in charge of the department to maintain and avail himself of proper information which should be reflected by adequate records is a dangerous practice. . . .

. . . We think the defendant has failed to discharge this burden and to clear himself of the charge of negligence which is predicated upon his failure to have kept complete and accurate records of the treatment of the patient, Mrs. Thomas. 162

In malpractice cases some difficulty in determining whether the proper standard of conduct has been followed undoubtedly arises from the fact that cases all too frequently fail to distinguish between the various aspects of a physician’s duty. A doctor must first diagnose the patient’s condition, then must determine and recommend treatment; and, finally, the treatment must be administered. The courts tend to refer to a general standard of care and skill, and allow considerable latitude for errors in judgment, regardless of which part of the physician’s function has occasioned the injury in the particular case. While the courts so far have not differentiated between diagnostic and therapeutic uses of X-ray, it would seem well for them to do so.

Distinguishing Diagnostic and Treatment Uses

As more is learned about the dangerous attributes of radiation, the medical profession is beginning to develop humility with respect to its use and to recognize that in most if not in all cases radiation should be used as a treatment device only by radiologists. In many cases the use of radiation for treatment by a general practitioner probably should be considered as negligence. Moreover, while radiation levels generally are not as dangerous in diagnostic uses as in treatment techniques, it still is unwise to make any unnecessary use of radiation.

For both diagnostic and treatment purposes it is becoming more important that the operator be expert in the use of new equipment and techniques to obtain the maximum results with the minimum of exposure. This again probably should lead eventually to a rule that it is negligent for a general practitioner to use radiation except at quite low

162 Id. at 612-13.
levels or when the particular technique for a specific condition has been thoroughly standardized.

**Standards for Operation of Equipment**

In any event, the very liberal standard applied when considering a doctor's judgment or discretion should not be used in considering operation of such dangerous equipment. It is one thing to say that a doctor should not be too quickly second-guessed as to a diagnosis or a decision on a course of treatment. It is quite another to say that he should be given great discretion in deciding how to operate the equipment to achieve the desired results. Radiologists are becoming much more exact in determining the amount of radiation needed to achieve certain results and how the radiation should be applied so as to do the least possible damage. The loose manner in which X-rays and other radiation sources frequently have been used in the last thirty years has come under criticism by the medical profession itself. It has begun to take note of the necessity of avoiding unnecessary exposure even to diagnostic X-rays. In each case considered judgment should be made of whether or not the need for information outweighs the dangers involved in subjecting the patient to radiation.

**Hypersensitivity to Radiation**

One other aspect of the X-ray malpractice cases may have significance in radiation injury cases arising from the use of radioisotopes for medical and other purposes. Frequently the defendant physician contends that the injury to the patient resulted, not from a lack of due care, but because of the hypersensitivity of the particular patient to X-rays. In nine of sixteen cases collected in a recent A.L.R. annotation, this defense was held to be inadequate. The fact that it was successful in seven indicates it may be available in a proper case.

The Wisconsin court in *Nelson v. Newell* placed an important limitation upon the use of hypersensitivity as a defense. The defendant physician offered the hypothesis that hypersensitivity of the patient might explain the injury that resulted from the X-ray treatments, but

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163 Harper & James 968, 969.
166 The seven cases where the defense successfully asserted hypersensitivity were in states which do not use the *res ipsa loquitur* doctrine in such cases. The other nine were in states which apply *res ipsa loquitur*. The courts did not always discuss the relationship between hypersensitivity and *res ipsa loquitur*, however. This relationship problem will be discussed later in the section on proof problems.
167 195 Wis. 572, 217 N.W. 723 (1928).
he did not offer evidence that the particular patient was especially sensitive. The court stated that if a finding of negligence could be set aside merely on the speculation that the patient might be hypersensitive, malpractice cases involving the use of X-rays could never be successfully prosecuted.

In *Hess v. Rouse*[^168] another possible limitation upon the use of unusual susceptibility as a defense was indicated. The court noted that experts testified to the effect that hypersensitivity usually appeared after the first or second treatment but in this particular case the burns did not appear until after the third treatment. The court concluded that hypersensitivity was not the cause of the burns. Moreover, the court accepted testimony that lack of hypersensitivity could be assumed even though the first exposures were to other parts of the body.

In *Lewis v. Casenburg*[^169] an expert testified that not only does hypersensitivity appear after the first one or two treatments but also that the likelihood of a person being hypersensitive to radiation was very slight. Under the facts of the case, however, hypersensitivity as a defense did not seem persuasive in view of the fact that 161 separate X-ray treatments of the patient’s abdomen had been given by the defendant. On the other hand, the court in *Kuttner v. Swanson*[^170] held that the jury was authorized to find that plaintiff had an idiosyncrasy of peculiar susceptibility on the basis of evidence that the three doses administered were not enough to produce injury in the absence of idiosyncrasy. Again, in *Nance v. Hitch*[^171] the court attached significance to the testimony of an expert to the effect that individual idiosyncrasy is a factor with respect to X-ray burns and that the only way to determine whether a patient has unusual susceptibility is to burn him. This testimony was a persuasive factor in the court’s decision to reject the use of the doctrine of *res ipsa loquitur*; one cannot assume safely that a burn necessarily indicates negligence, the court concluded.

One other fact should be pointed out in connection with the cases involving a defense of hypersensitivity. Those in which hypersensitivity has been asserted successfully are in general more recent than those in which it was unsuccessful, the former being decided mostly in the past thirty years while the others were prior to 1930. The trend, therefore, may be in favor of the defense, but a possible explanation is that in-

[^169]: 157 Tenn. 187, 7 S.W.2d 808 (1928).
[^170]: *Supra* note 146.
[^171]: *Supra* note 141.
Insurance companies are not defending malpractice cases unless the chance of success is very good.

(2) Radiation Injuries Not Involving Medical Malpractice

There are at least three non-malpractice radiation injury cases which deal with the problem of a breach of duty to use due care. Each of them deals with the liability of an employer to an employee who received radiation injury. They are especially important, therefore, to the atomic energy entrepreneur in assessing his legal responsibilities where radioactive material is being used.

The first is *Vallat v. Radium Dial Company*,\(^\text{172}\) where the plaintiff alleged that in 1929 she was employed by the defendant as a radium dial painter. She claimed that the defendant took no safety precautions with respect to particles of radium dust in the atmosphere where she worked and that she inhaled and swallowed these particles, which produced anemia, rarefaction of the bones, alveoli of the jaws, and other disorders. The complaint charged that the illnesses resulted from a violation of an Illinois statute (typical of those found in many states) providing that employers “shall, for the protection of all employees engaged in [peculiarly hazardous] . . . work or process, adopt and provide reasonable and approved devices, means or methods for the prevention of such industrial or occupational diseases as are incident to such work or process.” The State Department of Factory Inspection was authorized to promulgate rules and require compliance with these standards.

The defendant company filed a motion for judgment on the ground that the occupational disease act was unconstitutional because it failed to set up an intelligible standard of duty and therefore violated the due process clauses of the state and federal constitutions. The company also contended that the act violated the separation of powers concept of the state constitution because it unlawfully conferred legislative powers on the State Department of Factory Inspection. Further, the defendant supported the motion for judgment by arguing that plaintiff had neither a common law nor a statutory remedy because the complaint showed on its face that she was not an employee of the defendant when the disease became manifest, and, finally, it was claimed that the suit was not filed within two years after the cause of action accrued.

The court invalidated the statute on the ground that the phrase “reasonable and approved devices, means or methods for the prevention

\(^{172}\) 360 Ill. 407, 196 N.E. 456 (1935).
of such industrial or occupational diseases as are incident to such work or process” did not meet the requirements of due process of law. These words were held to be vague and indefinite, not furnishing an intelligent standard of conduct to be observed by the employers. The court also concluded that the delegation to an official of the power to define words not of common knowledge is unwarranted and void. Today it is unlikely that many state courts would hold this a violation of the separation of powers concepts, and certainly the delegation of authority is no violation of the due process clause of the Fourteenth Amendment of the Federal Constitution. While the Illinois court confused the two issues, the question of a standard definite enough to give sufficient notice to meet a due process requirement is treated much more liberally (or loosely) today than formerly, particularly in connection with administratively enforced statutes. The opinion of the court is not clear as to whether the Department of Factory Inspection had actually prescribed standards of conduct to be followed by employers in such cases as involved here. If the standards were laid down before the time of employment of the plaintiff as a radium dial painter, then there could be no question of notice, but simply one of whether or not there was a lawful delegation of legislative power. So long as notice of a specific standard of conduct is given by the administrator before any liability attaches, there usually is no problem of notification. It seems quite unlikely that today such a case would be decided on these grounds, and hence the case is not particularly significant in connection with prospective radiation injuries.

The next case is far more significant for the atomic energy entrepreneur. If it should be followed by other courts, it might mean that compliance with nationally recognized radiation standards in effect constitutes a *prima facie*, if not a conclusive, defense against a charge of failure to use due care. This case is *Rakowski v. Raybestos-Manhattan, Inc.*, decided in 1949 by the New Jersey Superior Court.


174 Yakus v. United States, 321 U.S. 414, 64 S.Ct. 660 (1944) is a perfect example of such a case (involving price regulations during World War II). Comment, 53 Mich. L. Rev. 264 (1954) is the most complete collection and analysis of various factors to be considered that was found. See particularly 270-72.

175 5 N.J. Super. 203, 68 A.2d 641 (1949), certif. den. 3 N.J. 502, 70 A.2d 908 (1949). An award of $52,800 was given to an Australian worker whose leg had to be amputated because of radiation burns received from a small radioactive capsule carried in his pocket for 6 days. Atomic Industrial Forum, April 1958, p. 27.
plaintiff was employed by the defendant in the X-ray department to operate a fluoroscope to test rubber belting for defects. The controls for the fluoroscope were in a room separated from the machine, and the plaintiff viewed the operation through a lead glass window. Evidence submitted by the defendant indicated that the construction of the room and the operation of the machine were such that the radiation which could be received by an operator even with the door open was substantially less than the permissible dosage for such installations under accepted national standards, including that of the American War Standard Safety Code for Industrial Use of X-ray. Tests made before and after the suit was commenced revealed that at no time was the maximum radiation in the room where plaintiff worked more than one half of the suggested permissible dose of 12.5 milliroentgens per hour for an eight-hour day and a six-day week. Plaintiff alleged that prior to her employment she had enjoyed good health and in fact passed the physical examination necessary for employment in the defendant’s plant. She also alleged that although she was only twenty-five years old, after commencing to operate the machine she underwent a premature menopause and suffered telangiectasis in the central portion of her face, a condition which manifests itself by showing the fine superficial capillaries and giving an appearance of premature aging. Expert witnesses called by the plaintiff testified that her condition was attributable to the absorption of X-rays that penetrated the room in which she worked. The experts set up their own standard as to what would be reasonable care under the circumstances, a standard which apparently was considerably different from that set up by the American Standards Association. The plaintiff charged that the trial court erred in directing a verdict for the defendant, claiming that she had made a *prima facie* case. In stating the general rule concerning the degree of care required, the court said:

It is the general rule that the mere fact that an instrumentality may become dangerous to others does not constitute its possessor an insurer against injury that may result therefrom. Liability for negligence in respect to dangerous instrumentalities, as liability for negligence generally, arises from the failure to use due care. A *higher degree of care* is required in dealing with a dangerous agency than in the ordinary affairs of life or business which involve little or no risk. The law exacts of one who puts a force in motion that he shall control it with a skill and care *in proportion to the danger created* and with appliances which, in view of the circumstances, are reasonably safe. In other words, the essential requirement of
due care under the circumstances necessarily implies that the care required to prevent injury to others in using a dangerous instrumentality is a *great* or *high degree* and every reasonable precaution suggested by experience and the known dangers of the subject ought to be taken.\(^{176}\)

In other words, a man of ordinary prudence when using a dangerous machine must take greater precautions. As the court stated it, quoting from an earlier case:

"Rather does it mean the exercise of that degree of care, of that manner of fulfillment of duty, which comprehends a circumspection, a foresight, a prevision which has due and proper regard to reasonably probable contingencies." \(^{177}\)

The court also approved the following language:

"Every peril, it is safe to say, including such as are termed 'latent' or 'hidden,' need not be discovered, since liability for negligence in keeping a dangerous instrumentality is not absolute. If, however, common experience has demonstrated that dangers lurk in the method adopted or in the instrumentality maintained by a person, he rests under the obligation of ascertaining the peril and taking precautions to avoid injury therefrom." \(^{178}\)

The court, nevertheless, held that defendant's motion for a directed verdict was properly granted, because, even under the proofs submitted, there was insufficient evidence to support a jury verdict that defendant was negligent even though he was dealing with a dangerous instrument. Since the testimony revealed that the defendant's construction, installation, and operational techniques complied with the generally accepted standards, and since the defendant used a competent and recognized radiation expert who had advised the two room installation, all necessary precautions had been taken for the reasonable safety and protection of the operator of the machine. The court said that plaintiff's experts could not use a standard of their own but should have shown that the defendant's installations and operations were not in conformity with the "standard practice in the industry." The court concluded that a contrary rule "would mean that industrial concerns would be subjected to the mere caprice of juries, and held accountable for actionable negligence regardless of whether they adopted a recognized standard of installation or not." \(^{179}\) In effect this is tantamount to a rule that compli-

\(^{176}\) *Id.* at 207. [Emphasis added.]

\(^{177}\) *Id.* at 208. See also same idea expressed in cases discussed *supra* at note 40.

\(^{178}\) *Id.* at 207.

\(^{179}\) *Id.* at 210.
ance with established codes concerning radiation means that there can be no inference of negligence on the part of the defendant, even if it should be accepted as true that the plaintiff's injuries were caused by the X-rays that penetrate the room in which she worked. The court did not consider the question of whether the industry standard was sufficiently high, it merely assumed it and refused to accept the standard asserted by plaintiff's experts.

If this view should be followed generally in radiation cases, it would make the problem of tort liability a much easier one to solve. The opinion of the court, however, may be contrary to the views of treatise writers; they are inclined toward the view that proof of compliance with a safety code, whether established by unofficial experts in the field or by statute or official administrative rulings, should be treated merely as evidence of use of due care.\(^{180}\)

Moreover, from the opinion in the Rakowski case one cannot conclude without question that the court is holding that compliance with such a safety code is conclusive for the defendant. This is a fair implication from some of the language used, but the plaintiff rested her case solely on the testimony of experts as to what they would regard as a reasonable standard. So far as the opinion indicates, no attempt was made to show directly that compliance with the accepted standard would not meet the standard of what a reasonably prudent man would do under the circumstances, although this is implied rather clearly by the testimony solicited from the plaintiff's experts. It might be possible for plaintiff in a subsequent case involving similar compliance to show that the code promulgated by the National Committee on Radiation Protection is somewhat out of date and, therefore, compliance with it might not amount to reasonable care. The recent establishment by the Atomic Energy Commission of a standard of exposure for its own employees of roughly one third of that which is still permitted for employees of licensees raises this possibility. The AEC apparently thinks that the lower dosage probably should be adopted from the standpoint of the workers' safety. Nevertheless, on balancing the interests of society in developing the atomic energy industry against admittedly only a possible danger from such low level radiation, the higher level is considered reasonable. All things considered, too much reliance should not be placed on the Rakowski case, although it is an important precedent.

The third case in point is *Kress v. City of Newark*, decided in New

\(^{180}\) *Supra* Section B, 2 a.
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Jersey in 1950. In this case the plaintiff was the employee of the Newark City Hospital where she worked at first as a maid and later in the X-ray department, where she helped prepare patients for photographing. After several years in this task she was assigned to the development room, and until 1941, some eight years after she was first employed, her exposure to X-rays was minimal. In 1942, however, the plaintiff was asked to become an X-ray technician. She received no formal training, "learning" by watching other technicians whom she assisted. After a relatively short period of observing she was given a portable X-ray machine to be used in the wards. She was furnished no portable safety screen and frequently stood across the table from the patient in such a manner that she also would be exposed. While taking dental X-rays she often held the film in place herself. This occurred as many as sixty times a week over a period of several years, during which time she received no warning of the danger inherent in the X-ray beam. A blood count was never taken during this period, except once on the occasion of an operation. Only once, in 1944, did a doctor suggest that a monitor film be attached on her uniform. On development the film showed presence of X-rays. It was not until a year or two later, however, that plaintiff noticed spots on her hand which she showed the chief of the X-ray department. In August, 1946, the plaintiff's finger accidentally was torn open and a biopsy was made by a doctor in another New York hospital. She ceased working in the X-ray department at that time, and was referred to a doctor who confirmed a diagnosis of skin cancer. Further operations were performed in later years, and, finally, in 1949 the whole surface of her hand down to the tendon sheet was removed. Prognosis at the time of the trial was that amputation would probably have to follow, with no guarantee that the cancer would be arrested. One of the experts in the case was Dr. Arthur Mutcheller, a biophysicist and radio-physicist, specializing for twenty years on the effect of radiation upon living material. He testified that standard practice in the use of portable X-ray machines called for a protective screen for the operator. He stated that in taking dental X-ray pictures the standard procedure was to use a lead screen, and to prohibit holding the film in place by the technician.

The lower court sustained defendant's motion to dismiss on four grounds: (1) plaintiff had failed to sustain the burden of establishing

defendant's negligence; (2) she was guilty of contributory negligence; (3) a municipality can only be liable for "affirmative wrongdoing"; and (4) a charitable institution is not liable for the negligence of its agents. On the first two grounds the court on appeal held that there was sufficient evidence to raise a question properly to be decided by the jury. On the third ground, the court decided that if the jury found that the city put the X-ray machine into operation without a lead screen, without giving adequate instruction to the plaintiff as to the dangers, and without periodic use of monitor film and adequate protective gloves and apron, then the city was clearly "an active wrongdoer." The court felt that this was quite like cases involving unguarded holes and ditches where proper safeguards are not taken, and quoted with approval the opinion recorded in the Rakowski case. As to the fourth ground, the court held that a hospital was not a "charitable" institution with respect to the plaintiff, who was not a beneficiary of the charity but an employee of the hospital.

Conclusion

In a field developing as rapidly as atomic energy, particularly as to our knowledge of the injurious effect of radiation, it would be most unfortunate if statutes, administrative regulations, or decisional rules should develop hard and fast lines as to what is or is not a reasonable standard of conduct. Some dramatic discovery, for example some simple chemical or drug which will either give considerable immunity or considerably reduce the aftereffects of radiation exposure, could be important in determining whether or not the conduct followed by the defendant in a particular case meets the standard of reasonableness. Some such discovery might reduce dramatically the risks involved in temporary, fairly high radiation exposure, or make it perfectly reasonable to expose persons to higher levels of radiation if the new techniques were used.

The converse is equally true. If new concepts and techniques are found, an employer or other user of radioactive materials should not be allowed to adhere stubbornly to a code previously promulgated and accepted in the industry. This variable standard of conduct will not be quite as comfortable for the defendant as would be the official pronouncement. He would like to know exactly what standard of care will be considered reasonably prudent action. Nor will it be as good for the plaintiff who would like to be able to prove his case merely by showing non-compliance with official standards, yet it would seem more nearly

182 See supra note 153.
fair in individual cases. A defendant's reasonableness should be judged by taking into account the techniques, new as well as old, which are available for reducing the hazard or preventing the aftereffects of exposure. This is important, for example, in a case such as the recent Oak Ridge accident where at least one worker was reported to have received 320 rads.\textsuperscript{188} It might become standard practice to have employees who undertake these operations during which serious exposure would result in the event of an accident take such pills as may prove to be effective in reducing the injurious consequences of exposure. Compliance or non-compliance with industry safety codes certainly should be given weight, and in most cases perhaps should constitute \textit{prima facie}, if not conclusive, proof, when no evidence to the contrary is introduced. Courts, however, should avoid a rigid rule and decide individual cases on the basis of the specific evidence produced.

As suggested in the \textit{Lobrano} case,\textsuperscript{184} due care probably requires the user of radioactive material to keep accurate and detailed records of his operations. Not only doctors and radiologists, but also other users of radioactive materials should keep such records. Often it will prove helpful to the defendant himself. Certainly, it seems a necessary requirement to protect the potential plaintiff because without such information it becomes very difficult for him to prove injury from radiation at a particular time and from a particular source, except in the most obvious cases such as when third degree burns result. Possibly a rule requiring the keeping of careful records should be adopted and combined with the \textit{res ipsa loquitur} doctrine so as to make failure to keep such records a \textit{prima facie} case of negligence. This is discussed later in connection with \textit{res ipsa loquitur}.\textsuperscript{185}

(3) The Use of Expert Testimony

Running through all of the radiation cases so far discussed is a common problem. How does one prove that the defendant in the particular case did or did not meet the standard of conduct of a reasonably prudent man under the circumstances? Must expert testimony be used or will lay testimony serve the purpose? Harper and James state the general rule as follows:

\begin{quote}
Except for malpractice cases (against a doctor, dentist, etc.) there is no general rule or policy \textit{requiring} expert testimony as
\end{quote}

\textsuperscript{188} \textit{Infra} Chapter IV at note 125.
\textsuperscript{184} \textit{Supra} note 161.
\textsuperscript{185} \textit{Infra} discussion in text beginning at note 1146, particularly at notes 1234-35.
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to the standard of care, and this is true even in the increasingly broad area wherein expert opinion will be received. On the other hand, any given matter may conceivably be so far out of the range of general experience that a jury will not be allowed to decide upon the reasonableness of an actor's conduct without the aid of expert testimony which at least explains to the layman the esoteric problems and the possibility and practicability of precautions. ***Courts could very easily expand the area in which expert testimony is required to establish the standard of conduct, but the tendency has been instead to resolve doubtful questions in favor of allowing the jury to decide the issue of negligence without its aid.186

One situation in which the courts have not resolved doubtful questions concerning the need for expert testimony in favor of enlarging the jury's sphere is when a doctor is accused of malpractice. There may be cases where "negligence is so grossly apparent that a layman would have no difficulty in recognizing it,"187 but in general the plaintiff must use experts to show a lack of reasonable professional skill.

In a recent case, Facer v. Lewis, the Michigan Supreme Court said:

Although we have held that leaving a sponge in a wound is not good medical practice and does not require the testimony of expert witnesses to establish this fact, the proper or improper use of X-rays does require the testimony of experts.188

In this case the defendant doctor used X-rays to treat the decedent for warts on his foot. The patient suffered a radiation burn severe enough to cripple him and he sued for damages charging defendant with negligence. Upon his death his administratrix was substituted as party plaintiff. The only expert testimony offered by the plaintiff was to the effect that in X-ray treatment procedure intensity, time and distance are important factors in determining the proper dose. The only evidence indicating negligence was that of decedent's son describing what the defendant had done in treating his father's foot. Defendant moved for judgment notwithstanding the verdict on the ground that only an expert can establish negligence in such a case. In approving the trial court's granting of the defendant's motion the court said:

Although laymen generally are acquainted with the fact that X-rays are destructive and may result in burns or other

187 Harper & James 968 (quoting from 7 Wigmore, Evidence §2090 (3d ed. 1940)) and cases cited at n. 15. To these should be added Ballance v. Dunnington, 241 Mich. 383, 217 N.W. 329 (1928), where the court said that the exposure period was such that "even the merest tyro would know was improper." Even the defendant admitted it.
188 Facer v. Lewis, supra note 141 at 713.
serious conditions, yet the testimony of plaintiff's own medical witness was such as to clearly demonstrate that an X-ray treatment for warts involves questions of skill, judgment and practice beyond the knowledge of laymen and upon which a jury would need the advice of experts to determine whether or not the claimed acts of defendant were improper. We believe the facts in the case at bar are such that the questions of negligence became exclusively for expert testimony. 189

A Mississippi decision, *Waddle v. Sutherland*, 190 appears at first reading to reach a contrary result. After X-ray treatment by the defendant of the plaintiff for eczema his leg had to be amputated because of radiation burns. Both sides presented expert testimony and in addition the plaintiff testified as a witness in his own behalf, apparently describing acts and circumstances concerning the final treatment tending to show an overdose of X-ray because of overlapping. 191 The plaintiff also testified that defendant stated at the time of his last treatment that this was going to be a stronger dose than he had previously given. The plaintiff's wife testified that the defendant doctor told her that they would probably have to amputate both of his legs and that the doctor blamed himself for the burns, not his assistant: "it was his mistake and not hers." The trial court instructed the jury that, in deciding whether the doctor treated the plaintiff in a "proper manner and with ordinary care and skill," and whether there was any negligence on the part of the defendant in the use of the X-ray machine, they could consider only the testimony of those "who themselves possess the skill required to administer such treatment and qualify themselves as expert in such treatment. . . ." The trial court's verdict was for the defendant doctor. The supreme court reversed, using the following language:

By the instruction given appellee, copied above, the court told the jury, in effect, that in considering and deciding the issues of fact, they were confined alone to the evidence of the experts. By this instruction the court necessarily excluded from the consideration of the jury, not only the doctrine of res ipsa loquitur embodied in the two instructions given appellant, but also the evidence of both appellant and his wife, to the effect that appellant's injuries were the result of a third

189 *Id.* at 714.
190 156 Miss. 540, 126 So. 201 (1930).
191 Overlapping results when the operator fails to keep the beam sufficiently narrow. To avoid unnecessary exposure of the good tissue, particularly at the surface, repeated deep therapy X-rays are focused on the deep spot from different surface angles. If the beam is not narrow there will be overlapping and therefore unnecessary exposure of the surface which can lead to serious burns.
degree burn, which fact he had admitted to appellant's wife, along with the statement that such burn was the result of his fault, and not that of Miss Satterfield, his assistant.

. . . In a case depending upon expert testimony alone such instruction would be proper; but this is not that kind of a case. This is a case where there is nonexpert testimony, as well as expert testimony bearing on the issues. The effect of this instruction was to tell the jury not only to disregard the doctrine of res ipsa loquitur embodied in two of appellant's instructions, but also to disregard the evidence of both appellant and his wife. 192

It is also important that the plaintiff's testimony was in addition to that of his own expert witnesses.

Laying aside the fact that Michigan does not apply res ipsa loquitur to this type of case while Mississippi does, it is possible to reconcile these cases on a ground that well might be a satisfactory basis for determining when expert testimony is required and when it is not. If the lay testimony goes only to a description of events occurring during a treatment and to reporting comments made by an attending physician or his assistants, there is only the question of probative value to be attached to the evidence. But if the lay witness attempts to show that this action constitutes lack of careful and prudent attention by the doctor because it is not in accordance with the care and skill ordinarily expected of a doctor under these circumstances, this would seem to be outside the area of knowledge of a non-expert witness, unless it is a situation where the "merest tyro" could determine that ordinary care and skill was not used. The court in Butler v. Rule seems to make just this distinction, although the only expert testimony there was to the effect that the treatment was given as the defendant testified and that it was proper. Because there was conflict as to how far the machine was placed from the patient the court said:

However, if there was evidence as to the manner in which defendant administered the treatment in conflict with his testimony, and tending to show that in some essential the treatment was not given as defendant stated, the expert testimony to that extent would fail, and a question of fact for the jury arise. 193

The judgment for the plaintiff was reversed, however, because the instructions to the jury were based upon the wrong standard of care.

192 Supra note 190 at 550, 551.
193 Supra note 154 at 412. See also supra note 140.
In Christie v. Callahan all the expert witnesses testified that the treatment, if given by the defendant doctor as described by him, was reasonable. Nevertheless, the jury had found the doctor to be negligent. The majority of the court of appeals stated:

The jury must have found that the treatments were not given exactly as Dr. Merritt testified they were, and that, unfortunately, he gave more than the amount proper for treatment of pilonidal cyst. . . .

The opposing view appears to be based on the theory that negligence in X-ray treatments can be shown only by direct and positive testimony of X-ray specialists to specific acts of negligence taking place in the course of the treatment. A burden so heavy is not required either by the general law of negligence or by the Sweeney case. Generally speaking, direct and positive testimony to specific acts of negligence is not required to establish it. Circumstantial evidence is sufficient, either alone or in combination with direct evidence. 194

The majority concluded that there was sufficient evidence to support the jury's finding that the defendant had been negligent.

Where the only question is whether or not the actions of the defendant doctor met the accepted standard of reasonable care and skill under the circumstances, surely it would be proper to insist on expert testimony. When this is the case, a statement by the California court in Bennett v. Los Angeles Tumor Institute indicates the typical judicial attitude: "The question as to whether there has been a breach of this standard of care is one which can be resolved only by the testimony of experts." 195

Where testimony by experts creates a conflict as to what is a proper course of treatment in a particular case, the opinion of the court in the Blankenship case is typical. The court said:

In view of this divergence of opinion among the specialists it cannot be said that it should be left to a jury of laymen to determine which method of treatment is right, which would be the effect of saying that the court erred in directing a verdict for the defendant Hospital in this case. 196

Later in the same opinion the court said:

As long as there is room for an honest difference of opinion among competent physicians, a physician who uses his own

194 Supra note 142 at 839.
196 Supra note 146 at 142. Not to be confused, however, with the case where action did not conform to either school or they both agree on this point, Wemett v. Mount, supra note 146.
best judgment cannot be convicted of negligence, even though it may afterward develop that he was mistaken. . . .

And where there is a difference of opinion among physicians or surgeons with reference to the treatment to be given in a particular case, a physician will not be held liable for malpractice if he follows the course of treatment advocated by a considerable number of physicians of good standing in his community. It would not be competent for a court or jury in such a case to say that a physician who followed either of said different methods of treatment was negligent. 197

On the other hand, in Simon v. Kaplan the court said that where expert testimony for the plaintiff and the defendant was in conflict, it would not set aside the jury's verdict for the plaintiff because, "in these circumstances we are not warranted under the law, in disturbing the verdict of the jury." 198 The decision of the majority in the Christie case, 199 allowing the jury to decide the question of negligence, did not really involve a question of the doctor's judgment being a reasonable one. The attack was not on the opinion of the expert witnesses for the defendant but on the accuracy of the defendant doctor's statement as to what was done. It might be argued, however, that the doctor also was accused of not using proper treatment and the court did allow the jury's finding to stand.

Another problem concerning the use of expert witnesses may prove very important in atomic energy cases. It is the training and experience that qualifies a person as an expert on radiation injuries. The general rule certainly is that stated by the court in Young v. Stevens:

Appellant's first point is that it was error to permit certain expert testimony to be given by witnesses who were licensed physicians. The questions had to do with X-ray and the like, and the argument is that because these physicians did not hold themselves out as specialists in that branch of the profession they were not competent to testify thereon. It is well established that having qualified as medical doctors they are competent to testify on all medical subjects upon which they claim sufficient ability to express an opinion. The qualification of an expert is for the determination of the trial court and such determination will not be disturbed where the ruling is supported by evidence. . . . 200

197 Supra note 146 at 144.
199 Supra note 142.
As to the weight to be given to testimony of various expert witnesses, however, the fact pointed out by the court in *Thomas v. Lobrano* is true:

It has been well and soundly established with reference to the evaluation of the opinion testimony of expert medical witnesses that the conclusions of qualified specialists in the various fields of medicine are entitled to greater weight than that accorded the opinions of general practitioners. 201

In deciding this question of the use of expert testimony, it is most important that the court take into account the distinction previously suggested 202 between the operation of radiation equipment and deciding whether or not to use it for diagnosis and treatment. The proper way in which to use the radioactive source or technique has now been developed into a fairly complex science in which the amount of voltage, size of the opening, type of shielding, and the distance from the machine to the affected area are all important calculations that can and must be made with considerable accuracy. Unless the person using the equipment is prepared to make the calculations and to use the machines with expert care, he ought not to attempt it, even though he is a licensed physician. In addition, in determining what is due care, a court should not accept loose practices followed in a particular local community. As is indicated by the court in the *McElroy* case, 203 knowledge of the use of radioactive sources is nation-wide and there would seem to be no reason to allow local practices of a small group, even of licensed physicians, to vary from the standard now generally accepted throughout the country.

Even more important in the atomic energy cases will be the question of whether persons not licensed to practice medicine should be allowed to testify. Since a great deal of our knowledge in this area is being developed by experts who are not licensed physicians (biologists, physicists, chemists, and others with similar scientific training), it would seem quite ridiculous for the courts to refuse to recognize the validity of opinion testimony given by such persons, especially in non-malpractice cases. Although the question was not litigated specifically, such non-physician experts were allowed to testify and their testimony given great weight in several recent cases. 204 The court in the *Rakowski* case,

201 *Supra* note 161 at 614.
202 See discussion *supra* at notes 173, 164.
203 *Supra* note 148.
204 *Kress v. City of Newark*, *supra* note 181 at 74 (bio-physicist and radio-physicist
apparently allowed non-medical experts to testify for they refer to the plaintiff's "medical and expert witnesses." In addition, non-medical experts participated in establishing the standards which were promulgated by the American Standards Association and admitted as evidence in the case.

(4) Conclusions

The general impression one gets from reading the radiation cases is that there is a growing tendency among the courts to recognize that it has become general knowledge among informed people that the use of radiation is something to be undertaken only if due consideration is given to the substantial dangers inherent in its use. The courts are beginning to recognize that the use of such materials has developed into a fairly exact science as far as measurement and production techniques are concerned. It also is true that the courts apparently are insisting that recognition be taken of new advances by any one who uses such material, whether he be a doctor or an industrialist. It is not suggested, however, that courts will hold doctors liable for errors in judgment as to the amount of radiation necessary to cure diseases or in drawing fine lines as to how much radiation can be risked, all things considered. Certainly the reasonable-man standard would require the advice of radiation experts in most cases, at least at the time of setting up the plan of operation and installing the radioactive source or operational technique.

In the light of the rapid development of specialized knowledge in this area, it also would seem that there are some instances, both in the area of medical practice and that of industrial uses, where radiation should not be used without the supervision of a person fully qualified in the field. This would be true in the operation of a nuclear reactor as well as in many other cases involving less severe radiation hazards. The better part of valor would be to use the expert—the reasonably prudent man will. Our suggested model state statute accepts this premise.  


205 Supra note 175 at 211. The opinion does not state this fact specifically but it is clear that the experts must have been non-doctors.

206 Infra Part III, Chapter VI.
3. Vicarious Liability for Negligence of Independent Contractors

a. Introduction and Limitations of Discussion

Remembering that radioactive material is uniquely insidious not only because it gives no warning to the usual human senses but also because in many cases its hazard continues for many years and in some cases centuries, and finally because the radiation source cannot be turned off like a machine, the owner or operator surely will consider seriously the possibility of immunizing himself from some of the consequent tort liability. One of the ways in which immunity may perhaps be obtained is through the use of independent contractors for certain operations. Therefore, consideration must be given to the concepts of vicarious liability.\(^{207}\) It does not fit well into either duty or breach analysis and is treated separately here although admittedly both duty and breach ideas are involved.

Vicarious liability is a very broad subject. It covers the whole ambit of principal-agency, master-servant, independent contractor, and joint enterprise. Many aspects of vicarious liability would seem to present no significant problems in atomic energy situations, at least in the sense of being unique or unusually troublesome. For example, the rules of master-servant will not be changed for radiation cases. The same is true as to joint enterprise questions.

The use of independent contractors, however, will create troublesome questions. Yet even within this area there are many questions which present no peculiar problem for our purposes; \textit{e.g.}, where to draw the line between an employee and an independent contractor. The distinction between an independent contractor and an employee is not nearly so significant as it once was in tort cases. The important question today seems to be not whether the negligent person was an employee or an independent contractor but, assuming he was an independent contractor, whether his negligence will be imputed to the one who hires him. Without question the old immunity said to follow automatically from hiring an independent contractor (who by definition was not within the control of the other contracting party) now has so many exceptions that it is scarcely recognizable as a general rule. This is quite consistent with the general trend toward extending liability, such as in

product liability cases to be discussed later,\textsuperscript{208} and the extension of liability of the independent contractor himself for injuries taking place after his work has been accepted but caused by conditions created by his negligence which he reasonably could have foreseen might cause injuries to a third party.\textsuperscript{209} This trend is also discernible in cases involving the liability to be imposed on the employer for the negligence of an independent contractor. It should not be assumed, however, that all distinctions will be ignored and that the independent contractor’s negligence will always be imputed to the other party. In this regard the English courts evidently have been moving in the direction of expanded liability more rapidly than have American courts.\textsuperscript{210} On the other hand, there have been some moves in Parliament recently to reverse this trend although English legal writers have criticized this attempt.\textsuperscript{211}

b. Liability of Owner or Occupier of Property

Once an independent contractor relationship has been found, one of the most frequently litigated questions deals with the liability of an owner or occupier of land for the negligence of an independent contractor whose work on the premises causes injury to others. It is in this area that the courts are moving most rapidly toward looking upon the independent contractor almost as an employee of the owner and holding the latter liable for negligence of the former. Typical of this trend is a recent Wisconsin case, \textit{Nechodomu v. Lindstrom},\textsuperscript{212} which held the owner of a building liable when an independent contractor doing construction work on the property allowed a young child to place his hand in a mixing machine in which there were exposed, revolving blades. This decision is somewhat unusual for even in cases where courts find that an independent contractor was performing a duty which can not be dele-

\textsuperscript{208} \textit{Infra} Chapter V.

\textsuperscript{209} Annot., 58 A.L.R.2d 865 (1958), particularly at 891 ff. The cases cited clearly bear out the conclusion stated in the annotation. A striking example of imposing such liability is Roush v. Johnson, 139 W.Va. 607, 80 S.E.2d 857 (1954), where a faulty installation of electrical connections caused the electrocution of a moving company employee long after the installation was made.


\textsuperscript{211} Munkman, “Liability for the Acts of an Independent Contractor,” 107 L. J. 245 (1957). A recent English case certainly moving in this direction, but which could be explained under some of our American decisions requiring the owner to see that reasonable precautions are taken, is Balfour v. Barty-King, [1957] 1 Q. B. 496, noted 1957 Camb. L. J. 132.

\textsuperscript{212} 269 Wis. 455, 69 N.W.2d 608 (1955), noted 28 Rocky Mt. L. Rev. 128 (1955).
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gated by the owner, the latter is not responsible for what is usually termed "collateral negligence," meaning that some specific part of the operation being performed by the independent contractor was not unusually dangerous nor unexpected. A carpenter using a hammer, saw and nails in the usual way is an example. It is arguable, however, that in the Wisconsin case the job required the presence of this mixing machine so the danger was inherent in the job, not just incidental or "collateral" to it. In one sense, however, this is true of all "collateral negligence" cases. Whether or not "collateral negligence" terminology is used, the basic question remains: Is this the kind of action for which the independent contractor only should be held liable, or is the nature of the negligence and the activity of the independent contractor so essential a part of the job desired by the owner, the kind of accident so foreseeable, and the danger so unusual that immunization of the owner should not be allowed? 218

Certain activities generally are carried out by an independent contractor and are thought to be delegable, for example, transportation of passengers by taxi, or the use of ordinary carpenter tools to do routine jobs in which the risk is not too great.

The cases involving independent contractors working on the property of the other contracting party have become so numerous that annotations usually group them under separate headings for each part of building and construction work; e.g., excavation and refill work, 214 demolition work, 216 excavation that affects adjoining realty, 219 and awnings, 217 to mention only a few. It has even been argued in a recent Michigan case, Cary v. Thomas, 218 that such liability ought to carry over to the ordinary home owner. In this case a home was fumigated by an independent contractor who was competent and carefully picked by a home owner who undoubtedly had no expertise in such matters. Two dissenting judges would have held the defendant liable because the danger was great. The plaintiff was a water softener serviceman who was overcome by cyanide gas when he entered the home after the independent contractor failed to block all the entrances by posting

215 Id. at 89.
216 Id. at 111. See Annot., 24 A.L.R.2d 288 (1952) for liability where the independent contractor sets a fire and negligently allows it to spread.
218 345 Mich. 616, 76 N.W.2d 817 (1956). One of the dissenting justices was Smith, supra note 213.
notices. *Pure Oil Co. v. Lassing* 210 is another recent case in which the independent contractor concept gave immunity from liability. An independent repairman working on gasoline pumps at a filling station negligently flipped a lighted match into the gasoline tank bin. This is a good illustration of an instance in which a court places considerable emphasis on whether or not the contractor is really independent and therefore not subject to the control of the employing party as to methods of performing the task.

Significant for our purposes are two types of cases concerning work by independent contractors on the owner’s property in which the courts often hold the owner liable for the contractor’s negligent actions. The first type deals with damage caused during construction, repair, or maintenance which are not a normal part of the day-to-day operation of the business. "Collateral negligence" 220 is the term used in construction and repair cases to state the policy question of whether or not to impute the contractor’s negligence to the employer. In the second type of case, concerning harm done in the course of the normal day-to-day operation of the owner’s business, the question is usually put in terms of "non-delegable duty." 221 Writers and courts often use a third phrase, "inherently or intrinsically dangerous," 222 to state the policy question. Actually, in all these cases the same test should be used to determine the liability of the employer for the independent contractor’s negligence, when the employer himself could not be considered as having acted negligently within the ordinary standards. The policy question in each situation is whether to allow the employer to shift the tort responsibility to an independent contractor or to insist that the employer remain responsible for any negligence, even that of the independent contractor. The activities of an independent contractor which will be the non-delegable responsibility of the employer are those which are appropriately described as involving "unusual danger" rather than being "inherently dangerous" or involving "collateral negligence." The phrase "non-delegable" merely states the court’s conclusion that the activities involve "unusual" hazard.

By the word "unusual" it is meant that the risk of harm is somewhat

210 222 F.2d 886 (6th Cir. 1955), noted 24 Tenn. L. Rev. 268 (1956).
220 Prosser 361; Harper & James 1410; Smith, *supra* note 213.
221 Prosser 359; Harper & James 1406.
greater than normal either because the harm is relatively serious or extensive, involves danger to a great many persons, or is of a unique or unexpected type.

It should be understood that this discussion concerns the liability of the employer for the negligent acts of the independent contractor, not for the negligent acts of the employer himself. In many situations the employer himself may be negligent, such as, (1) in failing to use care in selecting a competent independent contractor, (2) in failing to give an independent contractor the necessary information to avoid unnecessary danger, (3) in failing to prepare properly for the independent contractor’s operation, or (4) in failing to meet all the statutory standards or administrative regulations which may govern a particular operation while it is still clearly within the control of the employer. The only situation of significance in atomic energy operations is that in which the employer is being held for the negligence of the independent contractor although the employer himself has not been negligent in any of the respects just mentioned.

It also is assumed here that the nature of the operations is such as not to be classed as “ultra-hazardous” within the doctrines of absolute or strict liability. Liability in the cases here discussed, and as limited above, should be determined by deciding whether or not the activities are somewhat out of the ordinary; if so, they are “non-delegable” and the owner is liable for the independent contractor’s negligence.

(1) For Operations Performed on the Premises

During Construction

It seems quite unlikely that many cases will arise in which harm from radiation hazards will occur during construction, repair, or maintenance operations. Certainly during the construction of a reactor there is no radiation hazard until the building is completed and all component parts have been carefully tested. Even in the repair and maintenance operations for which an independent contractor is likely to be called, radiation hazards are not always present because often such periodic maintenance activities will have to be carried on only after the radioactive material has been removed. For accidents happening at the construction, repair, or maintenance stage and not involving radiation hazards, there is no reason to believe that the principles to be applied in atomic energy cases will differ from other situations. To the extent

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228 This problem is discussed infra Chapter IV.
that radiation hazards are an integral part of the contractor's operations, such as if an independent contractor is called in to do a repair job and makes use of radioactive material to make radiographic inspections of machinery, or if he is called in to do a clean-up job after radioactive material has been accidentally released in the area, it is likely that the court will classify this kind of activity as "inherently dangerous," or, as we would say, the kind of activity which involves "unusual" hazards. If this is the case, responsibility for these operations will be non-delegable.

Excavation cases are good examples of situations in which courts have drawn lines in terms of the degree of danger from the excavation. If it is of such a character and in such a place that unless unusual precautions are taken there is a substantial risk of a passerby falling into it, the courts conclude the duty to use due care is non-delegable. If, however, the excavation is made in a remote location where visitors are not expected, the duty may be delegated and the independent contractor's liability will not be imputed to the employer. The same distinction is drawn in the cases involving demolition of buildings.

An excellent example of this distinction is the decision by the Massachusetts Supreme Judicial Court in Whalen v. Shivek. The plaintiff was killed while walking on a sidewalk adjacent to the building where the independent contractor was engaged to remove the parapet at the top of the building. The contractor did not construct a barrier on the sidewalk below, and his employees negligently allowed a piece weighing about two hundred pounds to drop on the plaintiff. Finding both the tenant and the owner of the building liable, the court said:

We recognize that the principle with which we are concerned does not apply to cases where the danger does not come from work performed with proper skill and care, "but comes only from an unskilful or negligent act of the contractor or his servants, even if a lack of skill or care on the part of some of the persons engaged in the business reasonably may be expected." . . . But we are of opinion that a finding was warranted in this case that the removal of the parapet by the contractor, in the circumstances disclosed here, involved work of such kind that it would probably cause injury to persons using

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224 E.g., Tracer Labs, Inc., was called in to clean up after an accident in the Texas plant of another company using radioisotopes under license from the AEC. A.E.C. Release No. 1213, Nov. 6, 1957.
225 33 A.L.R.2d 7 (1954), especially 52 ff.
226 Id. at 89.
the sidewalk below unless special precautions were taken. . . . [The court then distinguished a previous case involving repair of a chimney where a brick fell onto the sidewalk as follows.] The work there involved consisted in taking bricks off of the chimney for a few feet and relaying them. What happened, the court said, was "a mere detail of the work" arising from negligence which was not a probable consequence of the work. A different case is presented here where the contractor was engaged in removing from a building bordering on a public sidewalk a parapet containing blocks weighing approximately two hundred pounds and in a state of disrepair.\textsuperscript{228}

There are literally dozens of cases of this nature but the reasoning and result of \textit{Whalen} v. \textit{Shivek} exemplify the modern attitude of the courts. Certainly, if a radiation hazard is at all significant it seems quite likely that courts will find that the use of such material even during construction, repair, or maintenance operations involves the kind of unusual hazard for which the owner will continue to be liable even if the only negligence in the ordinary sense is that of the independent contractor. This will be true even though the operation does not amount to an "ultra-hazardous" activity such as to result in strict liability. A distinction is drawn between such activity and the less hazardous operation which nevertheless possesses sufficient potentialities for harm to others so that it can not be delegated to an independent contractor, thus relieving the operator from liability.

The same reasoning is the basis for the holding in most jurisdictions that the owner who hires an independent contractor to excavate for a building is liable for the negligence of that independent contractor in not properly shoring up the excavation so as to give the necessary lateral support for abutting buildings. The courts always refer to this as a type of work in which it is readily foreseeable that a substantial risk of harm is involved unless special precautions are taken. In such cases, if the independent contractor is negligent, the owner who hires him will also be liable even though otherwise the owner is not careless.\textsuperscript{229} Probably if radioactive material is used, at least if it is sufficient in quantity and intensity to present a substantial risk, the operator himself will be held liable for the negligence of an independent contractor.

A recent opinion in the Ninth Circuit Court of Appeals in \textit{Fegles} \textsuperscript{228} \textit{Id. at} 151. \\
Const. Co. v. McLaughlin Const. Co.\(^{230}\) illustrates the possible criteria that may be used by a court in deciding whether to hold the employer liable for the negligence of an independent contractor. In this case the prime contractor, rather than the owner of the land, was held liable for the negligence of a sub-contractor. The sub-contractor’s employees allowed hot rivets to fall on timbers and other inflammable material being used by another contractor doing a different job on the premises. In holding the contractor liable for the sub-contractor’s negligence, the court said:

> An employer or primary contractor is liable for injuries caused by the failure of an independent contractor to exercise due care with respect to the performance of work which is inherently or intrinsically dangerous. “An employer may not divest himself of the primary duty he owes to other members of the community by contracting with others for the performance of work, the necessary or probable result of which is injury to third persons.”... This exception places an absolute, nondelegable duty upon the employer to see that all reasonable precautions shall be taken during the performance of the work to the end that third persons may be adequately protected against injury.

Work not inherently dangerous under some circumstances may be inherently dangerous under other circumstances. Thus, construction work near a street or sidewalk may, by reason of proximity to the street or sidewalk, be inherently dangerous. Riveting, while not inherently dangerous under all circumstances, becomes inherently dangerous if done over men and materials where no protection is afforded the men and materials below.\(^{231}\)

There is no reason to assume that radioactive materials being used by an independent contractor in the course of construction, repair, or maintenance are less dangerous than “hot rivets.”

**During Normal Operations**

The cases that are much more likely to arise involve radiation hazards which cause harm as the result of the normal operation of the owner, even though the negligence that makes it possible for the radiation to cause harm is that of an independent contractor. Liability probably will be imposed on the owner and operator of the reactor regardless of whether or not the negligent act was committed by the building

\(^{230}\) 205 F.2d 637 (9th Cir. 1953). (An interesting early case allowing delegation in conducting a fireworks display is Deyo v. Kingston Consol. R.R., 88 N.Y.S. 487 (1904).)

\(^{231}\) Id. at 640.
contractor who constructed the reactor tank, the supplier who furnished defective cores, the architects who designed the building, the repairmen who were negligent in repairing piping that carried radioactive material, or the installers or repairers of the ventilation system which filters out radioactive particles before air is discharged into the atmosphere or water into the river. Even though we assume that the operation of a reactor, or the use of a radiation source for radiography or of radioactive isotopes in research or industrial processing will not be classified as ultra-hazardous, such activities, at least where the danger is at all significant because of type or amount, will be considered to create an unusual hazard and will therefore be non-delegable. Consequently, the owner probably will be vicariously liable for the negligence of the independent contractor. Within the class of non-delegable duties Prosser lists such matters as the duty of a carrier to carry its passengers in safety and to maintain safe railroad crossings, or of a municipality to keep its streets in repair or to refrain from obstructing a public highway, or of an employer to provide employees with a safe place to work. Concerning the line to be drawn between the non-delegable and the delegable duties, he states:

It is difficult to suggest any criterion by which the non-delegable character of such duties may be determined, other than the conclusion of the courts that the responsibility is so important to the community that the employer should not be permitted to transfer it to another.

Harper and James, in commenting upon the line to be drawn between delegable and non-delegable or inherently dangerous and non-inherently dangerous activities, say:

At present the line is a ragged and irrational one somewhere between the two extremes. Several factors have been suggested as significant, but closer examination of their significance proves disappointing. Thus an operation's threat to highway travel has been thought important; and indeed the duty of care owed to travelers with respect to adjacent premises, or work done in the highway itself, may not be delegable. Nor perhaps may the obligation of care in working on scaffold over the sidewalk. On the other hand the duty of care in driving automobiles and trucks along the highway is fully delegable though this operation presents an infinitely greater threat to travelers than do premises or structures near or over the highways.

282 See infra Chapter IV on strict liability.
283 Prosser 359.
284 Harper & James 1409.
The opinion of the Kentucky court in *Brown Hotel Co. v. Siemore*,\(^{235}\) in which the hotel was held liable for injuries to the plaintiff when he fell into a manhole negligently replaced by the coal company delivery man, illustrates the typical approach of courts which apply the non-delegable duty concept. The court said:

> The courts are quite uniform in holding that there is an affirmative duty of seeing that a coal hole or similar servitude is properly guarded or protected when being used, and, as well, that the covering has been safely replaced; that the owner or possessor cannot absolve himself from liability or avoid performance of the duty by leaving it to another, such as the deliveryman of coal. The owner or possessor cannot receive the benefits of having the coal company use the chute to supply him with coal and at the same time renounce all interest or concern as to the condition it is left in, which may be to the manifest jeopardy of persons using the public thoroughfare being caught in the trap of an open hole or insecure covering.\(^{236}\)

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The displacement evidently was not obvious or apparent at a casual glance. But we do not think that fact excuses the defendant. The basis on which liability of the Hotel Company was submitted in the instruction was whether the Hotel Company should have discovered the loose lid within the interval of time. The correct basis should have been whether the Company exercised ordinary care and vigilance to discover the condition. The instruction was perhaps more favorable to the defendant than it was entitled to. It is not to be overlooked that the burden had shifted to the defendant to justify its non-action. The jury was authorized in law to find as a fact that the defendant was guilty of negligence.\(^{237}\)

The rationale of the court seems to be that where the public generally is so likely to be endangered by a negligent act of an independent contractor on a public way abutting the owner's property, the owner will be held liable for the contractor's negligence if the act is not done carefully; the situation is not ultra-hazardous nor normally hazardous, it is unusually hazardous. The unusualness of the hazard here is two-fold: there is a great likelihood that someone will be hurt from such negligence and the number of persons who will be exposed to danger in a public way is great.

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\(^{235}\) 303 Ky. 431, 197 S.W.2d 911 (1946).

\(^{236}\) *Id.* at 436.

\(^{237}\) *Id.* at 439.
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A recent lower court case in New York, *Thibault v. City of New York*,\(^{238}\) illustrates another situation in which a court is likely to find a non-delegable duty, even though the danger does not affect the public generally nor create a hazard for a large number of persons. Only a small group of employees was endangered but the hazard was unusual in the sense that severe harm was likely to result, in this case death by electrocution. The contracting company which installed an overhead electric line for a city electric trolley bus system and the city itself were both held liable for the electrocution of a lineman resulting from faulty installation of insulators. In concluding that both the city and the contractor were liable, the court said:

Whatever the cause, it is clear the failure to inspect and remove it proximately produced the accident, and the jury so found. It seems to me that neither the City nor the contractors could escape the obligation for thorough inspection. Though an electrical installation is a hazardous undertaking to workers and public alike, concededly neither of these parties inspected the insulator which, being defective, added to that hazard. The contractors plainly convenanted with the City that such equipment would be free of defects. They could reasonably anticipate that *its own linesmen* would be exposed to danger while making mechanical adjustments. They also knew that the City would energize the system to make the test runs. Their admitted failure to inspect and remove the dangerous device therefore constituted active negligence on their part.

... Clearly the City’s act of energizing the lines for test run purposes, without its own prior “full and minute inspection”, as provided for by Contract Article 29, and with knowledge that mechanical adjustments would thereafter be made, also constituted active negligence.

... sound public policy demands that he who authorizes a basically hazardous work be vigilant regardless of who performs it and whether or not he voluntarily participates in or controls its operation. ... The logical corollary to this rule is that in the course of basically hazardous work positive care be exercised by the owner even though he be promised indemnity by the person authorized to perform it.\(^{239}\)

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\(^{238}\) 154 N.Y.S.2d 338 (1956).

\(^{239}\) *Id.* at 342-43. [Emphasis added.] A similar duty was placed on the federal government for the death of an electric power lineman killed as the result of the government employee’s failure to see that an independent contractor doing rehabilitation work turned off the current before the men climbed the poles. *Pierce v. United States*, 142 F. Supp. 721 (E.D. Tenn. S.D. 1955). To be distinguished is the problem of a general contractor’s liability for negligence of a sub-contractor under an express indemnity agreement with the owner; *City of Polytechnic v. Redmon*, 217 S.W. 730 (Tex. Civ. App. 1919).
In effect the court is saying it is negligence not to inspect the work done by an independent contractor. If this is "active negligence" then it is a non-delegable duty situation.

Burns v. Vaughan²⁴⁰ may be another example of a case imposing vicarious liability on an owner of land. In this case a farmer hired an airplane pilot to dust crops with 2, 4-D. The defendant admitted that he knew that the dust was dangerous but claimed that he had taken care to instruct the pilot not to release the dust if there was any wind. The owner defendant nevertheless was held liable for the damage that resulted to other crops on adjoining land in spite of the fact that he tried hard to stop the pilot after a breeze came up but did not succeed in time to prevent the damage. The court said that the jury could find from this evidence that the owner was negligent notwithstanding the precautions he had taken to warn the pilot and to stop him once a breeze arose. The court does not refer to the pilot as an independent contractor but the situation is one in which it is likely that the pilot was not an employee and the court states that the basic facts are similar to those in a previous case in which it seems quite likely that the pilot was an independent contractor.²⁴¹ This case, if actually it involved an independent contractor, goes even further than cases which hold the owner of land liable for injuries resulting from construction work where objects fall on public sidewalks rather than on the owner's own property. The damage occurred at a point more than a mile distant from defendant's land, not immediately adjacent to it. Nevertheless, liability is imposed because the activities are being carried out on the owner's own property, and the injuries result quite directly and almost simultaneously with the performance of the operations themselves.

The use of radioactive materials on one's own property is likely to be at least as "unusually hazardous" as uncovered man-holes, power lines, or 2, 4-D.

(2) For Operations Performed off the Premises

The on-site cases discussed above make it rather clear that the user of atomic energy, even if his operations are not "ultra-hazardous," will

²⁴⁰ 216 Ark. 128, 224 S.W.2d 365 (1949). See annotation on liability for damages of all kinds arising from crop spraying, 12 A.L.R.2d 436 (1950). That such duties cannot be delegated, see cases collected at 440, including another Arkansas case.

²⁴¹ Chapman Chemical Co. v. Taylor, 215 Ark. 630, 222 S.W.2d 820 (1949). At 639 the court said the dusting was done "by an aviator whose regular business it was to
be held responsible in damages to persons injured through the negligence of independent contractors who carry out operations in the premises. These operations often will involve "unusual hazards" and, therefore, will be non-delegable. In reaching this result the courts have ignored the independence of the contractor and the consequent inability of the owner to control the contractor's employees except by telling the contractor to have his employees do things a certain way or stop work altogether. Liability has been imposed on the employer or owner regardless of how responsible the independent contractor was and whether or not he was able financially to respond for damages. The theory of the cases is that the duty simply is not delegable because the operations present an unusual hazard. Logically, therefore, argument can be made that the concept of non-delegable duty also should be applied to off-site operations involving unusual hazards. On this question, however, the answer is not nearly so clear. Legal literature and judicial opinions considering the question apparently are almost non-existent.

Will or should the user, such as a reactor operator, be allowed to immunize himself from liability for certain operations, such as transportation of radioactive material, fuel fabrication, or disposal of radioactive waste products, by hiring an independent contractor? The question posed assumes that the one hiring the services is not dealing with "ultra-hazardous" activities and in every other respect has acted as a reasonably prudent man would act. It is assumed that due care has been used in the operator's designs, requests, and specifications, as well as in giving notice of the dangerous nature of the commodity, in handling the material including preparation for shipment, in complying with all statutory requirements and administrative regulations, and in carefully selecting a competent independent contractor. Once the activity is found to be unusually hazardous, in determining the vicarious liability of the user or owner, should it make any difference whether the operation is performed on or off the premises? The dearth of treatment of the problem may indicate that all lawyers assume vicarious liability should not be imposed or perhaps it only means that plaintiffs' lawyers have not seen the logical possibility of applying the modern trend to off-site cases. The answer to this policy question will be very important to those engaging in atomic energy activities, and it should take into account the effect of liability or non-liability on wise development of nuclear enterprise.

dust crops. . ." It stated that the operator had engaged in crop dusting for 22 years from Florida to California and from Mexico to Canada.
TORT LIABILITY

(a) Decided Cases

(i) Transportation

The only recent case found which possibly deals with the liability of a shipper for the negligence of a carrier is Pope v. Edward M. Rude Carrier Corp., decided by the West Virginia Supreme Court in 1953. The plaintiff was injured when dynamite exploded while being carried on a public highway by a contract carrier which was licensed and regulated by the Interstate Commerce Commission. Both the carrier and the shipper, DuPont, were sued. The court held that neither the shipper nor the licensed regulated contract carrier which transported high explosives were carrying on a nuisance, and the doctrine of strict liability was not applicable. In holding both the shipper and the licensed and regulated contract carrier not to be subject to nuisance or strict liability doctrines, the court reasoned:

The manufacture and the shipment of dynamite and its transportation by carrier are lawful and essential business enterprises. High explosives, such as dynamite, are valuable, important and necessary articles of commerce and industry. Without their manufacture and transportation for many essential uses the economy of the nation would be restricted and impaired. There is no allegation that either defendant in manufacturing, shipping or transporting the dynamite before or at the time of the explosion violated any provision of any law of the United States or of this State or any valid regulation imposed by the authority of either of them, or that the design or the construction of the equipment used was faulty or improper, or that there was any delay in transporting the shipment or any undue stoppage in the movement of the truck or any storage of the dynamite which would imperil the safety of the public or subject the dynamite to any unnecessary hazard which would cause it to explode.

In holding the manufacturer and shipper of high explosives subject to the same kind of liability as the carrier, the court cited American Jurisprudence to the effect that "The same rule that applies to the carrier in the transportation of explosives, namely, that it is not an insurer against injuries, but is liable only for negligence, applies also to the shipper." The court therefore dismissed the first and third counts, based on nuisance and strict liability theories respectively, as to both the licensed contract carrier and the manufacturer. The second count, how-

242 138 W.Va. 218, 75 S.E.2d 584 (1953).
243 Id. at 226.
244 Id. at 243; 22 Am. Jur. 203 (1939).
ever, alleged that the doctrine of *res ipsa loquitur* applied because explosives if properly handled ordinarily do not explode. The court held that this was not subject to demurrer even if no specific acts of negligence were alleged.

If this case should be accepted as good authority it would mean (1) shipping and transporting a dangerous explosive is neither a nuisance nor an ultra-hazardous activity, even though the manufacture or storing of it may be, so negligence rules govern; and (2) if a master-servant relationship exists, the shipper may be liable for the negligence of the carrier and *res ipsa loquitur* may be applied. The language of the opinion clearly implies that unless the shipper is guilty of negligence himself there is no liability even if the carrier (including common as well as contract according to the opinion) is negligent; but this is not a holding in the case. The lower court certified the question of whether or not the relationship of independent contractor existed but the supreme court held that each count contained an allegation that the relationship of master-servant existed and this had to be accepted on demurrer.

The language to the effect that a shipper's liability is only for negligence is made even more doubtful as authority for refusing to apply vicarious liability principles because the concept of unusual hazard was not even mentioned. Its usefulness is reduced further by the fact that the only authority cited is the quotation from American Jurisprudence. The quotation itself is nothing but a repetition of an earlier statement in Lawyers' Reports Annotated which says:

> ... [I]t has been held that a shipper of crude petroleum is not bound to so protect and guard it that harm therefrom shall come to no one, but his duty is performed by providing a suitable vehicle, able to encounter the usual risks of transportation.\(^{246}\)

Even this statement is based upon a single case, *Goodlander Mill Co. v. Standard Oil Co.*,\(^{247}\) in which the shipper was excused from liability for a fire resulting from overflowing oil caused by a leaky valve since the consignee of the oil in operating the valve was an intervening agent. The court said:

> The shipment of such an article of commerce casts upon the shipper a certain duty to the public,—that of providing a suitable vehicle for the petroleum in all respects adapted to

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\(^{245}\) *Id.* at 242.

\(^{246}\) 1916B L.R.A. 730.

\(^{247}\) 63 Fed. 400 (7th Cir. 1894).
the purposes of carriage, and able to encounter the usual risks of transportation, so that the petroleum in its transit should not be exposed to danger of ignition from causes incident to its transportation, reasonably to be anticipated. We think that to be the true limit of the shipper’s duty, and that duty, as it appears to us in this case, was properly discharged. The petroleum was contained in a tank impervious to fire. The shipment reached its destination in safety. The case is not like that of the shipment of explosives, the character of the shipments being concealed. [Citations omitted.] Here the contents of the tank were declared by the peculiar construction of the car. The properties of the petroleum were known to the consignee and to the public equally with the defendant. They are a matter of common knowledge. There was here no disguise and no concealment.\footnote{248}

The court in another part of the opinion emphasized the fact that defendant’s negligence in connection with the valve was not the proximate cause of the fire because of the delay in time and remoteness in space between the negligent act and the accident.

If accepted at face value, the language quoted indicates that so long as the dangerous material is plainly marked and so packaged that it can withstand the ordinary strains of shipment, no liability will be imposed upon the shipper. Surely vicarious liability for the negligence of the carrier would not be imposed either. In light of recent trends in tort law, however, this case is of doubtful value as a precedent, except in West Virginia. The intervening agent and lack of privity arguments used by the court are not consistent with the trend today. The emphasis upon remoteness in time and space likewise is not consistent with current concepts. In addition, radioactive materials may be differentiated from crude oil and be found to present an unusual hazard.

Unfortunately no other recent transportation cases have been found clearly dealing with the vicarious liability of a shipper. All other discussions and cases dealing with a shipper’s liability involve negligence of the shipper himself, such as in failing to meet packaging, notification, or marking requirements.\footnote{249} Even these cases almost always concern injury to employees of the carrier, not to the public generally. The West Virginia opinion, therefore, is not a satisfactory precedent on the question of a shipper’s liability for negligence of an independent carrier.

\footnote{248 Id. at 404. The Deyo case, supra note 230, denying vicarious liability in shooting fireworks is probably also explained by its vintage—before the more liberal (loose) modern trend.}

\footnote{249 See cases discussed and cited in 22 Am. Jur. 203 (1939) and 1916B L.R.A. 730.}
Joseph R. Foard Co. v. Maryland,250 decided in 1914, may be another off-site transportation case. An explosion occurred on the chartered vessel Alum Chine while it was being loaded with dynamite by an independent contractor stevedoring company hired by the charterer. Suit was brought against the stevedoring company and the charterer for the death of several men and for damage to ships and other property in the vicinity of the Alum Chine. The explosion was found to have been caused by the negligence of the foreman of the stevedoring company. The charterer was found to have hired a competent company to do the loading and the court refused to impose vicarious liability, although plaintiffs argued that the work was inherently dangerous and therefore non-delegable. The court stated:

The rule that responsibility is on the independent contractor alone does not apply when at the inception of the undertaking a man of ordinary reason should know that in the natural course of things the work would certainly or probably result in injury to another, unless some distinct and definite precautions be taken, although the details of the work be done with due care; as, for example, guarding a hole dug in the street, or protecting buildings close to blasting operations from rocks which would probably strike them, or protecting a wall when excavating by it. But the exception does not extend to work which could be surely performed with safety upon the sole condition that due care be exercised in the details of its execution.

Applying this rule, the Munson Company [the company which hired the stevedore company to load the vessel] is not liable. Loading dynamite, gasoline, gunpowder, naphtha, and other inflammable or explosive substances is necessary to commerce and is not a nuisance. [Citations omitted.] There was no distinct and definite precaution to be taken, so as to make sure that due care in the details of the work would make it safe. It was not disputed that dynamite may be loaded with perfect safety, if adequate care be taken against concussion and heat. There was no danger of either, except from the details of the work, and therefore the independent contractor alone was liable.251

Neither this opinion nor that of the lower court252 considers the question of whether the arrangement was a bare-boat (demise) charter, in which the charterer takes over all management and operation functions,

250 219 Fed. 827 (4th Cir. 1914), affirming 213 Fed. 51 (D.C. Md. 1914).
251 Id. at 833-34.
or a charter of affreightment, in which the owner continues in possession and is responsible for all operations.\textsuperscript{258} Where there is any dispute as to which type of charter is involved, however, the courts lean to affreightment,\textsuperscript{254} and in such cases liability for injuries to third persons ordinarily is imposed on the owner, not the charterer.\textsuperscript{255} If this was the type of charter in the \textit{Foard} case it lays down a rule of no vicarious liability in an off-site situation involving the handling of dangerous material because the accident happened on property owned and legally controlled by another. On the other hand, if the boat was legally in the possession and control of the charterer, it simply is an on-site situation in which the court refused to find that an unusual hazard was involved. Perhaps the case means that in determining the vicarious liability of an employer for the negligence of an independent contractor no distinction is to be drawn between on-site and off-site cases. The way in which the lower court opinion describes the policy question involved certainly makes no such distinction.\textsuperscript{256}

\textsuperscript{258} Robinson, Admiralty 594 (1939).

\textsuperscript{254} \textit{Id.} at 597.

\textsuperscript{255} \textit{Id.} at 614.

\textsuperscript{256} \textit{Supra} note 252 at 86-87: "To them the \textit{Foard} Company seems called on to pay a high price for a very trifling error of judgment. On the other hand, if the decree here made shall be affirmed above, all that the \textit{Foard} and the Stevedoring Companies have will make good to the libelants but a fraction of what they have lost. It is no comfort to them to tell them that dynamite is necessary to modern industry. Few of them had an appreciable interest in shipping the dynamite to the Isthmus. Many of them had none at all except that which they shared with everybody else. What happened at Communipaw and to the Chine shows how widespread disaster an explosion of dynamite may cause. That they should bear the loss does not seem fair to them. It is natural that they should feel that every one who had a part in causing the dynamite to be stowed on the ship should be liable to them. On the other hand, what has been said shows that it does not seem to be in accordance either with natural justice or with settled legal principles to make every one who has any part in the handling of the dynamite answerable for all the consequences of an explosion, although he was not in fault either in person or through some one for whom under the ordinary rules of law he must answer. It may be that some day the law will be so moulded that more exact and complete equity may be done. Public opinion has apparently come to the conclusion that workmen should be indemnified against the pecuniary consequences of accidents suffered by them in the course of their employment. Hereafter a step further may be taken. It may then seem just to compensate all persons who without fault of their own suffer from industrial accidents. Such a policy may be wise. Even if it be, courts would not be now justified in holding liable for the consequences of the accident him who directs the shipment of an explosive or who knowingly and willfully takes any part in such shipment or permits it having power to prevent it. Whether indemnification shall be given at all, and if so how, is a complex problem. It is for the Legislature to work out. In this case the court may not impose the burden upon either the city or upon any person or corporation who was no more directly responsible for the explosion than was the Munson Line."
NEGLIGENCE

Williamson v. Southwestern Bell Tel. Co.,257 decided in 1954, perhaps should be treated as an off-site transportation case. A tree-trimmer was hired by the defendant telephone company to prepare the way for erection of telephone wires. He was negligent in driving his employees from work one day, causing the plaintiff to be injured. The court found that the tree-trimmer was an independent contractor and refused to hold the telephone company liable. This case, however, although it involves off-site transportation, is not very good authority on the vicarious liability question. The defendant's material was not being shipped and was not the cause of the injuries. More importantly, driving a car today, although an inherently dangerous operation in one sense, hardly classifies as one presenting an unusual hazard as the concept is used in the vicarious liability cases.

(ii) Other Cases Involving Off-Site Activities

The question of vicarious liability for the negligence of an independent contractor may arise in off-site activities other than transportation. An injured party may seek to impose liability upon the person who hires another to carry out such off-site activities on the same basis discussed already in connection with both the on-site and transportation cases, namely, the activity presents an unusual hazard and liability for negligence cannot be avoided by delegating the operation to another. The policy considerations influencing the courts seem to be the same. These cases illustrate how shadowy the line between on-site and off-site cases can become once it is determined that the specific activity has been requested by the employer of the independent contractor.

In Scales v. Lewellyn,258 the defendant city raised the street grade, cutting off access to several houses, including the one in which the plaintiff was a tenant. The city hired an independent contractor to raise each of the houses, this operation of necessity not being performed on city property. The negligence of the contractor in shoring up the porch of the house where the plaintiff lived caused the latter's injuries, although the court held that the city was not liable because the operation was not inherently dangerous and presented no unusual hazard, the opinion rather clearly implies that if it had, liability would have been imposed.

Judge Learned Hand, in Person v. Cauldwell-Wingate Co.,259 in

257 265 S.W.2d 354 (Mo. 1954).
258 Supra note 222.
259 176 F.2d 237 (2d Cir. 1949).
determining whether or not a contractor should be held vicariously liable for the negligence of an independent sub-contractor, clearly applied the same test as used when the owner is sued. The plaintiff’s husband, an employee of another contractor, was killed because of the prior negligence of the sub-contractor in stringing high tension wires. The plaintiff argued that the main contractor was liable because it was an inherently dangerous operation which was non-delegable. Judge Hand said:

In such cases the law imposes the duty of inspection upon the owner or contractor in invitum, and forbids him to delegate it, just as it does when a statute or an ordinance directly imposes such a duty. Often the factor which appears particularly to determine “the inherent danger” is the proximity of the work to a highway, since it is then more likely that any mischance will do harm, but these are merely instances of the general doctrine. Nor are the decisions anomalous which hold that the duty to inspect upon such occasions does not extend to matters “collateral” to the work itself. These do not concern the existence of the duty to inspect, but the extent of the inspection required.

Judge Hand concluded that if the jury found the sub-contractor liable, it “might also find the Contractor liable.” This seems to be holding that the employer cannot avoid liability for the negligence of an independent contractor when unusual hazards are involved, at least if an inspection would have discovered the dangerous condition, since surely Hand was not suggesting that the law question of whether or not to impose vicarious liability was for the jury.

In some older cases involving the laying of pipelines, pipeline companies which hired independent contractors to carry out certain operations were not held vicariously liable for the negligence of the independent contractors which caused injuries either to employees of the contractor or third persons. In both cases the operations, if performed negligently, could and did create a quite hazardous situation. These might be considered on-site cases in the sense that the pipeline companies undoubtedly had easements to use the adjoining property during

260 Id. at 240.
261 Ibid.
262 Holt v. Texas-New Mexico Pipeline Co., 145 F.2d 862 (5th Cir. 1944) (Negligence of independent contractor in using dynamite caused employee of another contractor to be injured); O’Hara v. Laclede Gas Light Co., 244 Mo. 395, 148 S.W. 884 (1912) (A sub-contractor was alleged to have been negligent in piling pipes for use in building a pipeline, causing injury to a third party).
their construction work. Perhaps the same explanation could be applied to the *Person* case on the theory that the contractor had temporary control of the property during the construction period, although in the *Person* case the army camp property itself was owned by the government. In none of the three opinions, however, is any distinction between on- and off-site cases discussed.²⁶³

In *Doran v. Flood*²⁶⁴ vicarious liability was held applicable to the building contractor who hired another to haul timbers to be used as piles to the building site. The death of plaintiff's son resulted from the negligence of the hauler as he was dragging the timbers along the streets to the site, clearly an off-site situation. The court held that the owners who had contracted to have the building constructed were not liable because they had nothing to do with procurement of the piles. The principal contractor would be liable vicariously, however, if his understanding with the hauler was to drag rather than truck the timbers through the streets. The court said:

> Those who have work, dangerous in itself, and requiring particular care, done, cannot shield themselves by letting it out to others without providing for the necessary care. If these defendants had contracted for dragging these logs along the streets as they were dragged, and so dragging them caused the injury, they would, without doubt, be liable. Letting the hauling for that distance at that price, to a person not a common carrier, who had no trucks or connection with facilities for doing it otherwise than by dragging, would have some tendency towards showing that the understanding with the defendants was that it was to be done by dragging, as it was done.²⁶⁵

The court specifically withheld judgment as to whether or not liability would be imposed if the arrangement were found to permit the hauler to choose a method other than the one way contemplated. The one contemplated happened to be unlawful because of a city ordinance prohibiting such operations. The case can be interpreted to mean that vicarious liability is imposed only when the arrangement in effect controls the manner in which the independent contractor is to work. Yet apparently the only control was the price paid, which was so low as practically to limit the methods to the one used, which was unlawful and negligent. There was nothing in the contract specifically allowing the employer to control the method.

²⁶³ See also similar case discussed in connection with on-site cases, *infra* note 230.
²⁶⁵ *Id.* at 544.
The question of whether or not to impose vicarious liability on the employer has arisen in a series of logging operation cases when an independent contractor has been hired to transport the logs to the mill of the employer. In one, McDonell v. Rifle Boom Co., such liability was imposed for much the same reason applied in Doran v. Flood. The terms of the arrangement were such that the operations could be carried on only in the manner actually used by the contractor. The employer was held liable when the logs being handled by the independent contractor jammed and caused the river to flood plaintiff's land. To meet the conditions imposed by the contract the river operations had to be carried out in this manner and the court imposed liability on the mill owner on the theory that for practical purposes it had not relinquished control. Although it had no power under the contract to control the contractor's operations directly, it had done so effectively because of the performance required of him by the contract. Clearly this is an off-site situation in which vicarious liability is imposed, yet the reasoning of the court, as in the Doran case, is remarkably like that used in the on-site cases discussed above. The similarity is particularly marked in the cases involving spread of fire from one piece of property to that owned by the plaintiff, it being impossible sometimes to determine whether it was an on-site or off-site situation.

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266 71 Mich. 61, 38 N.W. 681 (1888).
267 Supra note 264.
268 See discussion in text supra notes 224 to 241.
269 Cases are collected in Annot., 24 A.L.R.2d 241, 288 ff. (1952). The opinion of the court in St. Louis & San Francisco R.R. v. Madden, 77 Kan. 80 at 91-92, 93 Pac. 586 (1908), is typical: "We find no difficulty in determining that the work of burning the fire-guard was a part of the operation of the road. The company could not, therefore, absolve itself from the liability by letting out the work to an independent contractor, for the reason that it owed to the plaintiff an obligation, placed upon it by the law, to respond in damages for all injuries by fire thus caused; and for the further reason that it employed a dangerous agency which in the experience of every one required that precautions be taken to prevent damage to the property of others. Thus a second duty was cast upon the railroad company not to cause the work to be done, either directly by its employees or indirectly by a contractor, without seeing that precautions were taken to prevent the escape of fire and consequent injury to the property of plaintiff. Neither of these obligations, or duties, could be avoided by delegating the performance of the work to another."
270 See, for example, John L. Roper Lumber Co. v. Hewitt, 287 Fed. 120, 122 (4th Cir. 1923). The owner of land hired an independent contractor to carry out a logging operation knowing that inflammable debris would collect along the railroad right of way over which the logs were carried. Fire, set in the negligently accumulated debris, spread to neighboring land and the landowner was held responsible. The court reasoned: "In our view, the work which defendant contracted to have done was of that character commonly described as intrinsically or inherently dangerous, and, if this be
Other logging cases, however, indicate that vicarious liability will not be imposed when the independent contractor floating logs down river to the hiring company’s mill is not so narrowly limited in his methods or timing by the performance terms of the contract. The courts concluded that the operations (which were off-site, though this was not discussed in the opinions) were sufficiently separate to justify denying liability. Plaintiffs argued that floating logs was inherently dangerous but the courts did not accept the contention. The courts, however, did meet squarely the basic policy question involved in all independent contractor vicarious liability cases; i.e., are the operations distinct enough, is the danger not too unusual, is the economic value to society of this activity sufficient to allow the employer to immunize himself against tort liability by hiring competent independent contractors for certain operations?

A similar result in another early off-site case was reached by the Washington court in *Johnston v. Seattle Taxicab & Transfer Co.* Here the sub-contractor, in removing dirt from the main operation, set up a counter-weight sled device to help his horses keep the wagons loaded with dirt from running down hill too fast. The plaintiff was injured when the taxicab in which he was riding struck this device. Again the court found that the operations of the independent contractor were not controlled by the principal contractor and so refused to impose liability on him for the former’s negligence. The court said that the inherently dangerous exception did not apply because placing the drag in the street did not relate to the actual performance of the work contracted for but only to the manner of its performance.

In *Woodard v. A. F. Coats Lumber Co.*, the Oregon court used true, it follows, we think, that the contractee may not, under such circumstances, let the work to others to do, and avoid liability in case it is negligently done; for where danger to the property or person of others is likely to attend the doing of the work, the liability of the contractee is not avoided by committing it to someone else to do. Under the circumstances as they here obtained, defendant owed the duty to the owners of neighboring property to see that the work was carefully performed, and that proper means were adopted by which the consequences of the negligent accumulation of combustible material on the right of way would be avoided; in other words, to see that the mischief which would likely occur did not occur by removing the danger or otherwise adopting such precautionary measures as experience has shown to be necessary under like conditions.”


272 85 Wash. 551, 148 Pac. 900 (1915). This case comes closer to the on-site situation since the injury occurred closely adjacent to the main operation on adjoining land, unlike the logging cases.

278 Id. at 557.

274 97 Ore. 302, 191 Pac. 668 (1920).
much the same reasoning when plaintiff, a fisherman, sued for damages to his nets caused by oil which leaked from a barge which had sunk while being operated negligently by an independent sub-contractor. The barge had been hired to carry defendant’s wood but oil was left in the bottom of the barge from previous operations for other persons. Finding that the barge company was an independent contractor and that towing barges was not “inherently dangerous or liable to inflict damage upon another,” 275 the court refused to hold the lumber company liable for the negligence of the tug operator.

Although the logging and the Johnston and Woodard cases might be considered as transportation cases, the injuries resulted not from the dangerous nature of the commodity being transported but from the way in which the independent contractor carried out his operations. Unless the particular method of operating is specified by the contract or is indirectly dictated by the terms of the contract, the courts generally refused to impose on the employer vicarious liability for the negligence of the independent contractor, even though the operations certainly involved as unusual hazards as many of those in on-site cases where such liability was found. These cases illustrate the possibility that courts will find certain operations sufficiently separate to permit the employer to avoid liability for the independent contractor’s negligence in carrying on operations having considerable hazard potential. They all, however, are rather old cases.

(iii) Waste Disposal Operations

The problem of vicarious liability for an independent contractor’s negligence surely will arise to trouble the atomic energy producer or user when it comes to disposing of radioactive wastes or “garbage.” It is perfectly clear that in the light of the dangerous nature of radioactive material there is a real obligation of the user to take special precautions to insure proper disposal. Recognizing the unusual character of such material, surely the courts will say that due care requires that greater precautions be taken than are required for ordinary waste disposal procedures. In most cases such wastes certainly will be considered as dangerous as empty five gallon shellac cans 276 or oil filters, 277 and so

275 Id. at 308.
276 Salas v. Whittington, 77 Cal. App.2d 90, 174 P.2d 886 (1946). A shellac can exploded when put in fire by a small boy who had found the can in a trash pile used in common by defendant and the boy’s parents. Defendant held liable.
277 Justice v. Amherst Coal Co., 101 S.E.2d 860 (W.Va. 1958). Defendant dumped oil filters in a trash pile which he knew was frequented by children. Defendant was held liable for injuries to child hurt when filters exploded.
cannot merely be tossed into the trash pile, literally or figuratively. On the other hand, if care commensurate with the dangers is used, authority exists denying recovery to an injured party even when the waste material is dangerous explosives.\textsuperscript{278}

Assuming, however, that a person such as a reactor operator is careful to choose a competent chemical processor or disposal agent who has been licensed by the AEC and meets his packaging and notification responsibilities, but the disposal operation is done negligently, will the operator be liable vicariously? The number of cases found which deal specifically with off-site disposal actually can be counted on one hand, once cases involving a negligent owner or employer are excluded.\textsuperscript{279}

Even as to these, factual distinctions are not difficult to make; three deal with garbage and one with sewage.

The Garbage Cases. The case of \textit{Gulf, Colorado & Santa Fe Ry. v. Chenault} \textsuperscript{280} involved the disposal of cattle killed in a train wreck on the defendant's road. The railroad's roadmaster contracted with a butcher to remove the dead cattle to the butcher's pasture some two or three miles out of town. The butcher assured the roadmaster that this was far enough away so as not to bother anyone. The butcher's pay for disposing of the cattle was the hides of the eighteen head. The butcher placed the cattle in his pasture but close enough to the plaintiff so that they became a nuisance. The court permitted damages to be recovered for the nuisance in spite of the claim by the railroad that the butcher was an independent contractor who had undertaken to dispose of the carcasses so as not to create a nuisance. The courts \textit{total} discussion of

\textsuperscript{278} Ford v. United States, 200 F.2d 272 (10th Cir. 1952), and Iokepa v. United States, 158 F.Supp. 394 (D.C. Hawaii, 1958). Both involved explosives left after the property had been thoroughly searched by the federal government for unexploded shells and other weapons used during war-time training maneuvers. The properties at the time of the explosions no longer belonged to the government. In each case the court found that the government had conducted its decontamination searches carefully and was not to be held liable. There was no dependence in either case upon the doctrine of Dalehite v. United States, 346 U.S. 15, 73 S.Ct. 956 (1953), that the government, under the Federal Tort Claims Act, had not submitted to suits for injuries resulting from discretionary acts of government officers. It might also be argued that there was an element of assumption of risk in each case since the people occupied or used the property knowing of its prior use but the reasoning of the court in neither case based its decision on this idea.

\textsuperscript{279} Liability is imposed if the owner is negligent himself in garbage or refuse disposal operations, Annot., 156 A.L.R. 714, 734 (1945), or is negligent in supervising how others use the city disposal site, City of San Antonio v. Mackey, 14 Tex. Civ. App. 210, 36 S.W. 760 (1896).

\textsuperscript{280} 31 Tex. Civ. App. 558 (1903).
the policy involved and its reasons for deciding that the railroad was liable is as follows:

It was due the public by appellant to dispose of the carcasses so as to prevent a nuisance, and this duty could not be delegated to someone else, and appellant thereby escape liability. It was responsible for the acts of Phillips in failing to properly dispose of them.\(^{281}\)

On a motion for additional conclusions of fact, the court stated that they found the following:

1. Defendant exercised ordinary care in selecting E. J. Phillips as a suitable person with whom to contract for the removal of the carcasses.
2. Phillips employed his own means and facilities in removing the carcasses from the defendant's right of way near Garland to his pasture remote from said right of way. He was an independent contractor, provided it was possible as a matter of law for the defendant railway company to create such a relation in the disposition of such cattle.\(^{282}\)

Fourteen years later the Alabama appellate court had occasion to decide a remarkably similar case, *Southern Ry. Co. v. Robertson*.\(^{288}\) The plaintiff sued the defendant railroad for creating a nuisance by putting the carcass of a dead animal so close to the plaintiff's residence that the odors of decay were more than barely perceptible. The railroad's defense was that an independent contractor, not the railroad or any of its employees, was responsible for creating the nuisance. After stating that there were two exceptions to the general rule of non-liability for the acts of an independent contractor—one, inherently dangerous work and two, where "certain duties" are owed—the court said:

The common intent of the defendant and Cornett was to rid the defendant's premises of a nuisance that would result from having the carcass on the defendant's premises, and in accomplishing this result, a nuisance was created, to the annoyance and hurt of the plaintiff, so, assuming that Cornett was an independent contractor, the defendant would be liable. . . .

Negligence of the defendant is not an essential element in an action for damages resulting from a nuisance; the action is founded on the wrongful act in creating or maintaining a

\(^{281}\) *Ibid.*

\(^{282}\) *Id.* at 559.

\(^{288}\) 16 Ala. App. 155 (1917).
nuisance—in this case, in creating it. . . . The application for rehearing ignores the principle that the defendant owed the plaintiff a duty not to create a nuisance on his premises. If we should grant the contention that the defendant could avoid liability by employing an independent contractor in such cases, then by employing an irresponsible insolvent who could, with impunity, violate the rights of a third party the rule of law imposing a duty on a principal would be rendered futile and useless.284

The court then stated that the question of fact was for the jury, in any event, as to whether Cornett was an agent or an independent contractor of the defendant railroad.

Courts probably will not ignore completely the fact that the injured plaintiff often will be suing a public utility or other large corporation which is covered by an insurance policy and the government indemnity program. On the other hand, the applicability of these cases to the atomic energy problem we have posed is not clear. In the Chenault case it is possible to interpret the brief statement of facts and conclusion of the court as meaning that there was in fact an agreement between the roadmaster and the butcher as to where the carcasses were to be removed, and that the roadmaster was negligent in failing to investigate personally and determine that this disposal site did not create a nuisance. Even the Alabama case might be read as involving an agreement between the defendant’s foreman and the independent contractor as to where the carcass was to be placed. If this is true, then these cases come much closer to McDonell v. Rifle Boom Co.,285 involving an independent contractor hired to float logs down a stream. In that case the court held the company liable for the negligence of the independent contractor since to carry out the terms of the contract, he was forced to do the very thing which caused the injury.

Even if this fact is not read into either of the cases, some important distinctions should be recognized before applying them to the disposal of radioactive waste material. In neither case was the independent contractor licensed or controlled in any way by a governmental agency. Likewise, there was no evidence of special qualifications or expertise in disposal operations, though admittedly there is not much special knowledge needed in disposing of dead animals. In addition, while dead animals may create a hazard to health, for the most part the hazard is one of obnoxious odors only. In the case of radioactive waste 284 Id. at 156. 285 Supra note 266.
materials there is a health and safety danger to property and particularly to persons. The danger may be great and it usually will last a greater length of time than the smell of a decaying carcass. These cases, however, deal with the disposal of waste material which is usually classified as garbage, a term sometimes used to describe the fission products of the atomic energy business.

The third garbage case, *Kuehn v. City of Milwaukee*, \(^{288}\) presents a situation somewhat closer to the problem of disposing of radioactive waste materials. The commissioners of public works for the city of Milwaukee hired a contractor to dump all garbage and refuse collected within the city in Lake Michigan at some point not less than fifteen mile from the city. A right to suspend the work or to let it to somebody else in case of "improper or imperfect performance" was reserved by the city. The court held that this did not give the city the power to direct and designate the dumping place, and, therefore, the city was not liable for damages when on two occasions the garbage dumped by the independent contractor was carried by the ordinary currents and movements of the lake waters to the spot where the plaintiff's fish nets were located, damaging the nets. The court said:

> It requires no citation of authorities to show that, if the act which caused the damages was the work of an independent contractor, the city is not liable. Whether the person whose act caused the damages was, in legal contemplation, an independent contractor, is sometimes debatable on the facts. The test is, Had the defendant the right to control the conduct of the person doing the work, as respects the mode and manner of doing it, in the particular complained of? \(^{287}\)

There are several difficulties in using this case to answer our waste disposal problem. In the first place, it was decided in 1896 before many courts developed the idea of inherently dangerous material and non-delegable duties. Certainly the dependence of the court upon the independent contractor analysis with no recognition of the non-delegable duty principle makes it doubtful authority, even though it is true that unless garbage is properly disposed of and particular care taken in the disposal operation there will be very undesirable results both as to odors and health hazards. In *Kuehn v. City of Milwaukee* it resulted in damage to property only. Perhaps more important is the fact that the court, after holding the city not liable because an independent

\(^{288}\) 92 Wis. 263, 65 N.W. 1030 (1896)

\(^{287}\) Id. at 265.
contractor was used, said that if the commissioners of public works had used their own employees in this work the city still would not be liable, "for it is a public service, as distinguished from a corporate duty. In that respect, it is like the fire, health, or police departments of cities." A different result might have been reached if a private concern were disposing of its own wastes.

One other case was found in which there at least is some language concerning the power to contract away liability for disposal of waste material. In People v. City of Los Angeles, several outlying cities had contracted with the City of Los Angeles to dispose of their sewage. It was disposed of in such a way that, when swept back to shore, it caused damage to the beaches along the ocean. The court said:

A primary obligation rested upon appellants to dispose of sewage accumulating within their respective boundaries, and an equally binding obligation rested upon them to dispose of the sewage in such a way that it would entail no injury to other parties. And appellants cannot relieve themselves by contract with other municipalities of their primary obligation imposed upon them by law [The contract with Los Angeles is irrelevant] . . . There rested upon appellants a bounden duty to dispose of their sewage in such a manner as not to bring injury or damage to others. It therefore follows, that the fact that the screening plant and submarine tube at Hyperion are owned, maintained and controlled by the city of Los Angeles does not relieve appellants of responsibility for the admitted public nuisance sought to be abated, if they contributed thereto.

The fact situation seems analogous, the language denying immunity from liability is strong, and the case is the most recent found. The difficulty for present purposes is that it was not only an action by the state rather than by a private individual but also it was an action merely to abate a nuisance, not to recover damages. Even as to abatement of the nuisance, the only liability sought to be avoided was a duty to contribute toward the construction of a new disposal system for the whole area which would treat the sewage adequately and prevent pollution of the ocean and beaches. The case involved the question of whether the outlying cities had to help Los Angeles finance a new plant, or could insist on their original contract. The language was

288 Id. at 266.
290 Id. at 643. [Emphasis added.]
directed to this liability, not the quite different one involved in a damage action by a private person harmed by the pollution.

In the event an injury is claimed to have been caused by radioactive waste, it will be very difficult to identify not only the particular radioactive material but also the person or independent contractor who handled it. Therefore, as the use of radioactive materials becomes more widespread, it will become increasingly important to attain centralized control of disposal operations. At the present time most disposal operations are under the control of the Atomic Energy Commission.\textsuperscript{291}

(b) Conclusions Concerning Off-Site Operations

Existing cases do not give a very satisfactory answer to the question of whether or not vicarious liability will be imposed on the employer for the negligence of an independent contractor handling radioactive wastes in off-site situations. Courts do differ on the policy conclusion to be drawn in individual cases, both on and off-site, but they all are peculiarly uncommunicative as to precisely why in a particular case the hazard is or is not unusual enough to preclude delegation of liability. Proper development of this new industry, however, is dependent to some extent upon the answer to this question. The authors suggest that the answer should depend upon two factors; the degree of unusualness of the hazard created, and the distinctness of the operation delegated to the independent contractor, both considered in the light of what effect a rule of non-delegable duty will have on development of the industry and what effect a rule of delegable duty will have on the public possibly subject to the hazard created. The following conclusions are suggested by the authors.

*The transportation of radioactive materials*, whether by land, water, or air, undoubtedly will create some considerable risks, possibly to the passengers and employees of the carrier, to the property of shippers, or even to the general public should an accident occur. The extent of the hazard will vary greatly from case to case, depending upon the intensity and type of the radiation as well as whether it is in the form of a liquid, gas, or solid. Surely liability should not be imposed upon the shipper as a general rule and perhaps never so long as he is careful in all respects, including the choice of a competent, licensed common carrier.

\textsuperscript{291} The AEC is not given jurisdiction over some radioactive materials such as radium and radioactive isotopes produced other than in reactors.
The question is not whether someone must assume liability to compensate for negligently caused injuries but rather, is it to be imposed upon the shipper or carrier? Undoubtedly a competent, licensed common carrier will carry normal public liability insurance coverage and there would seem to be little reason for breaking down the traditional dividing line among various industrial operations. Traditionally one of these has been that between transportation and other phases of business activities. If an accident caused by the negligence of the carrier should release radioactive materials, the hazard to other property ordinarily would be much less than that created by the shipment of other kinds of materials regularly transported on common carriers. Explosives, dangerous chemicals, and various highly inflammable materials have a much greater destructive potential as to property than will radioactive materials in many if not most cases. Decontamination in every situation will not be possible but in many it will be quite feasible to remove the radioactive material with no substantial injury to the property itself.

When the number of persons possibly endangered and the extent and seriousness of the injuries that might result are considered, the same result should be reached as to personal injuries arising from shipment of such materials. The danger of personal injury from shipment of ordinary explosives and inflammables in the usual case will be much greater, both as to numbers and seriousness of injuries. In fact, except for the possibility of ingesting radioactive materials into the human body, it is doubtful that the risk is nearly as great. With adequate labeling, increased public awareness of the nature of radiation hazards, and particularly with special training for rescue personnel, injury to great numbers of persons through accidental release of radioactive material should be less likely than in the case of carrier wrecks involving explosives, dangerous chemicals, and inflammable material. In general, the risk is no more unusual, if as much so. When the negligence of the carrier is the sole cause of the accident, the number of persons and the extent of injury caused by inhalation or ingestion of radioactive material does not warrant breaking down the desirable separation of responsibilities in business operations which allows some activities to be carried on by independent contractors. This is the case particularly when the carrier is licensed by the federal government and its activities in transporting such material will be regulated closely with relation specifically to the health and

292 On the duty to label, see supra note 139.
safety problem. A rule imposing vicarious liability would tend to cause shippers to transport their own material and more danger to the public might be created than if use is made of carriers who have enough business in such shipments to acquire the necessary special knowledge and take the required precautions to protect the public. Administration of health and safety rules will be less difficult than if there are many persons engaged in shipment operations. If a carrier were not so licensed and controlled a different result perhaps is justified, but even here if a competent and financially responsible carrier is selected, it is doubtful that the traditional line between transportation and other business activities should be broken down.

Fabrication of fuel elements and similar activities related to work on the radioactive material before it is shipped to the ultimate user should be treated in the same way as transportation cases so far as the vicarious liability question is concerned. This conclusion is limited to harm from accidents that occur while the independent contractor is working on the product; it is not meant to apply to injuries which occur after the user has started to make use of the material in his regular operations. The question of the user's liability for a defect resulting from the supplier's negligence and of the supplier's liability for such defects after the material reaches the ultimate user surely will be governed by the usual rules.293

Although no very closely analogous cases were found on this problem, those found (all quite old) suggest that vicarious liability would not be imposed,294 except possibly where the contract in effect dictates the method to be used by the independent contractor.295 The modern trend in general to expand liability in negligence situations may lead more plaintiffs to assert the unusual hazards idea in off-site cases. It is likely, therefore, that courts will have to decide whether to impose vicarious liability on the employer for the independent contractor's negligence. The policy justification for forcing the user of the material (e.g., the reactor operator) to supervise personally all of the supplier's plant operations to guard against negligence is questionable.

At the present time, the reactor operator apparently does not make his liability insurance effective until he is ready to operate the reactor. In addition, apparently the AEC does not yet require the fuel fabricator to take out financial protection under the indemnity amendments

293 See discussion of enterprise liability, infra Chapter V, and cases concerning liability of a landowner for defective construction discussed supra note 227.
294 Cases discussed in text supra at notes 258-75.
295 See cases discussed in text supra at notes 264, 266.
to the Atomic Energy Act of 1954. The consequence of these two facts is that the government indemnity program does not cover the fuel fabricator’s operations; nevertheless, vicarious liability should not be imposed on the reactor operator if he uses due care in selecting the fabricator. The hazard involved in fuel fabrication operations is not nearly as great as that arising from the accumulated fission products resulting from reactor operations. The fabricator’s public liability policy, even without the government indemnity program, should cover any liability that would result and should provide adequate compensation for damages imposed. If coverage is not adequate, the solution should be to require financial protection and give government indemnity coverage, not shift responsibility for the independent supplier’s negligence to the reactor operator. If it is shifted, participation in atomic energy activities by the relatively small user who is interested in industrial or research uses, not reactors, probably will be discouraged considerably. The small operator, perfectly capable of abiding by safety requirements and meeting financial protection responsibilities for his own small operation, undoubtedly would not be equipped or want to supervise the plant operations of a supplier, nor would he feel justified in assuming liability for injuries to the supplier’s employees or third parties injured through the supplier’s negligence. The risks involved in fuel fabrication are not so unusual as to justify adoption of a rule of liability having this effect.

If the fuel reprocessing operator is negligent, however, the hazard could be considerably greater, though the operation is as distinct as that of fuel fabrication. Reprocessing operations often will involve great quantities of highly radioactive fission products with great potential for harm. In this respect these operations raise the same considerations presented by reactor waste disposal activities and should be treated in the same way.

Even disposal and reprocessing operations generally should be considered a separate function. The entrepreneur who creates the necessity for disposal or reprocessing should not have to assume vicarious liability for the negligence of the reprocessor or disposal concern. The most impelling reason for this legal result is that there is so much to be gained by centralized disposal operations carefully controlled or even conducted by the federal government itself through the AEC or its contractors. It would be very unwise to adopt a rule which would lead individual entrepreneurs to undertake the disposal operation them-

\[298\] See discussion of federal indemnity legislation, infra, in text at notes 1265 ff.
selves. If they are to be held liable for the negligence of the disposal contractor, however, they will tend to do just this. Because it is desirable to concentrate materials in preparing them for disposal and to dispose of them in designated places, it would seem that creating a separate and distinct disposal operation is the best solution. Where an entrepreneur contracts with a disposal company which has been specifically licensed and approved by the AEC with particular care directed to the question of preserving the public health and safety, it is best that only this company, or the federal government if it carries out the operation itself, be liable. So that the public which might be damaged by the negligent disposal operations can have the benefit of the indemnity program, however, the AEC should license such persons, require them to show financial responsibility and sign indemnification contracts so as to bring the $500,000,000 government indemnity coverage into effect.

There may be reason to impose upon the atomic energy user full responsibility for all operations carried on by his own employees or on his own premises by independent contractors; the trend of recent cases makes this result very likely in a radiation case. On the other hand, it would seem that reprocessing and waste disposal operations are sufficiently distinct and so closely regulated by the AEC that our tort liability rules should recognize them as distinct. If this is not done the small atomic energy operators will be seriously deterred from continuing in the field even though their specific activities create no unusual hazards (either in terms of number of people exposed or the kind of exposure involved) and do not call for a high financial protection requirement.

An additional reason for separating such functions for purposes of tort liability is to avoid some extremely difficult proof problems. The complications of proving whose radioactive material does specific damage are considerable. The disposal operator often will mix the material from several users making it impossible to tell whose was responsible for what injury. This might lead to making all who contributed some material liable for all damages from any of it and this is too much for most small operators. Instead the law should allow compartmentalization to the extent suggested, even as to tort liability rules.

The authors do not suggest, however, that a manufacturer of radio-

297 E.g., American Mail Lines, Ltd., has been licensed to dispose of waste products from the Boeing Airplane Company operations. Very specific limitations on the disposal method are imposed by the license. AEC Press Rel., July 31, 1958.
active material should not be held on a product liability basis as discussed in Chapter V. Neither do they mean to suggest that the user of the material should be immunized from injuries that occur during his use of the material even though the injury results from negligence of a supplier. He should be responsible for seeing that proper materials and proper procedures are used in his own operations. It also seems perfectly reasonable to hold the user to a standard of conduct which requires him to be extremely careful not only in his preparation of such materials for reprocessing, transporting, or disposing but also in labeling and giving adequate notice and in selecting competent licensed contractors.

So long as strict liability is not imposed upon all atomic energy operations, (and it should not since many of them are not even as hazardous as some normal business activities) and so long as there is careful governmental control directed specifically toward protecting the public health and safety, some compartmentalization of tort liability as well as operational activities should be allowed where it seems perfectly natural and useful and is not adopted solely to avoid liability. Such a rule should aid considerably in the development and diversification of atomic energy activities. When and if, as seems likely, separate insurance companies write atomic energy risk policies, it will become very important to decide which persons having contact with the particular material alleged to have caused damage are to be held liable. At the present time, since there are two separate insurance funds furnishing two separate insurance coverages for atomic energy hazards, the question may still be important. While the government is the only source of recovery if the damages go above the financial protection requirements set by the AEC for a particular operator, it is important to determine who is to be held liable up to the point where the government does take over. As insurance operations and the whole atomic energy business fall into more normal, standardized business patterns, it will be quite important that recognition be taken of this vicarious liability problem. Perhaps a legislative solution should be adopted. In our opinion it would be desirable to allow some compartmentalization along the lines suggested.

In deciding whether to apply the “inherently dangerous” or, as we prefer, the unusual hazard concept to fuel reprocessing or waste disposal operation, at least one line should be drawn—between cases where the injured person is a member of the general public and those in which the injured person is an employee of the independent con-
tracting company carrying out one of these distinct operations. The same distinction is applicable also to transportation and fuel fabrication cases. A radiation accident that occurred at Oak Ridge recently illustrates the kinds of situations that will arise as greater use is made of radioactive materials. Eight employees of the plant received significant exposures to radiation, one as much as 320 rad. The exposure occurred when a critical mass was created accidentally during handling of enriched uranium in the form of a slurry.

There will be similar types of accidents in all of the operations which we suggest are distinct, with the possible exception of transportation. It may be entirely satisfactory, as a matter of policy, to impose vicarious liability on the landowner for dangerous conditions which cause injury to the employees of an independent contractor if the negligence creates an unusual hazard, such as is found in the construction cases. Surely, however, there is no policy justification for applying such rules to a fabrication, transportation, reprocessing, or disposal operation employee whose injury results solely from the negligence of his own employer. His injuries certainly should be and in some cases would be covered by workmen’s compensation carried by his employer.

Where the user has carefully selected a licensed operator for one of these distinct activities and has been careful to give the necessary information and to properly label material so that the independent contractor is advised of the dangers involved, the best position would seem to be not to impose vicarious liability upon the user for damages caused by the independent contractor, even when the injury is to innocent third parties. In any event, surely there is no justification for holding the user vicariously liable for negligent injuries to employees of an employer-independent contractor.

This is a quite different problem from that involved in the product liability and construction cases where a manufacturer who is negligent in producing or building some article is held liable after the product has been turned over to other persons for their sale or use. In those cases the person is being held liable for damages caused by his own negligence, not for the negligence of another party carefully selected and duly licensed to carry out a particular function by a governmental agency charged with regulating the very problem of health and safety.

298 The facts of the incident are set out, infra, Chapter IV at note 125.
299 See discussion of workmen’s compensation, infra, Part II.
300 See discussion of enterprise liability, infra, Chapter V.
with which we are concerned. There seems little reason to shift responsibility for these distinct operations or to encourage attempts by the employer to control the independent contractor's operations far removed from the employer's own operations.

4. Damages—Interests Protected

a. Introduction — Limitations on Discussion — General Theory of Compensation

Some aspects of the damage problem typically are treated as part of the duty concept, while others usually are discussed after the other three elements—duty, breach, and causation—have been shown. Prosser does not consider it a separate question; to the extent that he discusses it he does so in connection with individual types of action. On the other hand, the general theory of damages in negligence actions is treated as a separate problem by Harper and James.

In part, this difference of opinion undoubtedly arises from the fact that frequently a court's determination of whether or not to allow compensation for a particular kind of injury is tied up with proof difficulties, real or imaginary. Courts will often cite the difficulty in attaining reasonable certainty of proof as a reason for denying recovery for certain kinds of injuries. In dealing with the underlying policies, it will help our analysis if the damage question is separated into two parts: (1) what types of injuries will be considered compensable, assuming that causation can be proved, or, in other words, what kinds of interests will the law of negligence protect by allowing a damage action against a person who has invaded another's interest; and (2) what kind of proof should a court consider, or let the jury consider, in determining (a) whether the particular defendant has caused injury to the plaintiff, and (b) the extent of this injury. In resolving these questions a social policy determination must be made as to what interests should be protected by our legal system against negligently caused harm. Some of the injury situations arising from overexposure to radiation will be decided unjustly if present proof difficulties are used to deny any recovery for invasion of a particular interest. Fortunately the trend seems to be away from any arbitrary limitation upon compensable interest; it is in the direction of treating

801 Harper & James 1028 ff; Prosser 174 ff.
802 E.g., Prosser 40 (mental disturbance), 56 (trespass), 416 (nuisance), 566 (misrepresentation), 593 (libel and slander), 765 (injurious falsehood).
803 Harper & James ch. 25 at 1299.
the proof problem as a matter of procedure, not as a matter of limitation upon the types of interest protected against negligent invasion.\textsuperscript{804}

Not all radiation injuries will present unique damage considerations; in fact, many will not. In determining whether or not to allow recovery in tort actions it would seem to make little difference whether the loss was caused by radiation or by fire, explosion, automobile accident, or scalding by hot liquid. If personal property is destroyed the usual rule of allowing the value of the property before the accident, less any salvage value,\textsuperscript{805} surely will be used. In personal injury cases loss of earnings and even of earning capacity, medical and similar expenses arising from the injury, and pain and suffering will be compensable in the normal way when the loss arises because of overexposure to radiation.\textsuperscript{806} Several types of radiation injury, however, are relatively unknown in tort litigation or present damage issues in such a way that the serious inadequacies in current damage concepts are dramatically revealed. These latter types are our concern here; they include (1) prenatal—both post-conception and genetic, (2) sterility and related incapacities, (3) increased susceptibility to disease (latent injuries), (4) shortened life span, and (5) several miscellaneous injuries such as inability to continue in a chosen field of work, psychic injuries, and lost business profits because of the proximity of a reactor or other radiation operation. The difficult proof matters will be discussed in the following section; but we feel proof difficulties should not determine whether a type of interest should be protected in general. In a specific case, lack of proof may call for denial of recovery.

This analysis is oriented specifically toward radiation cases, but the problems are basic to tort litigation generally; and it is our hope that a fundamental contribution will be made to achieving a more realistic and therefore satisfactory concept of damages. Legal scholars have written relatively little on this general subject, yet it is extremely important. It would seem to be one of the remaining frontiers of development in the law.\textsuperscript{807} The discussion of damages that follows in this and in the next section on proof should be of interest to all law-

\textsuperscript{804} Prosser 174-75; Harper & James 1028-29. Both condemn use of proof problems as a basis for denying recovery for prenatal injuries. The same is true for mental disturbance and to some degree as to lost profits from injury to property. See Harper & James 1305.

\textsuperscript{805} Harper & James 1310-11.

\textsuperscript{806} See generally id. at 1316-23.

\textsuperscript{807} See the foreword by Wright to the symposium of articles on "Damages for Personal Injuries," in 19 Ohio St. L.J. 155 (1958).
yers who deal with tort problems. The policy decisions to be made are extremely important, not only to interested parties, such as potential plaintiffs and defendants, but also to society as a whole because the group may suffer from any serious diminution in the value of persons or property. The manner in which our legal system distributes this loss may even have a considerable impact on our economy. We have attempted to identify these problems, to analyze the most nearly analogous cases, and to suggest policy solutions.

Rightly or wrongly, in dealing with negligently caused injuries, the Anglo-American system generally has adopted the principle of allowing compensating, not punitive, damages. As Harper and James put it:

What then is compensation? The primary notion is that of repairing plaintiff's injury or of making him whole as nearly as that may be done by an award of money. The "remedy [should] be commensurate to the injury sustained." "[W]hoever does an injury to another is liable in damages to the extent of that injury." Sometimes this can be accomplished with a fair degree of accuracy. But obviously it cannot be done in anything but a figurative and essentially speculative way for many of the consequences of personal injury. Yet it is the aim of the law to attain at least a "rough correspondence between the amount awarded as damages and the extent of the suffering," or other intangible loss.\(^{308}\)

The appropriateness of applying the compensation theory of damages to tort cases in general and to radiation cases specifically is assumed in the following discussion and also when making suggestions for more adequate solutions. So long as tort law provides damages for negligent injuries, compensation seems to be the best theory to adopt, even though measuring the amount of damages to be awarded is very uncertain in many cases. Radiation injuries will not present different considerations as to these matters; but we will point out where existing law, at least as applied to nuclear accidents and often as applied in tort cases generally, does not give results which are a logical or fair application of the compensation principle. Decided cases too often illogically deny recovery for injury to an interest which is no different from an interest for which in another type of case recovery is allowed. On the other hand, double recovery is in effect allowed in other cases because the courts have failed to recognize that two claims for damages supposedly for different interests of different victims

\(^{308}\) Harper & James 1301.
actually, to some extent, are duplicating claims. This is particularly true in the area of personal injuries as will be pointed out in discussing the rights of parents and next of kin under wrongful death and survival statutes. The overlapping nature of the claims should be recognized and duplication of awards avoided. Although it should be as complete as possible, only one recovery should be allowed to each victim for each injury.

b. Prenatal Injuries—Post-Conception and Genetic

The social policy involved in the question of whether to allow damages for injuries to unborn children is one which the greatly accelerated use of radiation will bring into very sharp focus. Until the last ten years there were very few claims for compensation involving injuries received by the child while being carried by the mother and almost every case denied recovery. Since 1949, however, the number of cases has increased and there has been a dramatic shift toward recognizing that the interest of the embryo or foetus, is a legally protected one. Moreover, legal scholars have begun to comment on this problem. There is need for more adequate analysis and a resolution of a number of uncertainties as to damages arising during this post-conception period. More important, legal periodicals have contained no discussion whatsoever and no reported opinion has been found that deals in any way with the problem of genetic damage. Yet scientists are unanimous in their opinion that exposure to radiation causes genetic damage, at least in that it increases the risk of genetic mutation. To understand adequately the legal concepts that will be applied to the solution of the genetic damage problem, it also is important that a careful analysis be made of the existing cases and legal principles which are applied to the non-genetic, prenatal, post-conception injury cases.

In discussing whether the unborn will be protected against negligent


811 See discussion infra notes 374-75.
invasion by another, it is assumed that the plaintiffs have established, either under the rules of strict liability or of negligence, that a duty was owed to the parent and that the duty was breached. It also is necessary to prove causation even though in many cases this will present real difficulties. There already is general agreement among experts, however, that overexposure to radiation will result in some kind of injury. This certainly is true as far as injury to the foetus itself is concerned, sufficient radiation giving rise to the possibility of microcephalic idiocy. In addition, irradiation of the parents’ gonads followed by the birth of a deformed child shows causal relation with sufficient probability to satisfy existing rules. Even if this were not the case, as our knowledge of radiation exposure and genetic damage increases, it may well prove possible to satisfy the causation-in-fact requirement. Nevertheless, there is no reason to deal with proof of causation (which undoubtedly will present difficulty in genetic damage cases) if, as a matter of social policy, it is decided unwise to allow damages for invasion of this interest. It seems more logical, therefore, to discuss the question of whether this is an interest to be protected, prior to a discussion of the problems of proof as they relate to causation.

If justification is needed to support the proposition that the court ought first determine whether there will be any recovery at all (rather than to assume that the proof problem is too difficult), it can be found by looking at the opinions in states where the cause of action is always denied. In only three decisions on the subject, so far as we have discovered, has the court concerned itself with proof of the causal relation between the act complained of and the resulting damage to the foetus.\textsuperscript{312} In the others the courts either assumed that the proof problem was too difficult without in any way analyzing or even suggesting what the difficulties would be or how the proof problem differed from that arising in other tort actions, or else decided there should be no such substantive right without discussing the proof problem. Practically all of the cases treat the substantive right question as different and separate from the causation question.

\textsuperscript{312} Valence v. Louisiana Power & Light Co., 50 So.2d 847 (La. App. 1951) (woman jolted in bus accident and medical testimony showed no causal connection so no recovery); Durivage v. Tufts, 94 N.H. 265, 51 A.2d 847 (1947) (court found no evidence of causal connection to fright from assault by defendant since no medical testimony offered, and there was evidence child died from measles or pneumonia); Montreal Tramways v. Leveille, [1933] 4 D.L.R. 337 (fall from tramway by mother and club-footed child born; found to be supported by enough evidence to go to jury which held for plaintiff).
(1) Injury to the Embryo or Foetus

For purposes of discussing the question of whether or not damages should be awarded for injury to the child while in the mother's womb, several important distinctions should be made, although courts seldom have made them. The first is to distinguish between the right of the child, or his estate, and that of his parents. In discussing the rights of all plaintiffs the existing cases fall into two additional categories: (1) those allowing recovery in certain fact situations; and (2) those denying recovery under all circumstances. Within jurisdictions allowing recovery, a further distinction must be made between three kinds of cases: (1) where the foetus was viable (able to survive if delivered) at the time of impact of the force set in motion by the defendant and the child lives for some period of time after birth, no matter how short, (2) where the foetus is viable at the time of impact but is born dead, and (3) where the embryo is not viable at the time of impact but is born alive showing an injury resulting from the impact. To be completely consistent a fourth category should be established, i.e., where the embryo is not viable at the time of impact and is born dead, although no case on this point has been found.

(a) Rights of the Child

All but one of the writers start their discussion of the problem with the 1884 Massachusetts case, Dietrich v. Northampton, in which the opinion was written by Justice Holmes. Five years previously, however, the Iowa Supreme Court, in Kansz v. Ryan, decided that a husband could not sue a defendant physician for producing his wife's miscarriage, the plaintiff contending that he was damaged by being deprived of offspring by the miscarriage. The court said:

Regarding, for the purposes of this case, the rights of the father as to an infant in ventre sa mere to be the same as though the offspring were in life—a point that we do not determine—he cannot recover for injury to such offspring except for the loss of services resulting therefrom. Addison on Torts, 907. Plaintiff does not and cannot claim for loss of services of an unborn child. Whether he could have claimed for future services to be rendered after the birth of

315 51 Iowa 232, 1 N.W. 485 (1879).
the child we need not consider, for no such claim is found in the petition. We may suggest that such a claim for damages would be based upon very remote and uncertain consequences of the act complained of. It is hardly probable that it would be allowed by the law.\textsuperscript{816}

As the court decided the case it does not involve the rights of the child but rather those of the parent for loss of services, a quite different question to be discussed later. The court’s suggestion as to the remoteness and uncertainty of the consequences of the miscarriage for damages of this kind, however, is indicative of the kind of concern that has caused some courts to deny recovery even to the child.

It was Holmes’ opinion in the Dietrich case, however, that undoubtedly set the pattern of judicial decision in this country until 1949, when suddenly the decisions started going the other way. In denying recovery to the administrator of the child assumed to have lived a few minutes after a premature birth caused by a defect in the highway of the defendant town, Holmes wrote:

\[\ldots\text{[I]f we should assume, irrespective of precedent, that a man might owe a civil duty and incur a conditional prospective liability in tort to one not yet in being, and if we should assume also that causing an infant to be born prematurely stands on the same footing as wounding or poisoning, we should then be confronted by the question raised by the defendant, whether an infant dying before it was able to live separated from its mother could be said to have become a person recognized by the law as capable of having a \textit{locus standi} in court, or of being represented there by an administrator. \ldots}\]

The Pub. Sts. c. 207, §9, \ldots punish unlawful attempts to procure miscarriage, acts which of course have the death of the child for their immediate object; and, while they greatly increase the severity of the punishment if the woman dies in consequence of the attempt, they make no corresponding distinction if the child dies, even after leaving the womb. This statute seems to us to shake the foundation of the argument drawn from the criminal law, and no other occurs to us which has not been dealt with.

Taking all the foregoing considerations into account, and further, that, as the unborn child was a part of the mother at the time of the injury, any damage to it which was not too remote to be recovered for at all was recoverable by her, we think it clear that the statute sued upon does not embrace the plaintiff’s intestate within its meaning; and have not found

\textsuperscript{816} Id. at 234. (Emphasis added.)
it necessary to consider the question of remoteness or the effect of those cases which declare that the statute liability of towns for defects in highways is more narrowly restricted than the common law liability for negligence.\textsuperscript{817}

In his usual succinct but also obscure-as-to-meaning style, Holmes does not make clear exactly what his reason is for denying recovery, except to deny the validity of the analogy to criminal law and property law (where potential rights of the unborn are recognized). It would seem that the main thrust of his opinion is that until the child is born no person in being is hurt. His opinion did not consider the question of remoteness.

There is one further suggestion in Holmes’ opinion which has received little attention in later cases or discussions of the problem but which should not be ignored. This is that the child is a part of the mother until actual birth, which Holmes suggests might give the mother grounds for a damage action.

Courts which deny recovery, even when the child lives and suffers a serious defect resulting from a prenatal injury, differ as to the reasons for doing so. The following would seem to be a fair summary of the various grounds that have been or could be suggested to deny recovery: (1) there is no common law precedent allowing recovery, or precedent in a particular jurisdiction denies recovery so that denial must continue to be the result under the doctrine of \textit{stare decisis};\textsuperscript{818} (2) any unborn infant is a part of its mother and has no separate juristic existence until it is born alive; therefore, there is no duty of care owed to it prior to birth;\textsuperscript{819} (3) the causal relationship between

\textsuperscript{817} \textbf{Supra} note 314 at 16-17.


\textsuperscript{819} Stanford \textit{v.} St. Louis-San Francisco Ry., 214 Ala. 611, 108 So. 566 (1926); Allaire \textit{v.} St. Luke’s Hospital, 184 Ill. 359, 56 N.E. 638 (1900) and Smith \textit{v.} Luckhardt, 299 Ill. App. 100, 19 N.E.2d 446 (1939), both \textbf{overruled}, Amann \textit{v.} Faidy, 415 Ill. 422, 114 N.E.2d 412 (1953) (allowing cause of action); Drabells \textit{v.} Skelley Oil Co., 155 Neb. 17, 50 N.W.2d 229 (1951); Drobner \textit{v.} Peters, 232 N.Y. 200, 133 N.E.
the negligent act and injury being too difficult to prove and the possibilities of pure speculation creating so great a danger of a fraudulent or fictitious claim, it is unfair, and perhaps impracticable from the standpoint of overloading the courts, to allow recovery for such claims; to recognize a cause of action of an unborn infant raises the spectre of an action by the child against the mother for her negligence, to which might be added the related problems of contributory negligence of the mother and assumption of risk by the mother in her relations to the defendant.

As the Table of Cases appended at the end of this section indicates, slightly more than one-half of the fifty jurisdictions in this country have faced the question in some form. Considering all the cases decided in this country, the very clear preponderance of authority is now in favor of allowing recovery, at least where the foetus is viable at the time of the injury and is born alive. Legal writers are practically unanimous in approving recovery for prenatal injuries but they fail to consider the question of who ought to recover for invasion of what


Twenty-seven jurisdictions have faced the problem.

interest. Whether only the child, only the parent or next of kin, or both the child and survivors should recover is not considered, leading to the possibility that double recovery will be allowed, the existence of wrongful death and survival statutes compounding the confusion. As suggested later, it is very important to differentiate between the recovery of the child and that of others such as parents; but the cases do not do so, being content to decide generally there should be recovery for prenatal injuries or there should not.

The argument that there is no common law precedent in other jurisdictions no longer is a valid one when the question of whether or not to allow recovery is raised in a jurisdiction which has not had occasion to consider the matter. Actually several courts have refused to follow *stare decisis* where previous decisions in that jurisdiction denied recovery. As the New York Court of Appeals said in the 1951 case of *Woods v. Lancet*,\(^{828}\) in overruling an earlier decision denying recovery:

> What, then, stands in the way of a reversal here? Surely, as an original proposition, we would, today, be hard put to it to find a sound reason for the old rule. Following *Drobner v. Peters* (*supra*) would call for an affirmance but the chief basis for that holding (lack of precedent) no longer exists. And it is not a very strong reason, anyhow, in a case like this. Of course, rules of law on which men rely in their business dealings should not be changed in the middle of the game, but what has that to do with bringing to justice a tort-feasor who surely has no moral or other right to rely on a decision of the New York Court of Appeals? Negligence law is common law, and the common law has been molded and changed and brought up-to-date in many another case. Our court said, long ago, that it had not only the right, but the duty to re-examine a question where justice demands it. . . .\(^{828}\)

The court then continued in answer to the charge that such changes of the law were for the legislature:

> The same answer goes to the argument that the change we here propose should come from the Legislature, not the courts. Legislative action there could, of course, be, but we abdicate our own function, in a field peculiarly nonstatutory, when we refuse to reconsider an old and unsatisfactory court-made rule. Perhaps, some kinds of changes in the com-

\(^{825}\) *Supra* note 319.

\(^{828}\) *Id.* at 354.
mon law could not safely be made without the kind of factual investigation which the Legislature and not the courts, is equipped for. . . . [referring to the study of the Law Revision Commission] The report, itself, contained no recommendations for legislation on the subject but that apparently was because the commission felt that it was for the courts to deal with this common-law question. 827

In the Woods case the plaintiff alleged injuries received during his ninth month in his mother's womb. The court held that the foetus at that time had a separate existence.

As to the "separate existence" argument, at least in the case of a viable foetus, both legal writers and the majority of courts have now carried over the analogies from the criminal law and property fields (where separate existence for some purposes is recognized). They say that medically there is a separate being and there is no reason why injury to this being should not be treated separately from that of the mother. There are many recent cases expressly rejecting the no separate existence objection to recovery. 828

Kelly v. Gregory 829 is the one decision squarely holding that, if causation can be shown, a negligent defendant will be held liable for injuries sustained during the third month of pregnancy and, therefore, probably while non-viable. The court felt that the decision of the Court of Appeals in Woods v. Lancet 830 should be applied whenever there is "biological separability," which the court held could be clearly demonstrated as beginning at conception.

Kelly v. Gregory was cited by the Georgia court in Hornbuckle v. Plantation Pipe Line Co. 831 In the Hornbuckle case it was held that

827 Id. at 355-56.
830 Supra note 319.
831 212 Ga. 504, 93 S.E.2d 727 (1956).
the trial court properly overruled a general demurrer to a petition for relief which simply alleged that defendant's negligence caused prenatal injury to the plaintiff; there was no allegation that the foetus was viable at the time. The Chief Justice in the Hornbuckle case concurred in holding that relief should be granted for prenatal injuries but only if the embryo was "quick." "Quick" is to be distinguished from "viable" because it demands only separate existence that can be recognized but not that the embryo be able to survive if born. Fearing that carrying the cause of the action back to a point of time before the embryo is quick will make the courts a "dumping ground for faked and fraudulent suits," the Chief Justice concluded:

If a baby can sue for injuries sustained five seconds after conception, as the majority rules, why not allow such suits for injuries before conception, even unto the third and fourth generations?^{382}

He concluded that it should be a matter of proof in each case upon the facts and not a matter of law as to when the baby becomes quick, although this might take place prior to four months after conception. The reduction to an absurdity argument of the Chief Justice is particularly interesting because it raises the very problem that radiation exposure of potential parents clearly creates, a subject that will be discussed below under genetic damage.

One other jurisdiction possibly rejects the viability distinction, allowing recovery when the injury in received before viability. The Maryland court, in Damasiewicz v. Gorsuch,^{383} seems to suggest that the dividing line ought not be viability (capability of life separate from the mother), but rather whether the child is quick, in the sense that it can be recognized medically, *i.e.*, when the embryo is a separate life within the mother. The court said:

Some of the later cases attempt a distinction between a child which is viable and one which is not. . . . This is an apparent effort to correct the early doctrine that the child is a part of the mother by bringing it more in line with known medical facts. Children are frequently born prematurely and live. And at times they have been removed from a dead mother and have survived. At some period in their growth they reach a stage where they can live apart from their mother. But, from a medical point of view, a child is alive within the mother before the time arrives when it can live

^{382} *Id.* at 506.

apart from her. If it is injured at a time when, according to Blackstone it is "able to stir in the mother's womb" there would seem to be just as logical a basis for allowing it to recover, as if it were injured after it had reached the period in its growth when it could be removed from the mother and live. In both cases it is alive, and in both cases there has occurred an injury to a living human being for which the responsible party should be made liable.\textsuperscript{834}

Legal writers agree that the distinction of viability is an artificial one, and it would seem that the same holds true as to the distinction of being quick or recognizably a separate being. It is difficult to justify any such line when a causal relationship between exposure to radiation during any stage of pregnancy and an injury manifested after birth can be proved. In such cases as microcephalic idiocy, for example, the greatest danger from radiation arises during the first three months of pregnancy.\textsuperscript{835} Medical evidence makes a very strong case for ignoring the distinction, an artificial one at best.\textsuperscript{836} Nevertheless, the lawyer predicting his client's potential liability must take account of this distinction because it still may be followed in many jurisdictions.

While the reasons given for making the distinction between a viable and a non-viable foetus are usually stated in terms of whether or not there is a separate being, the real reason for this distinction until recent years has been a fear that it is too difficult to prove that a woman is pregnant when the blow is struck unless the foetus has developed sufficiently to be viable. This, however, really goes to the difficulty of proof of causation, still another objection to allowing recovery. Today, however, proving the existence of an embryo should not prove much of an obstacle. With modern tests for pregnancy, it seems quite unrealistic for a court to say there is no way of proving a separate entity that can be hurt until the child can be detected by the mother herself or until the child could live if separated from the mother. Even the assumption that a normal pregnancy lasts for 280 days after the last menstrual period is a more correct generalization than many assumptions upon which rules of law are based in other areas.

As previously suggested, one of the most obvious cases for allowing

\textsuperscript{834} Id. at 438.

\textsuperscript{835} \textit{Infra} note 360. Denial of recovery in general criticized, see Prosser 174-75; Harper & James 1028-31.

\textsuperscript{836} All cited \textit{supra} note 324. See particularly 48 Mich. L. Rev. 539 (1950); 50 Mich. L. Rev. 166 (1951); Cason & Collins, \textit{supra} note 324. See also Dunlap, "Medicolegal Aspects of Injuries from Exposure to X-Rays and Radioactive Substances," 11 Mo. L. Rev. 137 (1946).
damages arises when radiation exposure occurs during the first two or three months of pregnancy.\textsuperscript{887} This indicates the unrealistic arbitrariness of the distinction between the viable and the non-viable foetus. It is not meant to suggest, however, that under all circumstances the foetus should be treated as a separate entity for tort liability purposes. For example, as is suggested at the end of this section, particularly as to contributory negligence and assumption of risk, there may be occasion for not treating the foetus as separate. Nevertheless, the argument against recovery based upon absence of separate identity is unrealistic, and, in addition, will involve the court in a very difficult proof problem in trying to determine when the embryo becomes viable.

The possibility of applying contributory negligence or assumption of risk concepts is important in some cases because it makes unacceptable the argument given by practically every writer on the subject,\textsuperscript{888} that the analogy from criminal law and property cases involving unborn infants should be applied in tort recovery cases. In addition, the theories of recovery are different. So long as criminal law is based upon an odd mixture of "an eye for an eye" and "deterrence-by-example," it has no justifiable application in connection with liability for negligence, which by definition involves unintentional injuries. If the theory of negligence recovery is one of compensation, then the policy decision should be directed to the question of whether or not this is the kind of injury for which compensation ought to be given and, if so, to what extent.

In connection with proving causation, the speculative character of the actual conclusion to be drawn from the evidence presents some difficulties. We do not go so far as many writers have done and suggest that there is no relationship between the difficulty of proof of causation and the granting of a right to damages. It seems best, however, to separate the two. There are instances in which the causal connection will be easy enough to prove, some of which already have arisen in litigated cases.\textsuperscript{889} In others, present scientific evidence points to a very clear causal connection, as could be true in the case of exposure to radiation during the first few months of pregnancy.\textsuperscript{840} In such instances no court ought to lay down the broad proposition that the causal connection never is going to be sufficiently demonstrable to

\textsuperscript{887} Infra note 360.
\textsuperscript{888} See articles listed supra note 324. See also text discussion infra at notes 392 ff.
\textsuperscript{840} Infra notes 350, 363.
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justify a cause of action. In addition, there is no reason to believe that the rapid progress of the last decade or two in scientific research will be slower in this area than in others. Particularly in radiation cases, surely the present drive for rapid development of atomic science will lead to much greater certainty in the area of causal relationships. The law must remain flexible in order to take account of such developments. If the facts of a particular case present too speculative a causal relationship to submit to the jury, the courts can always handle the problem by withholding the case and directing a verdict for the defendant. Legislatures, if they so desired, could establish a higher standard of proof for such cases.

One answer to the causation argument which ought to be deemed almost conclusive has never been mentioned. If the problem of proof is not too difficult to allow the criminal prosecution of a person for injuring an embryo (not viable), even for murder if the infant lives sometime after birth and then dies, then surely the law should not hesitate to impose some degree of responsibility on the negligent person who causes the same kind of injury. It would be an odd result if our traditional concern to protect the person accused of a serious crime, should be reversed in these cases and the greater protection be given to one charged only with damage liability. If causation cannot be proved in a tort liability case with sufficient certainty to allow a cause of action, surely this kind of speculation ought not to enter the picture when imposition of the death penalty is sought for murder in a criminal case. By the same token, if it is felt just to subject an accused to a criminal trial on the theory that causation can be proved beyond a reasonable doubt, surely we ought to go that far in civil liability cases. At least difficulty of proof should not be a deterrent. This is not meant to suggest that the social policy factors which determine whether to allow an action for invasion of another's interests are the same in each of the cases, but it is to suggest that the causation problem is no different.841

Perhaps in prenatal injury cases a higher burden of proof should be imposed, but recovery should not be denied altogether merely because proof of causation in some cases will be difficult.

Another obstacle to recovery was suggested by the court in Allaire

841 On difficulty of causation, see e.g., Amann v. Faidy, supra note 319; Valence v. Louisiana Power & Light Co., supra note 312; Durivage v. Tufts, supra note 312; White, supra note 324 at 402-403, suggesting no great increase of cases since allowing recovery. Contributory negligence defenses may call for a different result in some case, supra note 338.
v. St. Luke's Hospital, i.e., if recovery were allowed it would be unjust where the mother was contributorily negligent or had assumed the risk. This argument should not be used as a reason for denying recovery where there has been no negligence or assumption of risk by the mother and where the defendant's negligence clearly has been proven to be the cause of the injury to the embryo or foetus. If a line should be drawn to immunize the tortfeasor from liability where the mother is negligent, this is no reason to deny recovery in all cases.

Often the courts which allow recovery in prenatal injury cases will "clinch" their argument as did the court in a recent Connecticut case by stating the general principle of the common law that there should be no wrong without a remedy and that natural justice demands that damages be allowed in these cases. This argument really goes to the basic policy question underlying all tort cases: Is this the kind of injury for which the law ought to allow compensation? These are not arguments or reasons for granting recovery. They are merely statements of the basic policy issue of whether or not compensation is to be allowed. Later we suggest that possibly distinctions should be made and lines drawn depending on the type of injury and the surrounding circumstances.

(b) Rights of Next of Kin Under Death Statutes

The theory of some death statutes is to permit the cause of action to survive the death and allow damages to be recovered to the extent that the decedent would have been able to recover for injuries had he lived. These typically are called survival acts. Others, often called wrongful death acts, allow particular surviving relatives to recover damages caused to them by the death itself. It is clear, therefore, that if the particular jurisdiction follows the Massachusetts rule and does not allow a child to recover for prenatal injuries even when born alive, no action can be brought under the survival death statutes. The theory of the wrongful death act logically could still be applied to allow recovery but it seems most unlikely in such jurisdictions and no cases have been found. On the other hand, if the child is born alive and then dies as a result of prenatal injuries inflicted by a negligent defendant, there

842 Supra note 319. See also concurring opinion in Damasiewicz v. Gorsuch, supra note 333.
844 See suggestions infra in text at section B4(3).
would be no difficulty under existing survival statutes in those juris-
dictions which allow recovery by a living child for prenatal injuries.

If the injured child is stillborn, however, only a few jurisdictions
have ruled specifically on the question of whether or not damages can
be recovered under a wrongful death act. Some courts have refused
to broaden the application of the wrongful death statute when the child
is not born alive, although recovery would be allowed if the child lives
for a short period after birth. Under the decided cases this is a
distinction lawyers must take into account in advising their clients.
Harper and James suggest that while this is an arbitrary line, it is per-
haps the fairest and most practical place to draw the line." It is
arguable that so drawing the line actually is attacking the validity of
wrongful death statutes on the unstated premise that tort recovery
ought to be for compensation and not for vengeance. It would seem
that various philosophies of tort law get badly confused at this point
and that perhaps we need a new approach, if necessary by statute, to
answer the policy question as to what kind of prenatal injuries should
be compensable and to what extent compensation should be taken from
the wrongdoer. In formulating this policy it is advisable to take into
account the rights of the parents as well.

(c) Rights of Parents Other Than Under Death
Statutes

As suggested above, the first case in the common law countries
dealing with the problem of prenatal injuries was the Iowa case, Kansz
v. Ryan, which really involved the right of the parent to recover dam-

Delaware, Kentucky, Mississippi, Minnesota, New Hampshire, and South Car-
olina, infra Table of Cases at end of this section. For cases involving wrongful death
actions generally, see 10 A.L.R.2d 639 (1950). Many courts have permitted recovery
under such statutes where the child is born alive and then dies. See Table of Cases
infra.

Norman v. Murphy, 124 Cal. App.2d 95, 268 P.2d 178 (1954); In re Logan's
Estate, 156 N.Y.S.2d 49 (Surr. Ct. 1956) (letters of administration refused); In re
Scanelli, 208 Misc. 804, 142 N.Y.S.2d 411 (Surr. Ct. 1955) (letters of administration
refused); Muschetti v. Charles Pfizer & Co., 208 Misc. 870, 144 N.Y.S.2d 235 (Sup.
Ct. 1955); In re Roberts' Estate, supra note 319 (letters of administration refused).
See also West v. McCoy, 105 S.E.2d 88 (Sup. Ct. S.C. 1958), denying recovery and
reserving question if born alive. Cf. Butler v. Manhattan Ry., 143 N.Y. 417, 38 N.E.
454 (1894) (action for loss of services where injury caused miscarriage of non-viable
foetus not maintainable because pecuniary loss is too remote and speculative).

Harper & James 1031.

Supra note 315. No English case has arisen. Salmond, Torts 389-90 (11th ed.
Heuston 1953); Clerk & Lindsell, Torts 92 (11th ed. 1954) say damage action would
not lie; see other foreign cases cited at 234. "Injury to an Unborn Child," 83 Sol. J.
185 (1939).
ages not for the child but for himself. The plaintiff’s claim in that case as stated by the court was that the plaintiff was “deprived of offspring by defendant’s act.” The court said very distinctly that the father could not recover for injury to an offspring except for the possible loss of services, and this had not been requested. The court suggested that a claim for loss of future services would probably be too remote and speculative.

Again, in the Dietrich case Holmes made the comment that, “as the unborn child was a part of the mother at the time of the injury, any damage to it which was not too remote to be recovered for at all was recoverable by her. . . .” This is only dictum, but it is a rather clear suggestion that there is nothing by way of theoretical obstacle to the mother’s recovery, and that the only limitation would be one of remoteness. Later cases have dealt more specifically with the rights of parents.

The Alabama court in Snow v. Allen dealt with two aspects of the recovery that a mother possibly may have if her child is killed because of prenatal injuries. The charge was made that the defendant doctor had crushed the skull of the infant while still inside the mother’s womb, causing the infant to be stillborn or to die immediately upon birth. The defendant demurred to the complaint and the court said:

As we see it, the defendant does not properly interpret the plaintiff’s complaint as regards the averments as to death of plaintiff’s infant. As we construe the complaint, no recovery of damages is sought on account of the death of the child, but for the pain and anguish suffered by the mother on account of its death, occasioned by the negligence of the defendant. If the mother was caused to suffer physical pain by reason of the killing of the unborn child, occasioned by the negligence of the defendant, no one, we assume, will argue that she could not recover in this action for such pain; and, likewise, if on account of the negligent destruction of the child, in its delivery, the mother also suffered distress of mind, a recovery could be had for such mental anguish. This is just what the plaintiff claims in the complaint with reference to the killing of her unborn child.

* * *

However, were we to accept the defendant’s construction of the complaint, it would by no means follow that the complaint was subject to any grounds of demurrer assigned

349 Supra note 314.
350 Id. at 17.
351 227 Ala. 615, 151 So. 468 (1933).
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thereto. So long as the child is with the mother's womb it is a part of the mother, and for any injury to it, while yet unborn, damages would be recoverable by the mother in a proper case. [Citing Dietrich v. Northampton]. . . .

We are of the opinion that the mother, in an action against the attending physician, may recover, in one and the same action, damages for all injuries sustained by her, by reason of—proximate result of—the negligence of the physician in and about the parturition of the infant, including the death of the infant, before it is severed from the mother, provided, of course, such death was due to the negligence of the physician.852

The court in this case seems to be saying that the mother can recover for her own mental anguish arising from the loss of a child and, in addition, can recover for damages to something that was a part of her prior to birth, the unborn child.

In several cases actions for prenatal injuries have been brought by parents to recover for loss of services or for medical expenses, but the courts have denied recovery. They considered the action to be derivative of the child's right to sue and in these jurisdictions the child had no such right; therefore, the parents lost their claims.853 For example, in Prescott v. Robinson,854 a pregnant woman was injured in a highway collision caused by the negligence of the defendant, and she later gave birth to a deformed child. The New Hampshire court, in affirming the trial court which had overruled defendant's demurrer to the complaint, said that it was perfectly natural for a pregnant woman after an injury to experience mental distress arising from the fear of an abnormal birth and that this fear was "proximately caused" by the defendant's negligence. The court then said:

Her ability to be delivered of a normal and healthy child was jeopardized, and her grief and apprehension before the birth on account of what the probable or not unreasonable effect would be upon the child is not a remote consequence of the alleged negligence of the defendant. It was her right to produce a healthy child; and if by the defendant's negligence her enjoyment of that right was diminished or violated, her mental distress for the unnatural result to be expected was

852 Id. at 618-19.
854 74 N.H. 460, 69 Atl. 522 (1908), approved later in Durivage v. Tufts, supra note 312 at 268.
an element of damage for which she should be compensated, as well as her disappointment at the birth of a deformed child. [While the mother cannot recover for the injury to the child itself]. . . the mother’s anxiety before the birth of the child, in view of the reasonable probability that the defendant’s act will cause her to produce an abnormal child, is peculiarly an element of damage to her. 355

The court also concluded, however, that:

The fact that the plaintiff will undoubtedly suffer great disappointment during her lifetime, occasioned by her continual observation of her child’s deformity and its probable suffering, though in some sense caused by the defendant’s negligence, is a misfortune for which the law can afford no compensation in an action for negligence. . . . The deformity of a crippled child and its suffering may be an ever-present cause of disappointment to its parents, and their lives may be made miserable thereby; but they can obtain no redress on that ground against the person whose negligence was the cause of the child’s condition. 356

The court felt that where the act causing the injury is merely a negligent one, compensation for the lifetime of disappointment is too “remote, secondary, and speculative.” 357 The mother could recover for losses peculiar to herself, of course, but not for mental anguish after birth.

In general, the right of the mother to sue for her mental anguish resulting from fear of an abnormal child is well recognized, including her physical and mental suffering resulting from the miscarriage itself. In cases which support the New Hampshire distinction, however, she may not recover for the death of the child or for her mental anguish because of the deformed nature of the child after birth, remoteness usually being given as the reason. 358 It also seems to be well recog-
nized that neither parent may recover for loss of services or loss of 
prospective earnings of the child or for loss of companionship with the 
child. 859

(d) Radiation Cases

There are two decided cases in which prenatal injury was alleged to 
have resulted from the negligent use of radiation in the treatment of 
the pregnant mother. In Smith v. Luckhardt 860 the defendant doctors 
incorrectly diagnosed the condition of the plaintiff's mother as a 
tumor and administered six X-ray treatments of forty-five minutes 
each over a period of four months. The child was born permanently 
crippled and feeble-minded, developing to the mental age of two years 
although living to a chronological age of thirteen. The action was in­
stituted for the child shortly before his death. The Illinois Appellate 
Court dismissed the action on defendant's motion. It cited the Allaire 
case as binding authority that damages could not be recovered for pre­
natal injuries, 861 although it recognized that there were very good 
arguments for allowing recovery in such cases. The Illinois Supreme 
Court has since joined the present majority of jurisdictions which 
allow recovery. 862

The other case is Stemmer v. Kline, decided in New Jersey in 
1942. 863 Here again the plaintiff's mother was subjected to X-ray treat­
ment by defendant physician for a tumor which plaintiff alleged could 
have been identified as an embryo by a complete examination. The 
plaintiff was prematurely born and described as a microcephalic idiot 
who could not walk, talk, hear, or see. The jury found that this condi­
tion was caused by the X-ray treatments. On appeal the judgment for 
plaintiff was reversed, ten judges to five, although one of the majority 
agreed with the dissenting group that the cause of action should be al­

53 Vt. 183 (1880); Malone v. Monongahela Valley Traction Co., 104 W.Va. 417, 
140 S.E. 340 (1927); Annot., 145 A.L.R. 1104 (1943); Annot., 10 A.L.R. 639, 640 
(1950).

859 Ibid.

860 299 Ill. App. 100, 19 N.E.2d 446 (1939).

861 Supra note 321.

862 Amann v. Faidy, supra note 319. The court said at 434: "In rejecting the con­
tention upon which the defendant now insists, this court pointed out more than a 
hundred years ago, 'that if we are to be restricted to the common law, as it was en­
acted at fourth James, rejecting all modifications and improvements which have since 
been made, by practice and statutes, except our own statutes, we will find that sys­
tem entirely inapplicable to our present condition, for the simple reason that it is more 
than two hundred years behind the age.' Penny v. Little, 3 Scam. 301, 304."

863 Supra note 318.
allowed for prenatal injuries but joined in the decision reversing the trial court because it admitted evidence which he felt was inadmissible under the New Jersey rules. The court also refused to allow the parents to recover for expenses they alleged were caused by the alleged malpractice because it was dependent on the claim of the injured party, the child; the child having no cause of action, the parents' cause must fail.

There is no reason to believe that these results would be reached, however, in the seventeen jurisdictions which currently recognize a cause of action for prenatal injuries at least in the case of a viable foetus. Viability probably would not be a factor in the Luckhardt case because the treatments were given between the fourth and seventh month after conception and this is after the foetus usually is considered viable. It is not made clear in the Stemmer case just when the treatments took place, although the third and last one was given just six weeks prior to birth. Actually, the cases of microcephalic idiocy arising from radiation treatment to pregnant women are perfect examples of cases where the viability distinction is harsh and unrealistic. There is some persuasive evidence that sufficient radiation during the first two or three months of pregnancy may cause microcephalic idiocy. If this is so, it is the very case in which recovery should be allowed, if it is to be allowed in any case.

With the rapid expansion in the use of radioactive materials and radiation machines for medical treatment and also for various industrial uses, it is not difficult to predict that the number of radiation cases involving pregnant women will increase. The doctor will have to be careful not only in his use of X-ray treatments in the abdominal area, but also in his use of radioactive isotopes for diagnosis or treatment of other parts of the body. Such uses well may create hazards which will affect the pregnant woman since elimination of radioactive isotopes takes place primarily through the normal elimination channels, in close proximity to the developing embryo. In addition, there will be a problem in the case of women being employed in establishments where it is possible for them to receive, even on a temporary emergency basis, a considerable amount of radiation. While there may be no apparent harm to the mother, there may be injury of the embryo. The harm apparently occurs if there is radiation at any time beginning immediately

364 Conversations with very competent radiologists confirm this fact though none knew of an authoritative written collection of such cases. Specialists in gynecology now recognize the necessity of minimizing exposure of pregnant women because of genetic damage as well as abortions. N.Y. Times, Oct. 11, 1958, p. C11, col. 2.
after conception. The administrative problem for employers desiring to make use of women in radiation establishments is obvious. Additional cases may arise from accidental exposure of visitors in places where radiation sources are present. When a nuclear accident discharges radioactive material over a well-populated area it is very likely that some women in the area will be pregnant. If they later give birth to deformed children, they may be able to show sufficient causal connection to establish that radiation was responsible. In the light of the clear trend of the cases toward a recognition of the right to recover for prenatal injuries, not only where viable but also regardless of viability, it seems not unrealistic to predict that the viability line will be discarded, at least in cases where causation is clear. If damages for fear of giving birth to a deformed child are permitted, as in several of the cases set out above, this could become a very sizeable problem.

(2) Genetic Damage

Up to the present time no cases have arisen involving a claim for genetic damage. By genetic damage we mean injury manifested in a descendant's abnormality but resulting from injury to the genes or chromosomes of a parent or a more remote ancestor who has been exposed to radiation (or some other force) between the time of the ancestor’s conception and the time when he ceases having children. Damage to the parent will be considered in the next section on “sterility.” As pointed out later, any force which causes a mutation for practical purposes can be considered as injurious because almost all mutations are deleterious. Scientists seem to agree that exposure to radiation at any time from conception to birth of a child causes genetic damage. There also seems to be general agreement that no matter how small the dose of radiation the effect is a cumulative one, although there is some recent evidence to the effect that there may be less genetic damage if a given amount of radiation is spread over a longer period of time.

In the face of such unanimous opinion and in view of our ever increasing knowledge of the cause and effect of genetic damage it would be carrying the concept of blindfolded justice too far if the law simply refused to recognize that a problem exists. If it should be decided, as a matter of social policy, that it is unwise to allow recovery for genetic damage, it ought to be a decision arrived at after full consideration of all the factors involved, and not on the basis of an ostrich approach

865 Infra discussion at notes 1072-79. See also Chapter I, supra.
866 Infra discussion at notes 1080-84.
which assumes that if the problem is not recognized it does not exist. In
the present state of development of knowledge about the cause and
effect of genetic damage, the causation proof problems which the plain-
tiffs will face are great, but it is submitted that the question of whether
or not to allow genetic damage at all is the first question to be answered.
There are two reasons why difficulty of proof is not a satisfactory rea-
son for refusing recovery generally for genetic damage caused by radia-
tion. First, even in the present state of knowledge and in view of the
requirements of probability which the law currently employs in tort
actions, there will be cases where it is perfectly conceivable that causa-
tion can be proved. This will be considered later in the section dealing
with proof problems. Secondly, genetics is a developing science. With
the great impetus that has been given to research in this area by a recog-
nition of the dangers from radioactive fall-out, it would be most un-
fortunate if damage recovery concepts were frozen at the present state
of scientific knowledge. While the proof problem as it relates to causa-
tion in radiation cases cannot be ignored in making this decision, any
more than it can in connection with post-conception prenatal injuries,
there would seem to be enough evidence already to warrant an assump-
tion that in some cases the causation factor can be proved. If this is
true then the law must face squarely the problem of whether or not to
allow recovery for genetic damage resulting from negligent exposure to
radiation.

In States Now Denying Damages for Prenatal Injuries. From the
above analysis of the present attitude of the various state courts on the
general question of prenatal injury, it is clear that in most jurisdictions
where that question has been answered negatively no recovery will be
allowed for genetic damage unless legislation is enacted, or unless the
courts regard the problem of genetic damage as calling for somewhat
different analysis than has been applied heretofore. The answer in the
eight jurisdictions which do not allow recovery for prenatal injuries
under any circumstances is perfectly clear—there is no reason to believe
that recovery will be allowed for genetic damage because proof prob-
lems certainly are more difficult than in post-conception cases. In
the other four jurisdictions which incorrectly have been classified by
judges and writers as states in which recovery is not allowed for pre-
natal injuries, the answer is not so clear. The cases decided so far in

867 Infra discussion following note 1079.
868 See Table of Cases at end of this section.
869 Nebraska, Oklahoma, South Carolina, Wisconsin. See Table of Cases at end of
this section.
in these four jurisdictions involved situations where the injured foetus was not born alive or was not viable; therefore, these decisions give no answer as to what the courts would do if a case were presented where causation was shown, and a child, viable at time of injury, was born alive and lived for some time. For purposes of determining the possibility of recovering genetic damages, we would classify these three jurisdictions with those jurisdictions in which the result is uncertain, although the chances for recovery in these states might be thought to be somewhat less than in states which actually have decided that prenatal injuries are recoverable in some circumstances.

In States Now Allowing Recovery for Prenatal Injuries. Of the seventeen jurisdictions in which recovery has been allowed for prenatal injuries, in predicting what may be done with genetic injuries, account must be taken of certain distinctions. The distinction as to whether the child is dead at birth or lives for a time thereafter would not seem to present any different problems when the injuries are genetic in character. This damage apparently either can be of the kind that causes death of the foetus while still in the mother, or it can manifest itself in children born alive with some abnormality. Conceivably the mutation could be beneficial or at least not harmful, so that no damages should be awarded. We can see no tenable policy distinction to be drawn between pre-conception and post-conception prenatal injury cases so far as deciding whether recovery ought to be allowed for death of the foetus itself. Of the seventeen jurisdictions in which recovery has been allowed, only two have clearly held that viability of the foetus is not important. In most of the other jurisdictions where recovery has been allowed, either the facts of the cases or the language of the court makes it clear the court is allowing damages only when the foetus is viable. To the extent that this remains a requirement for prenatal injuries during the post-conception period it may be assumed that there can be no recovery for genetic damage because by definition this is damage that arises before conception. For the same reason a relaxation of the requirement to one that the child merely be "quick" in its mother will not suffice to permit recovery in a genetic damage case.

Effect of Separate Legal Entity Argument. Most of the argument in the cases and law review discussions on the question of recovery for

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870 See Table of Cases at end of this section.
871 Discussion supra at notes 329-35.
872 See cases listed in Table of Cases at end of this section permitting recovery.
873 Supra note 333 and suggestion of concurring justice in Hornbuckle case, supra note 331.
prenatal injuries deals with the question as to when a child developing in its mother becomes a separate legal entity or "person" for purposes of tort liability. Practically all arguments by law review writers and those courts which have allowed recovery in recent years contrary to the earlier majority view have emphasized the fact that we now know that before birth and even before viability or quickness the embryo has an identity of its own which is, in some degree, separate from its mother's. To the extent that attention continues to be focused upon separate legal entity, there will be no right of recovery for genetic damage. Even with our limited knowledge of the science of genetics, we know it is not until the chromosomes of the mother and father are joined in a fertilized egg that a particular set of genes from each forms what will ultimately become a child. If the irradiated person does not have children or if the mutated genes are not passed on to the offspring at the time of conception, there has been no really important damage to the descendant. It seems very certain, therefore, that conception is a crucial point in determining potential damage. It is not possible to argue realistically, therefore, that there is an entity before conception. Most courts, even in jurisdictions where recovery is allowed for prenatal injuries to viable children born alive, probably will hold that there is no tort because there is no "person."

Scientifically this does not make sense, however, for if the geneticists are right (and they all agree), genetic damage can result from pre-conception radiation of the parent, and the mutation that results may be passed on to the child and manifest itself as a disabling deformity or organic inadequacy many generations later. In some cases causal connection can be ascertained on the basis of present scientific knowledge; in the future, as our knowledge of genetics increases, undoubtedly proof of causation will be possible in a greater number of cases. To the deformed child it certainly makes no difference whether his deformity was caused by radiation of his parent before conception or of his mother after conception. He lives with the deformity and should or should not be allowed recovery in a damage action on the social policy ground that we can or cannot afford to burden with such damage actions a growing industry so vital to our future, or can or cannot afford to let injured persons suffer uncompensated injuries. The decision should not be on the basis of whether irradiation occurred before or after conception. In asserting this we do not mean to imply that the proof of causation difficulty will be solved easily or that it will be solved at all in the great majority of cases. In those cases where causation
can be shown, however, it is important to answer the question, Should society allow recovery?

In those jurisdictions where the courts, in allowing prenatal injury recovery, clearly have taken note of new scientific developments establishing the separate identity of the embryo, they may follow scientific discoveries one step further and hold that so long as causation can be proved, compensation should be allowed, even though the radiation causing the abnormality occurred before conception. The growth of the law of prenatal injury has necessitated persuading the courts to accept scientific knowledge concerning both the identity of the embryo and the possibility of proving causation.

The Social Policy Considerations. If the next step is taken, however, it should be done only after a full consideration of the social impact of allowing such recovery. Undoubtedly, courts when faced with problems of genetic damage may use the "proximate cause" formula to find that the defendant owes no duty to the unborn. It certainly cannot be a question of foreseeability, because both as to post-conception and pre-conception prenatal injuries from radiation, it is clear that irradiation of either parent in the pre-conception period and irradiation of the mother in the post-conception period foreseeably will cause damage to the potential or actual embryo. Any limitation in the name of proximate cause, therefore, really will be a disguised policy judgment to the effect that negligent defendants should not be held responsible for this kind of injury. It is an arguable position but should be made openly and knowingly, not hidden behind the camouflage of proximate cause or a blanket rule against recovery merely because in many cases the proof problem will be difficult.

Decisions Bearing on Genetic Damage. Only two cases have been found which seem to contain even the remotest implication concerning the allowance of genetic damage. One is the brief comment by Chief Justice Duckworth in his concurring opinion in the Hornbuckle case where he asserted that if a baby could sue for injury occurring immediately after conception, as he felt the majority had ruled, "why not allow such suits for injuries before conception, even unto the third and fourth generations?" His remark in this case clearly indicates that he would not allow recovery for genetic damage; rather, he would draw the line at the time when the child becomes quick in its mother.

The other case, Morgan v. United States, is so remarkably analo-

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874 Supra note 332.
ous to the genetic damage situation that it is most unfortunate it arose in a jurisdiction (Pennsylvania) in which no recovery is allowed for prenatal injuries under any circumstances. In this case the mother alleged that she was negligently given a blood transfusion "of an improper or unsuitable type" while in defendant's army hospital in February, 1952. In June, 1955, the mother was delivered of a baby boy whose health allegedly was impaired because of the transfusion of improper blood two and a half years earlier. Causes of action were brought for damages to the mother, the child, and the husband and father. The court disposed of the mother's claims on the ground that the two year statute of limitations ran out in February, 1955; the action was not begun until January, 1956. The court's reason for dismissal of the action for damage to the child is not completely clear. It first seemed to state that the statute of limitations also called for the dismissal of the action for damages to the child as well. The court then said:

When the tortious conduct occurred William Morgan had not yet been conceived. He was then neither a viable foetus nor en ventre sa mere. The alleged tort occurred in Pennsylvania. Whether a cause of action accrued to William Morgan is governed by the law of that State.\(^{376}\)

The court cited the *Berlin v. J. C. Penney, Inc.* case in which the Pennsylvania court denied recovery in a prenatal injury situation.\(^{377}\) Here the federal district court apparently rests its decision on the rule of no cause of action for prenatal injuries. The court concluded that because the claim of the father for injuries to the mother and to the child was derivative, it must fall with the first two causes of action. If this case had arisen in a jurisdiction where recovery is allowed for prenatal injuries, the court would have been forced to decide whether a cause of action for pre-conception injuries is to be permitted and a precedent for genetic damage cases might have been established.

The blood transfusion case is very likely to be the forerunner of many cases that will be brought to the courts as the result of extensive use of radioactive materials. In several accidents workers have been exposed to sufficient radiation to increase substantially the risk of genetic mutation.\(^{378}\) More significant in number, however, will be those

\(^{376}\) Id. at 584.

\(^{377}\) 339 Pa. 547, 16 A.2d 28 (1940).

\(^{378}\) See description of accidents, *infra* Chapter IV. In addition, several persons unknowingly were exposed to significant quantities of radiation when a source was carelessly lost and it was some time before its loss was discovered. BNA, Atomic Industrial Rep. 4: 419, 4: 444 (1958). The exposures at the Y12 accident were 365, 339, 327, 270,
cases arising from the use of radioactive material or radiation sources for medical treatment, and from the discharge of a large quantity of radioactive material over a heavily populated area. If a substantial reactor burn-up should occur and radioactive material be dropped over a city, the possibility of claims by parents, either for the increased possibility that their children will have deformities, or for deformities that actually show up in children later conceived, is not inconsequential and is a problem not to be dismissed lightly.

(3) Some Suggestions Toward a Solution

The proper solution of the problems that have been suggested in connection with pre- and post-conception injuries from radiation is not easy to determine. A comprehensive attack on the problem should be carried out by a group of lawyers representing all types of interests in tort litigation, with the advice and consultation of scientists and other experts to check the validity of assumptions that lawyers too often blithely (or blindly) make. It may be that atomic energy will open up an opportunity to the legal profession to do a really imaginative and yet practical job in the handling of tort cases, something that will be better than our present hit and miss system with its fabulous recoveries in some cases and its niggardly awards in others, quite out of proportion to the relative suffering in the respective cases. Much of the present system is good and must be retained, but some of it is bad, and atomic energy cases may present the legal profession with the opportunity to try some experiments that will have application in other cases as well. The following ideas and suggestions are presented as a starting point toward a proper solution.

In making these suggestions it is assumed that causation can be proved with reasonable certainty, a problem to be considered later in the section on proof. Many of the malpractice cases involve X-rays, and probably could have included such a damage claim. Specialists in gynecology as well as radiologists now recognize the necessity of minimizing exposure of pregnant women. N.Y. Times, Oct. 11, 1958, p. C11, col. 2. Cf. Contrary statement reported N.Y. Times, Nov. 23, 1958 p. E9, col. 6. Infra discussion beginning at note 1072.
the sense of wanton disregard of consequences. These assumptions seem fair; for no matter what the system of compensation, the problem of proof of causation and the prevention of fraudulent or purely speculative claims will always be present but are no more bothersome, in some cases at least, than in many other types of damage cases.

(a) Post-Conception Injuries

The common law cases are confusing and the results reached seem inadequate and based upon an uncritical analysis, not only of scientific knowledge but also of the underlying social policy considerations involved. Too often the results indicate a failure to apply the compensation theory we assume in negligence cases generally. They also show a failure to distinguish sharply between the rights of the injured child, the next of kin under death statutes, and of parents for damages other than under the death statutes.

(i) Recovery by Child

If the child is born alive and lives at least until after the trial, recovery should be allowed. Damages should include the extra expenses which will be required because of the abnormality and for a period extending through the whole life expectancy of the child determined as of the time of trial, taking into account any shortening of the period because of the abnormality. The compensation theory logically (and correctly) does not permit recovery for the full life expectancy without taking into account the abnormality. Either as a separate item of damages or as an element of the extra expenses award, an amount should be included to provide for really adequate rehabilitation to the extent it is possible to correct the defect or provide some substitute for the ability impaired by the deformity.

Determining whether to allow recovery for pain and suffering and mental anguish of the child and if so in what amount is somewhat more difficult. Undoubtedly an amount should be allowed to provide for good medical treatment including whatever is available to reduce pain and suffering as much as possible. In many cases, however, nothing should be awarded to the child for humiliation and similar mental anguish. The microcephalic idiot who has none of the normal senses cannot suffer this type of injury. In general, a mentally alert child with some other abnormality probably does not suffer from humiliation and related feelings during the first few years. If the child lives long enough and is able to sense humiliation because of the deformity and the defect is such as to
cause the normal person humiliation, a good case can be made for allowing something for mental anguish, but there is much to be said for applying here also the suggestion that recovery for such damages be limited in amount.\textsuperscript{881}

In awarding damages to the child who lives, the concern about finding a separate legal entity should be forgotten and the distinctions based on "viability" and "quick" should be eliminated. Except possibly for the difficulty of proving causation, there is no policy justification for such distinctions. If a child has to live with a deformity it matters not to him that it happened before or after he was quick or viable in his mother's womb, as the case may be in a particular jurisdiction. He is now an injured legal entity which should be sufficient.

Even as to proof of causation, in the light of present medical knowledge and techniques, the difficulty is not sufficiently greater in the one case than the other to justify basing a distinction upon this factor. Probably it is more difficult to determine whether the quick or viable condition exists than it is to determine whether the mother is pregnant. If it is felt that the difficulty of proof is such that the danger of spurious, fraudulent, or speculative claims is great, the legislature by enactment or the judge by decision can control this by making the burden of proof somewhat higher, if this is felt to be necessary. Certainly, if the prosecution is allowed to prove causation beyond a reasonable doubt in such cases in criminal suits, there is little reason to deny the plaintiff at least the same opportunity in a tort action.

Perhaps it is not amiss to re-emphasize our position that these damages should be awarded to the child and not to his parents. The necessary accounting and trustee arrangements are available already by common law rule or by statutory provisions.

\textit{If the child is stillborn or dies before trial}, results under existing doctrines are quite unrealistic in some respects. If stillborn, surely the child gains nothing from an award for mental anguish or pain and suffering. Such an award cannot help the child, but only the survivors. The allowance of damages in several jurisdictions\textsuperscript{882} is unjustifiable under a compensation theory. If the child is born alive but dies before trial, recovery for the child's mental anguish or pain and suffering, allowed in even


\textsuperscript{882} \textit{Infra} Table of Cases at end of this section. Delaware, Kentucky, Minnesota, Mississippi, and New Hampshire apparently permit such recovery even when the child is stillborn.
more jurisdictions, again is unjustifiable because survivors are the only beneficiaries. Any recovery by beneficiaries should be in their own right, not because of the suffering of the child now dead.

To the extent that there were extra expenses incurred in delivering or caring for the child until its death, including those for medical treatment to reduce pain and suffering and for rehabilitation efforts, if any, recovery should be allowed. Once the child dies such recovery cannot benefit him but these efforts in his behalf should be encouraged and those who have incurred the expenses should be recompensed by the wrongdoer. Whether the claim is in the name of the now dead child or by the parents, if they incurred the expenses as ordinarily would be the case, is not important; the suggested limits on recovery are.

(ii) Recovery by Next of Kin Under Death Statutes

Application of survival and wrongful death statutes to prenatal injury suits cannot be justified, except possibly in one situation.

Survival statutes are based on the theory that the estate of the deceased should be awarded the amount which the deceased could have recovered, had he lived. Perhaps recovery is justified in the case of property damage but not when the award is for pain and suffering or mental anguish. The deceased’s suffering is not lessened by knowledge that some money will pass on through his estate, even assuming the deceased lives long enough to realize the significance of the possibility. If recovery is allowed under a survival act, the artificial argument about whether there is a separate legal entity who had a cause of action must be revived. It also may be necessary to make the artificial distinction between the case where the foetus dies before birth and that in which he survives birth, if only for an instant, since a cause of action can vest in an instant. As applied in non-intentional tort cases, at least in the prenatal injury situation, the results reached under survival acts have more of an element of vengeance or at best of a windfall than of compensation. Nevertheless, applied with strict logic, recovery would be allowed if the death occurs in a jurisdiction which would allow recovery if the child survived the trial and if the child lived for at least a moment, or if the foetus is considered as legally alive even before birth.

Six states; see Table of Cases at end of this section.


Connecticut, Louisiana, and New Hampshire. See Table of Cases at end of this section.
Wrongful death statutes generally allow recovery to a specific and limited group of persons who ordinarily suffer financially from the death of a close relative such as a parent or child because they have been deprived of a source of financial support. The Delaware, Kentucky, Minnesota, Mississippi, and New Hampshire courts can assert a possibly tenable, theoretical justification for allowing recovery under a wrongful death statute. Practically speaking, however, recovery is not justified under these statutes either. Certainly no person really begins to depend on a conceived but unborn child, or even on one already delivered and living, until many years later when there is some indication of earning capacity and a desire to support relatives. If the child is handicapped, no such expectations of support should develop. There is no real likelihood of receiving financial support from even a healthy child these days when raising children ordinarily costs much more than they can earn until they are grown and away from home. The uncertainties even then are great. This is considerably different from the position of a spouse or child or even parent who actually has come to expect financial support from a grown father or mother, son or daughter.

The only possible exception to the suggested denial of recovery under death statutes arises in the event a deformity or incapacity resulting from prenatal injuries manifests itself only after the child has grown and accepted support responsibility, and others have depended on such support. Perhaps in this case recovery under a wrongful death statute is justified, although the statute of limitations conceivably could make recovery impossible if the time of the original injury is used to determine when the cause of action arose.

We submit that results under existing death statutes are unrealistic and that a new statute should be enacted to prevent their use in prenatal injury cases. A statute should be adopted fully protecting the injured child, those who incur expenses to help him while living, and possibly those who, not knowing of the incapacity, reasonably have come to depend on the injured child for financial support where the manifestation of the injury is long delayed.

(iii) Rights of Parents

So far as the mother's rights are concerned, the decisions seem fairly satisfactory insofar as they allow recovery for all of her own injuries resulting from the impact, including those arising from the birth and its aftereffects to the extent they are caused by defendant's negligent

Supra note 382.
If we could start anew we would have serious doubts as to the advisability of unlimited recovery for the mother's mental anguish during pregnancy and after the impact for fear of having a deformed child, unless it manifests itself in some type of recognizable disability to continue normal activities. This problem, however, is not different from mental anguish recovery in other types of negligence actions and perhaps all that can be hoped for is some kind of limitation on maximum recovery in such cases. On the other hand, the arbitrary rule that there can be no recovery for the mental anguish which a mother suffers as she watches over and takes care of a deformed child probably is unfair. Looking at the matter from the standpoint of compensation and rehabilitation, paying her a large sum of money just so she can buy a fur coat or a new house is not justified, but if her mental anguish seriously interferes with carrying out her normal activities, something might be said for a type of recovery which is so controlled that it would have to be used for rehabilitation, including psychiatric treatment if necessary.

To the extent that the parents are put to unusual expenses in caring for the abnormal child, they should be allowed to recover a compensatory award, assuming that there is no duplicating award allowed to the child or his estate as suggested in discussing the rights of the child.

The rights of the parents arising from the loss of the expected or already born child are discussed in the next section on sterility and related injuries.

(iv) Conclusions

The one fundamental principle to keep in mind is that while a full recovery should be allowed for all interests injured to the extent money damages can in some way make amends, duplicating recoveries should be prevented. It is important to keep separate the rights of the child while he is living, the rights of close relatives in certain exceptional cases, and the rights of parents in their own right but not that of the child; otherwise duplication is likely. Certainly there is a need for changes in survival and wrongful death statutes and development of a whole new approach to granting damages for prenatal injuries.

(b) Pre-Conception Injuries

If the science of genetics develops to the point where causation can be proved, logic would seem to call for recovery for pre-conception in-
juries on the same grounds suggested for post-conception injuries in radiation cases. The concept of a separate legal entity should not be an obstacle if compensation is accepted as the theory for tort recovery. So long as the defendant is protected against unreasonable claims by placing a substantial burden of proof upon the plaintiff, there is no reason to immunize the wrongdoing defendant from liability for actual injuries which result from his negligence.

There is one problem connected with genetic damage, however, which is much more serious than in the case involving post-conception prenatal injury. The injury from radiation to the embryo in the mother’s womb will manifest itself within the lifetime of the child later born. This in itself is a long period of time and presents some serious problems under existing statutes of limitations. In the case of genetic damage, however, these problems are much more serious for such injuries transmit themselves through succeeding generations. Assuming that thirty years is the normal length of a generation in this country, it could easily be 150 or 200 years before an injury manifested itself in the form of a mutation. Such cases, however, do not present the problem in sharpest focus. At the end of so long a period no human defendant will be alive and under the laws of incorporation in most states even a corporate defendant is likely to be legally dead. In addition, proving causation at this late date probably would be impossible for the plaintiff. The case most likely to arise, and the one which should be the basis for legal rules, involves the birth of a child with manifestations of genetic mutation within the same or a second generation. This is not unlike post-conception injuries to an embryo which is later born and lives a relatively normal length of time. The period will be longer but not inordinately so.

The rules suggested for application to prenatal injuries should be extended to cover genetic damage if the manifestations occur within the first or perhaps the second generation.

(c) Common Problems

The statute of limitations problems raised by these cases are common to many, if not to most, radiation injury situations. In most jurisdictions it is necessary that a whole new scheme of limitations be developed to take care of radiation injury cases whether they be post or pre-conception prenatal injuries, or other types of injuries such as leukemia, bone cancer, etc. Statutes usually require actions for negligence to be brought within a very short period, e.g., two or three years. If we treat the time of injurious impact as the time when the cause of action arises,
as seems to be indicated in the Morgan\textsuperscript{889} and LaPorte\textsuperscript{890} cases, it is clear that genetic damage cases cannot be brought within the statutory period. Most cases will involve radiation exposure more than two or three years before the deformity shows up. Even in post-conception prenatal injury cases many of the disabilities may not appear within the periods of limitation. An example of this would be the occurrence of leukemia which may not show up for several years after birth.

In addition, it seems clear that there is room for substantial improvement in the system of remedies and compensation in tort cases of the character here under consideration. Certainly the atomic energy or radiation injury cases are going to strain our present system very greatly, especially if we are concerned with compensation and not vengeance. It is possible that we may need to adopt principles similar to the splitting of causes of action found in certain European countries, or we may need to adopt some kind of a "wait and see" doctrine for tort cases. Perhaps emphasis should be placed on paying the expenses of rehabilitation and treatment rather than on mental anguish and pain and suffering awards. These suggestions apply generally to radiation cases and will also be discussed later.\textsuperscript{891}

One other troublesome problem common to both pre- and post-conception prenatal injuries concerns contributory negligence and assumption of risk on the part of the parent. Prosser in his usual pithy way summarizes the possibility of imputing the negligence of the parent to the minor child in the following language:

\begin{quote}
In 1858, in a still more unfortunate English case, it was held that a small child injured through the negligence of a railway company was barred from recovery by the contributory negligence of a grandmother who was in charge of the child at the time. This barbarous rule, which denies to the innocent victim of the negligence of two parties recovery against either, and visits the sins of the fathers upon the children, was accepted in several American states, but is now overruled everywhere except in Maryland, Maine, and perhaps Delaware. The "agency" of the parent to look after the child is of course the barest fiction, and the fear that the parent may profit by his own negligence is now removed by the power of the court to put the proceeds in trust for the child.\textsuperscript{892}
\end{quote}

\textsuperscript{889} Morgan v. United States, \textit{supra} note 375.
\textsuperscript{891} See recommendations \textit{infra} following note 1123.
\textsuperscript{892} Prosser 301.
Harper and James are not quite so disturbed but agree that the negligence of the parent should not be imputed to the child. 393

References to the matter of the mother's negligence are found in a few of the prenatal injury cases. As pointed out before, the possibility of the child suing the mother for her negligence was used by the Illinois court in the Allaire case 394 as a reason for denying all recovery for such injuries. On the other hand, in Rainey v. Horn, 395 the court pointed out that in Mississippi, as in most jurisdictions, 396 a child cannot sue its mother. Another reference is found in the Missouri case of Kirk v. Middlebrook, 397 this time to a question involving assumption of risk. Both lawyers assumed that the right of action was in the mother and not the infant and the court apparently held that the mother could contract away damage rights arising from injury to the foetus. The language seems to suggest that if the action had been that of the child, the mother could not contract it away. These are all of the references to the question found in the cases. Prosser and Harper and James are not referring to prenatal injury cases in their comments on contributory negligence. Obviously significant differences exist between applying contributory negligence and assumption of risk doctrines to cases of injuries to living children and to cases of prenatal injury.

The first distinction to note is that both the parents (particularly the mother) and the child may have claims. Surely so long as contributory negligence and assumption of risk doctrines are used in negligence cases generally, these should be defenses to any action by the parent for injuries to his interests as distinguished from those of the child.

Whether such defenses arising from the actions of the negligent parent should be applied to defeat the child's own rights against third parties is a somewhat more difficult question to answer; but here again they probably should be applicable, in contrast to the result where a living child is hurt. It does not seem as "barbarous" to apply the defenses to a child still in its mother's womb, or still to be conceived. Even if the injured foetus is born alive but dies within the first five or ten years of his life, recovery from a negligent defendant in effect will help the parents themselves rather than the child for they will be caring for him during this period in almost all cases. Yet the condition was partly the

395 221 Miss. 269, 281, 72 So.2d 434 (1954).
396 Prosser 675-76, although he disagrees with the rule.
397 201 Mo. 245, 285-86, 100 S.W. 450 (1907).
result of their own contributory negligence. The unborn or unconceived child seems too closely connected with the parents to deny defendants the right to use contributory negligence or assumption of risk as a defense, even if the child lives to a mature age with some serious deformity.

This position is not inconsistent with the argument that the embryo or foetus is a separate entity and should be allowed to recover for prenatal injuries. Separate existence should not govern application of these defenses. The burden of extra expenses and rehabilitation in such cases should be born by the parents, so long as contributory negligence is used in negligence cases generally.

In any event, assuming the parent is advised fully of the risks involved, no rule should be adopted which will embarrass in any way the doctor or the expectant mother or potential parent in deciding to use radiation in the course of medical treatment of the parent, even though this admittedly creates a risk of injury to the embryo or foetus, either directly or because of mutated genes.

TABLE OF CASES—PRENATAL INJURIES

I. States Allowing Recovery Under Some Circumstances

1. If Viable at Time of Injury and Born Alive

**CALIFORNIA:**

*Myers v. Stevenson*, 125 Cal. App.2d 399, 270 P.2d 885 (1st Dist. 1954) (Injuries during delivery and born alive; specifically provided for by amendment to statute following *Scott* case).

*Scott v. McPheeters*, 33 Cal. App.2d 629, 92 P.2d 678 (3d Dist. 1939) (Injuries at birth and born alive; construing code provision as creating separate existence of foetus for personal injury as well as property rights).

**CONNECTICUT:**


**DELAWARE:**


**DISTRICT OF COLUMBIA:**

*Bonbrest v. Kots*, 65 F. Supp. 138 (D.C., D.C. 1946) (Injury at birth and born alive, the court emphasizing that child was viable).
GEORGIA:
Hornbuckle v. Plantation Pipe Line Co., 212 Ga. 504, 93 S.E.2d 727 (1956) (Injury six weeks after conception and apparently born alive; concurring justice saying should have to prove that quick in mother).
Tucker v. Howard L. Carmichael & Sons, 208 Ga. 201, 65 S.E.2d 909 (1951) (Injury three hours before birth, nothing being said about being born alive but language leans this way).

ILLINOIS:
Rodriquez v. Patti, 415 Ill. 496, 114 N.E.2d 721 (1953) (Injuries while en ventre sa mere; controlled by Amann case).
Allaire v. St. Luke’s Hospital, 184 Ill. 359, 56 N.E. 638 (1900) (Action not permitted but overruled by Amann case).
Smith v. Luckhardt, 299 Ill. App. 100, 19 N.E.2d 446 (1939) (Born microcephalic idiot as result of X-ray treatments of mother from third to seventh month of pregnancy; action not permitted on ground controlled by Allaire case).

KENTUCKY:

LOUISIANA:
Cooper v. Blanck, 39 So.2d 352 (La. App. 1923) (Civil code read as allowing wrongful death action for viable foetus born alive).

MARYLAND:
Damasiewicz v. Gorsuch, 197 Md. 417, 79 A.2d 550 (1951) (Born alive and apparently not viable; test apparently is whether is quick).

MINNESOTA:
Verkennes v. Cornelia, 229 Minn. 365, 38 N.W.2d 838 (1949) (Injury at birth killed mother and foetus; wrongful death action allowed without mention of living even for moment).
Korman v. Hagen, 165 Minn. 320, 206 N.W. 650 (1925) (Allowing recovery without considering problem; injury forty-eight hours before birth and born alive).

MISSISSIPPI:
Rainey v. Horn, 221 Miss. 269, 72 So.2d 434 (1954) (Injury during delivery and stillborn; wrongful death action allowed).

MISSOURI:
Steggall v. Morris, 363 Mo. 1224, 258 S.W.2d 577 (1953) (Viable at time of injury and born alive; wrongful death action allowed).
Buel v. United Railways Co., 248 Mo. 126, 154 S.W. 71 (1913) (Action disallowed but overruled by Steggall case).

NEW HAMPSHIRE:
Poliquin v. MacDonal d, 135 A.2d 249 (N.H. 1957) (Viable at time of injury and stillborn; wrongful death action permitted, provided on remand find that viable).
Prescott v. Robinson, 74 N.H. 460, 69 Atl. 522 (1908) (Held mother had no cause of action for deformed child born alive; distinguished in Poliquin case).
TORT LIABILITY

Durivage v. Tufts, 94 N.H. 265, 51 A.2d 847 (1947) (No cause of action for unborn because no medical testimony showing causation; distinguished in Poliquin case).

New York:
Banas v. City of Syracuse, 204 Misc. 201, 125 N.Y.S.2d 490 (Sup. Ct. 1953), aff'd, 282 App. Div. 826, 122 N.Y.S.2d 532 (Right to sue recognized but must be brought against municipality within prescribed time; regardless of excuse or inability, cannot be maintained otherwise).

Ohio:
Jasinsky v. Potts, 153 Ohio St. 529, 92 N.E.2d 809 (1950) (Injured during eighth month and born alive; wrongful death action allowed).
Mays v. Weingarten, 82 N.E.2d 421 (Ohio App. 1943) (Action denied but surely overruled in Williams case).

Oregon:

Canada:
Montreal Tramways v. Leveille, [1933] 4 D.L.R. 337 (Viable when injured and born alive; based on civil code provision given broad interpretation).

2. Not Viable but Born Alive

Georgia:
Hornbuckle case, supra (Very broad language covering any time after conception; child actually six weeks along).

Maryland:
Damasiewicz v. Gorsuch, supra (Says viability bad test, but suggests when "comes alive" in mother, apparently meaning when "quick").

New York:
Kelly v. Gregory, supra (Injury during third month, court saying separability begins at conception).

3. Viable at Time of Injury but Born Dead

Delaware:
Worgan v. Greggo & Ferrara, Inc., supra (Language indicates administrator of viable infant can sue if does not survive the accident).
Kentucky:
Mitchell v. Couch, supra (Viable and born dead and wrongful death action allowed).

Minnesota:
Verkennes v. Corniea, supra (Viable and no mention of being alive after birth; wrongful death action allowed).

Mississippi:
Rainey v. Horn, supra (Death during delivery; wrongful death action allowed).

New Hampshire:
Poliquin v. MacDonald, supra (Viable and stillborn; wrongful death action allowed).

II. No Recovery Allowed

1. No Recovery in Any Case

Alabama:
Birmingham Baptist Hospital v. Branton, 218 Ala. 464, 118 So. 741 (1928) (No death act cause by father for child dying after birth from prenatal injuries, the damages to it, if not too remote, being recoverable by mother).
Stanford v. St. Louis-San Francisco Ry., 214 Ala. 611, 108 So. 566 (1926) (Lived for short time and action for damages denied to it, mother having right to any damages).
Snow v. Allen, 227 Ala. 615, 151 So. 468 (1933) (Court said if complaint is interpreted as claiming damages for injury to viable foetus then this item is recoverable by mother, though court reads complaint as for mental anguish for loss of child as well as injury to herself in delivery).

Massachusetts:
Dietrich v. Northampton, 138 Mass. 14 (1884) (Court assumes that born alive at fourth or fifth month of pregnancy and states that any damages to infant not too remote to be recovered at all can be recovered by mother).

Michigan:

New Jersey:
Stemmer v. Kline, 128 N.J.L. 455, 26 A.2d 489 (1942) (Viable and born alive, last X-ray treatment of mother only six months before birth).

Pennsylvania:


Contra: Von Elbe v. Studebaker-Packard Corp., 106 Pittsburgh Legal J. 219 (1958) (Born alive and recovery allowed regardless of inability, although whether non-viable at time of injury not stated.)

Rhode Island:


Texas:


Ireland:

Walker v. Great Northern Ry., 28 L.R. (Ir.) 69 (1891) (At least quick and born alive; court deciding that no duty owed by carrier to unborn child since the agents did not know of existence of foetus; a contract case so not deciding trespass case but difficulty of proof question noted by one judge).

2. No Recovery If Stillborn, but Reserving Question If Born Alive

Nebraska:

Drabbels v. Skelly Oil Co., 155 Neb. 17, 50 N.W.2d 229 (1951) (Viable but stillborn).

Oklahoma:

Howell v. Rushing, 261 P.2d 217 (Okla. 1953) (Simply following Drabbels case, supra, not Verkennes, supra; born dead).

South Carolina:

West v. McCoy, 105 S.E.2d 88 (Sup. Ct., S.C. 1958) (Quick but not viable at time of injury and stillborn. Reserving question if viable and born alive).

3. Recovery Denied If Not Viable, but Reserving Question If Viable When Injured

Wisconsin:

Lipps v. Milwaukee E. Ry. & L. Co., 164 Wis. 272, 159 N.W. 916 (1916) (Non-viable and court expressly reserves question where viable, suggesting there are “cogent reasons” for contrary rule in that case; born alive).

II. Actions Under Wrongful Death and Survival Statutes

1. Recovery Allowed Under One or Both When Born Alive

Connecticut:

Prates v. Sears, Roebuck & Co., supra (Recovery under both).

Illinois:

Aumann v. Faidy, supra (Apparently wrongful death only).

Louisiana:

Cooper v. Blanck, supra (Recovery under both).
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MISSOURI:
Steggall v. Morris, supra (Apparently wrongful death only).

NEW HAMPSHIRE:
Poliquin v. MacDonald, supra (Seems to be survival action).

OHIO:
Jasinsky v. Potts, supra (Apparently wrongful death only).

2. Recovery Permitted Even Though Stillborn

DELAWARE:
Worgan v. Greggo & Ferrara, Inc., (Language indicates administrator of viable infant can sue for damages even though stillborn).

KENTUCKY:
Mitchell v. Couch, supra (Wrongful death action permitted).

MINNESOTA:
Verkennes v. Corniea, supra (Wrongful death action permitted).

MISSISSIPPI:
Rainey v. Horn, supra (Death during delivery; wrongful death action allowed).

NEW HAMPSHIRE:
Poliquin v. MacDonald, supra (Viable and stillborn; wrongful death action permitted).

3. No Recovery Permitted Only Because Stillborn, Otherwise Allowed

CALIFORNIA:

NEW YORK:
In re Logan's Estate, 156 N.Y.S.2d 49 (Surr. Ct. 1956).

4. No Recovery When Stillborn in Jurisdictions Where No Decisions on Rights If Born Alive

NEBRASKA:
Drabbels v. Skelly Oil Co., supra (Viable but stillborn).

OKLAHOMA:
Howell v. Rushing, supra (Simply following Drabbels case, supra, not Verkennes case, supra; born dead).

SOUTH CAROLINA:
West v. McCoy, supra (Quick but not viable at time of injury but stillborn, expressly reserving question if viable and born alive).
c. Sterility and Related Injuries Involving Loss of Children

The type of radiation injury most closely related to genetic damage is impairment of procreative function caused by irradiation of the reproductive organs. Nevertheless, it is a quite separate injury for sterility injures the parent and not future generations. Exposure to radiation possibly will increase so greatly the chances of a deformed child being produced that the potential parent may decide as a matter of conscience to avoid propagating a line of defective descendants. He would feel deprived of procreation powers with the same effect as if he were actually sterile. In either case the question arises as to whether or not compensation should be awarded to a person who has been made sterile by radiation or as to whom the likelihood of genetic damage is so great that he should refrain from having children. The only actual case known to involve solely the claim of sterility caused by overexposure to radiation never was brought to court, for at about the time the suit was to be filed the claimant’s wife became pregnant, and the cause of action vanished because of the legal presumption. In general it is believed that sufficient whole body radiation to render a person permanently sterile will prove fatal. Radiation limited to the area of the reproductive organs might not prove fatal, yet might create permanent sterility. Temporary sterility may occur but damages seem so unsubstantial that consideration seems unwarranted.

While no cases exactly in point have been found, the nearest analogies indicate what the courts might do if sterility is proved to have been caused by radiation and to be of sufficient duration to constitute a serious impairment of the victim’s power to propagate. The discussion is limited to the inability to have children and is not meant to include the separate problem of impotency.  

(1) Decided Sterility Cases

Allowance of Damages for Sterility Caused by Ordinary Physical Injuries. There has been very little discussion of the problem of sterility which does not affect in any way the ability to have sexual intercourse but which does deprive the person, and his or her spouse in the ordinary case at least, of the ability to have children. One of the earliest cases found which deals directly with the question of whether the inability to have children is an element of damages in a tort action is Denver &

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Rio Grande Ry. v. Harris, where the plaintiff was injured by a gunshot of an employee of the railway in such circumstances that the attack was a tort. The court said:

One of the consequences of the wound received by the plaintiff at the hands of the defendant's servants was the loss of the power to have offspring—a loss resulting directly and proximately from the nature of the wound. Evidence of this fact was, therefore, admissible, although the declaration does not, in terms, specify such loss as one of the results of the wound. The court very properly instructed the jury that such impotency, if caused by the defendant's wrong, might be considered in estimating any compensatory damages to which the plaintiff might be found, under all the evidence, to be entitled.399

While the court here speaks in terms of impotency it is clear that it is referring also to the inability to have offspring as an element of damage. It is also true that even if this were the kind of assault which justifies punitive as well as compensatory damages, the punitive were separated from the compensatory. The loss of the power of the plaintiff to have offspring was dealt with by the court as part of the compensatory damages. Of course, the case involved what would be termed an intentional tort but the court did not mention this fact in discussing the question of whether or not the loss of the power to have offspring was an element in the damages to be allowed.

An equally distinct statement of the opposite position is found in Landwehr v. Barbas, arising in New York in 1934. Factually the case is different, but the court considered the same problem. The per curiam majority opinion was as follows:

The loss of opportunity of childbearing, due to physical injuries of a husband caused by the negligence of a third party, has never been recognized as giving a cause of action to a husband or wife against the wrongdoer. There are so many elements of doubt and conjecture in connection with the birth of children that it cannot be said that the wrong is the proximate cause of the loss. If the complaint be construed to mean that because of the injuries the husband has become sexually impotent, the wife has no cause of action.400

The dissent was a vigorous one and, after pointing out that the wife's action really was for the loss of consortium, continued:

We have recognized the right of the wife to recover compensation for the loss of her husband's attentions, caresses, af-

399 122 U.S. 597, 608, 7 S.Ct. 1286 (1887).
400 270 N.Y.S. 534, 535 (1934).
fection, exclusiveness; then why not for the loss of her right to motherhood within her marriage contract? Surely this loss transcends all the others. For its loss through the tort of another, she is entitled to such compensation as the law can afford.\textsuperscript{401}

The dissenting judge does not state what the "law can afford."

The only case found involving exposure to radiation which deals with the problem of sterility is \textit{McElroy v. Frost},\textsuperscript{402} discussed before. In that case the plaintiff was awarded damages in the amount of $29,125 because the negligence of the doctor in treating his scrotum with X-rays resulted in atrophy of the testicles, extensive dermatitis, and a condition which ultimately would develop into a fatal cancer. In describing the injury the court stated that "the effect of the treatment on the plaintiff would be to render him sterile," but said nothing else about damages for sterility, though upholding the verdict.

A large number of cases have dealt with the childbearing ability of women who have been in accidents resulting in injury to the pelvic region. While most of them do not speak in terms of sterility as such, the cases are analogous and pertinent to the extent that the damages allowed include an element for the loss of the ability to have children. An early Alabama case, \textit{Alabama Great Southern R. R. v. Hill}, contains an effective presentation of the argument in favor of allowing damage recovery for injury to a woman's ability to have children. The court said:

The objection to the testimony of Dr. Drennen, to the effect that plaintiff's injuries were of such character as that child-bearing would be thereby rendered perilous to life, is untenable. It may be that she might never have married, even had she not been injured; or that, marrying, she might have had no desire to bear children; or even that, desiring issue, she might not have had any, as is argued by counsel; but these considerations can exert no influence on the question. It is to be assumed that every physical endowment, function and capacity is of importance in the life of every man and woman, and that occasion will arise for the exercise of each and all of them. And to that extent to which any function is destroyed, or its discharge rendered painful or perilous by the wrongful infliction of personal injury, is the party complaining entitled to damages. We can, in other words, conceive of no physical injury, wrongfully inflicted, whether entailing pain only, or

\textsuperscript{401} \textit{Id.} at 536.

\textsuperscript{402} \textit{Supra} note 148.
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disfigurement, or incapacity, relative or absolute, to perform any of the functions of life, which may not be made the predicate for compensation in damages.\textsuperscript{403}

The injury to childbearing functions was only one element, there being other injuries as well as pain and suffering, but the court upheld a verdict for $8,000. If the language of the court is to be taken literally and applied generally it, of course, would support an action for tortious injury to either a man or woman which created an inability to have children.

In a number of other cases the loss or impairment of the ability of an injured woman to have children has been an important element in the damages allowed; for example: (1) $20,000 was allowed to a twenty year old wife whose head was creased slightly by the defendant's negligently fired bullet, resulting in shock, miscarriage, and later an operation causing sterility;\textsuperscript{404} (2) also $7,500 to a thirty-five year old wife whose negligently caused miscarriage prevented her from conceiving thereafter without a serious surgical operation to which the court said the woman need not subject herself in order to reduce damages, the court saying, "That the loss of fecundity is a proper element of damage in a personal injury case is undoubted. . . .";\textsuperscript{405} (3) $9,150 awarded a wife injured so as to require a serious operation with inability to do housework, the court saying, "The loss of the power of child bearing is certainly an element of damage to be taken into consideration by the jury, as much so as an injury to any other part of the human body, and the question as to whether or not the injury is the reasonable and probable consequence of the negligent act, is a question of fact for the jury";\textsuperscript{406} (4) awards of $2,500 and $7,500 to husband and wife, respectively, where the wife's genital organs were injured by tortiously caused miscarriage, the sum later being reduced to $1,500 and $4,000, respectively, because there was no evidence that the condition was permanent, the court clearly implying that if there were sufficient evidence the higher amounts would have been approved;\textsuperscript{407} (5) $17,500 for wife and $2,500 for husband mainly for sterility of wife caused by wrong blood check,\textsuperscript{408} and (6) $15,000 for the wife and $12,500 for the hus-

\textsuperscript{403} Alabama Great Southern R.R. v. Hill, 93 Ala. 514, 519, 9 So. 722 (1890).
\textsuperscript{404} Empire Oil & Refining Co. v. Fields, 188 Okla. 666, 112 P.2d 395 (1940).
\textsuperscript{405} Potts v. Guthrie, 282 Pa. 200, 203, 127 Atl. 605 (1925).
\textsuperscript{406} Normile v. Wheeling Traction Co., 57 W.Va. 132, 140-41, 49 S.E. 1030 (1905).
\textsuperscript{407} Geller v. Riccuci, 10 N.J. Misc. 239, 158 Atl. 754 (1932).
band where the baby was born dead from injuries caused by the defendant's negligence, the court saying:

There can be no doubt at all that there could be a recovery for a result of an accident which might cause sterility, or which might otherwise prevent parents from having children. If, as the result of actionable negligence, a husband or a wife should be so injured that either, in the future could not expect to produce children, surely this would be taken into consideration as an item of damage. It necessarily follows, we think, that when parents are actually expecting the arrival of a child, and they are deprived of the fruition of that great expectation by the actionable negligence of someone else, they may recover from the tortfeasor as an item of damage for that particular loss.\textsuperscript{409}

In another group of cases in which the ability to bear children was either impaired or made impossible, substantial recoveries up to as much as $85,000 were allowed, though in these cases the loss or impairment of the ability to bear children either was only mentioned or else the other damages were very serious,\textsuperscript{410} and probably would justify the total award without considering inability to have children. Such inability was a major item of damages in the previous group of cases.

On the basis of these cases which deal directly with the loss of ability to have children it seems clear that the majority of jurisdictions will allow recovery for sterility caused either to a man or a woman by exposure to radiation if the exposure is the result of defendant's negligence or if the doctrine of strict liability is applied to his operation.

One should not draw a conclusion on this question, however, without taking into account an equally clear majority view on a closely related question which leads to the opposite conclusion.

\textsuperscript{410} Suburban Transit Corp. v. Malone, 156 F.2d 422 (4th Cir. 1946) (plaintiff, 32 years old, was rendered incapable of bearing children in the ordinary manner and was awarded $33,125); Hider v. Gelbach, 135 F.2d 693 (4th Cir. 1943) (medical testimony was in conflict as to whether plaintiff could safely bear children, but other injuries were present and a verdict of $14,000 was not excessive); Shriver v. Silva, 65 Cal. App.2d 753, 151 P.2d 528 (1944) (3 year old plaintiff suffered, among other injuries, damage to pelvis impairing childbirth and $4,000 verdict was allowed to stand); Melton v. Fraering Brokerage Co., 31 So.2d 884 (La. App. 1947) (second and third degree burns made skin inelastic creating great difficulty in childbearing for unmarried 18 year old plaintiff; $12,000 verdict for suffering, disfigurement, and disability not excessive); Duvall v. T. W. A., 98 Cal. App.2d 106, 219 P.2d 463 (1950) (childbirth would threaten wife's life; husband awarded damages).
(2) Cases Denying Recovery for Mental Suffering from Loss of Child

As pointed out in discussing the damages that parents could recover for injuries to the embryo or foetus resulting in stillbirth, it was stated that almost all cases denied recovery of damages for the mental anguish and grief that the parent suffered after the birth of the child, even though mental anguish of the mother during pregnancy after the injury from fear of death or deformity in the unborn child was a permissible item. The language in an early Texas case states the argument against recovery found in most of the cases:

We do not think the death of the child before birth and the grief or sorrow occasioned thereby can be an element of damages in this character of suit. If it is made to appear from the testimony that Mrs. Cooper suffered more physical pain, mental anxiety and alarm on account of her own condition than she would have done if Dr. Keating had been in attendance upon her, and the failure to secure his services is shown to be due to the want of proper care on the part of defendant's servants [the telegraph company], whose duty it was to deliver the message, a fair and reasonable compensation should be allowed for such increased pain and mental suffering; but the death of the child, the bereavement of the parents and their grief for its loss can not be considered as an element of damages. Such damages are too remote; they are the result of a secondary cause, and ought not to be allowed to enter into a verdict. This is not an action under the statute by the parents for the death of a child, and if it were, injury to the feelings of the parents could not be a basis of recovery by them.

The Michigan court in Tunnicliffe v. Bay Cities Consol. Ry. also concluded that the trial court was wrong in allowing the jury to consider as an element of damages the loss of "the society, enjoyment, and prospective services of the child." The court said that the jury should not attempt to compensate for the sorrow and grieving of the mother. An opinion of the New York Court of Appeals in Butler v. Manhattan Ry. reached a similar conclusion in the same year and stated the objections to allowing such damages in a manner that has caused its opinion to be quoted more frequently than any other. The trial court had permitted the jury to consider damages resulting from depriving the plain-

411 Supra discussion in text at notes 351-58.
412 Western Union Tel. Co. v. Cooper, 71 Tex. 507, 511-12, 9 S.W. 598 (1888).
413 102 Mich. 624, 629, 61 N.W. 11 (1894).
The difficulty of finding any safe basis upon which to estimate the pecuniary damages in such cases, has been frequently adverted to by the courts. Whether the infant would have lived to an age capable of rendering service, and whether the continued life would be a pecuniary benefit or burden, and the numerous contingencies which may affect the value of the life make the ascertainment of such value by a jury, in a great degree, a matter of speculation and conjecture. But where the inquiry relates to the value of the life of a child cut off in infancy, there are some material facts capable of proof, which may be placed before the jury and which afford some aid in estimating the pecuniary loss suffered by parents or other relatives. The age and sex of the infant may be proved, its mental and physical condition, its bodily strength, and generally whether there was the apparent promise of a continued or useful life, or the contrary. The speculation which, in the present case, the jury were permitted to make had not even these safeguards, slight as they are. They were allowed to estimate the pecuniary interest which a husband had in the chance that an embryo, not yet quickened into life, would become a living child. The sex could not be known, and if born alive, the infant might have been destitute of some faculty, or so physically infirm as to have made it a helpless charge. There are no elements whatever upon which a jury could base any conclusion that a pecuniary injury had been suffered by the plaintiff from the loss of the unborn child, and this inquiry should have been excluded from the consideration of the jury as too remote and speculative to form an element in the recovery. Where a wrong has been done from which pecuniary injury has resulted, or where injury is the natural or probable result of a wrong, the injured party is not remediless, although the extent of the injury is not capable of precise proof. The jury in such a case may fix the damages within reasonable limits, as best they may. Actions for defamation or involving recovery for pain or suffering are examples. But where damages claimed are neither the probable result of the wrong nor capable of proof, they cannot be awarded by the jury. It is not in the interest of justice to extend the field of speculation in jury trials beyond its present limits, and to sustain the ruling in this case would go beyond what has been hitherto sanctioned by the courts.  

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A Missouri appeals court in *Finer v. Nichols* stated the matter somewhat differently but also emphasized the speculative character of such damages.

But though a recovery may be had by the mother to the extent mentioned, the loss of the offspring itself is not to be considered as an injury to her. As the basis of a recovery on the part of the parent for the death of a child by the negligent act of another is the value of the service of the child to the parent during minority, a recovery for the loss of a prospective offspring, it is said, would extend the field of damage into the realm of mere possibility. Of course, the loss of the anticipated society of the prospective child and mere matters of sentiment which attend such misfortunes are too remote for consideration by the courts as a basis for monetary compensation, though the law be humane in its policy and purpose.411

While there are some cases which seem to indicate a contrary result,416 the cases generally still follow the views expressed in the excerpts just set out.417 Most of these cases, however, were decided before 1940 and the law has been changing generally on the question of damages and particularly as to mental anguish. In 1955 the Washington Supreme Court upheld as not erroneous the instruction, “which included, as a factor of damages, the continuing worry and anxiety of respondent wife up to the time of the trial.” 418 contrary to the general rule that mental anguish of the mother because of the condition of the child after birth is not compensable, even though anxiety after injury but before birth is.419 McCormick states in his treatise420 that the general rule (in 1935) is to deny recovery for loss of the child’s companionship or mental anguish suffered by the parent, though he indicates that Nebraska421 and Wyoming422 apparently make the “subtle refinement” of allowing only the “pecuniary loss” sustained by the parents

416 Cooper v. Blanck, 39 So.2d (La. App. 1923) and Snow v. Allen, 227 Ala. 615, 151 So. 468 (1933), supra Table of Cases after prenatal section.
420 McCormick, Damages 352 (1935) [hereinafter cited as McCormick].
422 Coliseum Motor Co. v. Hester, 43 Wyo. 298, 3 P.2d 105 (1931).
because of loss of the child's companionship, not for mental anguish itself.

When the courts hold, as almost all do, that the sorrow from loss of the prospective child is too remote they are holding that this is an item of damages for which our legal system, as a matter of policy, should not allow recovery. The nature of the loss, however, is exactly the same as in cases where a person loses the physical ability to procreate children (sterility), yet recovery is allowed in the latter situation. The fact that there has been other physical injury to the mother in the sterility cases is not a satisfactory distinction because typically there also is other physical injury to the mother when a miscarriage results in loss of a prospective child. If in one case social policy calls for denying recovery to a parent who cannot have the child he had hoped for, it does in the other case also. Likewise if the policy dictates allowing recovery in one, it does in the other.

(3) Claims Under Death Statutes for Grief, Loss of Society, and Comfort

In analyzing the liability that would or should be imposed for sterility, account also must be taken of another line of cases dealing with a very closely related problem where considerably more authority can be found allowing recovery for loss of the child's society and companionship. These cases arise under death statutes of one kind or another where the decedent is not a minor. The great weight of authority apparently holds that, under death statutes, the sentimental value of the deceased to the next of kin, the grief or mental anguish of the statutory beneficiaries, or the loss of comfort, society, and protection are not proper items to be considered in assessing damages, twenty-seven state supreme courts having decided cases denying recovery for one or more of these items. At the same time, in Virginia, West Virginia, Louisiana, and Florida parents are allowed to recover for their mental pain and suffering resulting from the death of the minor. In Florida recovery for such damages is specifically authorized by statute.

Most statutes say nothing about what losses caused by the death are compensable to next of kin, but most courts limit recovery to pecuniary

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NEGLIGENCE

losses such as of prospective support. Loss of companionship—the only loss caused by sterility—is not compensable. The most significant cases under the various death statutes are those in several jurisdictions which have allowed the parents to recover for the loss of “comfort, society, and protection.” Some of the very jurisdictions that do not allow recovery for sentimental value of the decedent to the next of kin, do allow it for “comfort, society, and protection.” The cases, however, do not make it clear just what part protection plays in recovery or what the relationship is to the loss of services and other financial benefits that might be derived from a child. At least seven states have permitted recovery for loss of “comfort, society, and protection.” All of these cases are based upon the rights of beneficiaries under some type of death statute, typically wrongful death statutes patterned after the one adopted in England. The statutory language is such as to leave it to the court to decide what type of losses should be considered compensable.

The decision of the Supreme Court of Utah in the relatively recent case of Van Cleave v. Lynch summarizes rather well the position taken by those courts which have allowed damages under wrongful death statutes. In approving an instruction of the trial court to the jury that “you should also take into consideration the financial loss to the plaintiff of the boy’s comfort, society and companionship,” the Supreme Court said:

The theory that a parent should receive compensation only for actual loss of earnings of a child killed by the negligent acts of another, has not only been obliterated by time and social changes, but by sound reasoning. Since a right of action is granted for wrongful death, if mere earning capacity were the criterion for measuring the amount of recovery, then in the case of the wrongful death of a hopelessly crippled child through the negligence of a defendant it could be claimed with some semblance of reason that no recovery at all should be allowed, because the parent bringing the suit would be better off financially as a result of the death by being relieved of the obligation to support one who would always be financially dependent. While children still frequently contribute to the support of their families, their status in society cannot be measured merely in terms of what they are able to do for

425 Id. at 498-500. California, Hawaii, Idaho, Louisiana, Mississippi, Utah, and Virginia.
426 Lord Campbell’s Act, Fatal Accidents Act of 1846, 9 & 10 Vict. c. 93. For a history of this type of statute see Prosser 709-10.
427 109 Utah 149, 166 P.2d 244 (1946).
the financial aid of their parents. In many cases the cost of rearing children far exceeds all possible earning capacity. Nevertheless children are sought, not for their financial possibilities, but for love, companionship and happiness which transcend all financial considerations.

In the final analysis there is no actual quid pro quo for wrongful death. The loss of a loved one cannot be measured with any degree of exactness, although the right of action granted for wrongful death provides indemnity only in terms of money. While earning capacity in some cases might be an important element, it is not the only element; and as a relative matter, it may shrink in importance as the age of the person is considered either by reason of greatly advanced age or by childhood when earning capacity is absent. While the instruction given in this case relative to measure of damages is not a model instruction and does not entirely accord with our views, we conclude that there is no reversible error.428

The court in no way emphasizes the language "financial loss" found in the trial court's instruction so one is uncertain as to whether this is an attempt to attach a monetary value to the comfort, protection, and sense of security which parents might feel in contemplating the prospect of a child, once he is of age, taking care of them in their old age or in an emergency, or whether it is simply an attempt to equate in monetary terms the sentimental value of the companionship of the children.429 One gets the feeling in reading the Utah opinion, however, that it is the latter that is being compensated. A $10,000 general and $345 special damages award was upheld although the child was only six years old when killed.

The jurisdiction in which there has been the greatest development in this type of recovery and the rules to govern it is California.430 Attempts by the California court to place some limit on the recovery for this element of damages have not prevented substantial verdicts for this item alone.431

Jurisdictions which do not allow recovery for prenatal injuries because there is no legally recognized injury of course cut off any rights

428 Id. at 161-62. (Emphasis added.)
429 Supra notes 421, 422.
431 Where deceased was age 5, $18,500 was awarded in Tyson v. Romey, 88 Cal. App.2d 752, 199 P.2d 721 (1948); awards of $5,000 each were made where deceased were 8 months and 64 years old, respectively, United States v. Guyer, 218 F.2d 266, 269 (4th Cir. 1954); see also Wytupeck v. City of Camden, 25 N.J. 850, 136 A.2d 887 (1957). Walker 582-85, 636, indicates only very moderate awards are given for very young children. See also id. at 591-92.
of personal representatives under survival statutes. They also deny recovery to parents or other statutory beneficiaries under wrongful death statutes. The same is true in Nebraska, Oklahoma, and Wisconsin, where courts have held that there can be no recovery by parents under a wrongful death statute when the foetus is born dead. If recovery should be allowed in these three states when the injured foetus is born alive, perhaps a survival act suit would be permitted if the child died before trial. In those jurisdictions where a cause of action has been allowed under the wrongful death statute where the foetus was born dead, the only question raised was whether or not a cause of action existed, and no indication was given of what elements would enter into the recovery if causation were proved. No indication is given as to the permissibility of a survival action.

Some obvious distinctions between the kinds of rights discussed above can be made. It seems quite unrealistic to expect any court to extend any concept of person under the wrongful death statutes to cover the genes in the potential mother or father and the organs in each which produce the gene-carrying material, so there can be no recovery in the name of the child not yet conceived. The theory of a survival type of death statute, that the wrongdoer pay the next of kin what he would have had to pay the deceased had he lived, is different from the right of the parents to recover for the mental anguish or perhaps more importantly the loss of society and companionship of the child. Nevertheless, in the usual case, the next of kin are going to be the parents or other very close relatives. Therefore, anything above the loss of prospective support from the child (which in the case of children under ten surely is minimal in the light of the cost of raising children under modern economic conditions) is really going to be granted on the basis of loss of society and companionship.

If this is true, then the law ought not to reach a different result when the action is brought under a death statute than when it is brought by the parents themselves to recover for the sentimental loss of the society or companionship of the child. Recovery ought to be allowed or denied for this kind of sentimental loss on the basis of social policy, not on the

482 See Table of Cases supra at end of prenatal injury section. Some courts clearly decided this since the actions were based on such statutes where the child died before suit was brought. Others denying an action to a surviving injured child surely would reach the same conclusion.

483 Ibid.

484 Minnesota, Mississippi, and Kentucky. See Table of Cases supra at end of prenatal injury section. For a general discussion of survival and wrongful death statutes and the theories underlying them see Prosser 705-19.
basis of whether or not we can find a separate legal entity in whose name the cause of action can be brought. When an older child dies, recovery may be premised on a real pecuniary loss in the form of expected financial help, but when a small child dies the recovery in reality is for sentimental loss. It is submitted that loss for sterility, aside from pain and suffering attendant on the physical injury causing sterility, in reality is for loss of a prospective child.

(4) Some Suggestions for Revision of the Law of Damages

As suggested before,\(^4\) the law of damages arising from death is badly in need of an over-all revision. The treatment of inability to have children and loss of children is simply another example of how artificial, if not downright absurd, distinctions have become in this area.\(^4\) If parents are permitted to recover for loss of society and companionship, as clearly they are in some of the cases discussed above, then recovery should be allowed when the capacity to have children has been impaired through the negligence of another. On the other hand, if recovery is to be denied in one case, so also should it be denied in the other.

One obvious distinction can be made, of course; in cases of sterility there has been an actual impact on the body of the plaintiff parent, clearly physical in nature even if caused by radiation. This is not true, however, where the loss by way of sentimental value is because of the post-natal death of a child, or even while in the mother's womb so far as the father is concerned. This is also not true for the mother when the child is killed after birth. This distinction might be used by courts in loss of children actions, as it is in cases where mental anguish is allowed where there is physical impact on the plaintiff but not where this is absent. In sterility cases caused by radiation there will be impact, but this is not always true in other cases of inability to have children. In any event it would seem to be an artificial and unrealistic distinction. If anything, parental suffering from loss of society and companionship of an existing child is more realistic and provable than much of the mental anguish for which recovery is allowed in cases where there has been a slight impact.\(^4\) The pain and suffering and loss of society, companionship, and comfort of the child is surely much less remote in these circumstances than in the case where a prospective parent has been made sterile. Yet, if anything, the existing cases would seem to allow recov-

\(^4\) See text discussion beginning at note 382. See also Prosser 719.
\(^4\) See discussion of psychological injuries *infra* at note 594.
ery for sterility but not for the loss of society, companionship, and comfort of the child. If one takes an over-all view of the damage problem, it would seem to make more sense if the law were just the opposite.

One possible additional reason for allowing damages in sterility cases, which is not present where the loss is of a child actually conceived or already born, is the loss of capacity to reproduce. Even this distinction is not a tenable one in most cases. Where the parent is beyond the age of reproduction, which might be the case so far as the mother is concerned, the loss of the child is in effect deprivation of the right to have one's own children. In addition, it is arguable that so far as the companionship of children is concerned, the loss is exactly the same, if not more real, when it concerns a child already born rather than one possibly to be conceived in the future. The only additional damage to the plaintiff in the sterility case is the possibility that this will make the person undesirable as a potential mate in marriage. The possibility of adoption may mitigate even this damage. It sometimes is difficult to arrange adoption legally, of course, but it also may be very difficult to conceive and give birth to a child, not to mention keeping him alive and healthy. Certainly, if any damages are to be allowed at all for sterility they ought to be limited to the factor of decrease in marriage potential and not for loss of potential companionship and comfort of children, unless the law also is ready to grant parents bereaved by the death of an existing child the same kind of recovery.

Whether to allow recovery for loss of companionship of a child, existing or potential, raises a very serious social policy question of whether our society can afford to absorb the economic burden of a loss not only speculative but little assuaged by money. A new hat or a new car seldom has any real effect on as serious an emotional shock as is involved in the loss of children. If recovery is to be allowed for this loss it ought to be allowed in all situations which actually raise the same considerations, and the suggestion of placing some kind of maximum limit, at a very low level, on this element of damages would not be amiss. The lawyer, in predicting what the courts and juries will do in actual cases, however, must not lose sight of the fact that the right to

438 See Carter, "Assessment of Damages for Personal Injuries or Death in the Courts of Common-law Provinces," 32 Can. Bar Rev. 713, 725 (1954), pointing out when this is an allowable item. Such recovery has been allowed in Scotland, Walker 601, citing cases. Such damages were denied in City of Amarillo v. Rust, 45 S.W.2d 285, 290 (Tex. Civ. App. 1932) on the particular facts, 12 year old girl and only scars, but there was a clear implication that damages might be awarded where impairment is clearer.

439 See Plant, supra note 381.
have children of one's own blood is an interest highly regarded in our society and loss of this interest constitutes an invasion of the body of the plaintiff parent or potential parent. It therefore would not be surprising if courts and juries continued to allow the incapacity to have children, quite separate from the physical damage and pain and suffering involved in the accident causing sterility, as a recoverable item of damage in tort cases and at the same time continue to deny recovery to parents for their mental sufferings, including loss of companionship, where the tort has caused death of an already born child. It is submitted, however, that pecuniary recovery for the death of a child does not fit very comfortably into a compensatory theory of damages.

There should be a considerable increase in such cases with the expanded use of radiation. Exposure of potential parents undoubtedly will occur in such amounts that thereafter in all good conscience they ought to refrain from having children because of the real danger of genetic mutations. There is the additional possibility of sterility itself being caused directly by radiation. Here again radiation cases will give the law an opportunity to take a more comprehensive, over-all look at the varied and conflicting rules concerning damages which have developed in separate types of cases, all in splendid isolation from each other and without adequate realization on the part of the legal profession of the similarity, if not complete identity, of the social factors underlying the various situations. Perhaps the explanation for the lack of cases dealing with the separate problem of sterility is that lawyers have just assumed, as the Alabama court did,440 that since the power to have children is a normal attribute of human beings, any loss of this power is a compensable injury. This uncritical assumptive type of reasoning is at least partly responsible for the unsatisfactory state of present rules as to damages. A beginning should be made in working out more logically consistent patterns of damage recovery than exist at present. The relationship between sterility, the rights of the parents for loss of children, and causes of action under the death statutes is one of the areas where much more satisfactory analysis needs to be made of the underlying social policy questions involved in defining damages. It fits into the whole pattern of the growing trend of recovery, sometimes in very large amounts, for damages for mental disturbance. Any solutions to problems here suggested should not be worked out in isolation from these other more general problems of mental disturbance. We make the above suggestions as a starting point toward such a study.

440 Supra note 403.
d. Increased Susceptibility to Disease

One of the attributes of a healthy human body is a considerable power to resist disease, though this ability differs among individuals and even within the same individual from time to time under varying circumstances. One of the possible results of overexposure to radiation is a reduction in the ability to resist diseases.\footnote{441} Actually, there are two aspects of increased susceptibility to disease, at least in radiation cases.

One is the increased susceptibility to a specific disease such as leukemia, cataract of the eye, or cancer of the bone. As to this type of injury the normal rules of damages provide some answers which are sometimes adequate where the injury or disease appears within the statute of limitations and before trial. Very little has been said even in court opinions, however, about whether or not an increased risk that a specific injury will develop at a future date is a compensable item of damages. The question is, does a present predisposition to a particular disease or injury warrant compensation, and if so to what extent?

The second aspect is even more difficult to handle under existing cases; this is whether or not an increase in general susceptibility to all diseases is a compensable item of damages in a tort case. It may prove to be true that as a person accumulates radiation exposure he increases his susceptibility to disease generally by lowering his normal resistance. This latter aspect has escaped the attention of legal writers and court opinions have ignored it almost as completely, probably because it is very unlikely in most cases. It will be present to some degree, however, in most cases involving overexposure to radiation. Some possibly analogous cases and concepts give a little indication of what the courts will do with these two problems when they arise. As is so often the case in tort litigation, damage questions are lumped together into one over-all judgment. Even where individual items entering into the total judgment are enumerated, there usually is no separate treatment by the court of whether the future possibilities are compensable because the court is satisfied that the existing injuries, where serious, justify the verdict and do not call for overruling the judgment as excessive.

(1) Non-Radiation Cases

(a) Cases Involving Recurrence of Existing Injury

Some courts in non-radiation injury cases have considered the problem of a possible subsequent disease or injury not manifested at the

\footnote{441} See discussion \textit{infra} at notes 1100-1103.
time of the trial. For example, in *Mooney v. McCarthy*, while the court reversed the judgment for the plaintiff because of a problem concerning apportionment between two defendants, it seems to have allowed, as an item of damages, the possibility of a later recurrence of tuberculosis. The court said:

The evidence regarding her injuries was such that defendant requested the court to charge the jury, in substance, that there was not sufficient evidence upon which they could find that there would be a recurrence of the tubercular trouble and, therefore, if their verdict was for plaintiff, they should not consider such condition as an element of damages, and to its failure so to do excepted. . . .

[The doctor testified that] . . . he had not yet "any positive opinion that it (the disease) has begun to be active, but more a very definite fear that it may begin"; but he testified that such fear was based on his judgment and experience. He testified, too, on cross-examination, that he had no definite evidence that a pulmonary change had taken place, and that whether or not one would was entirely speculation. But in answer to the next question, which was: "Q. It is merely a matter of speculation, she may start getting better any time or start getting worse any time, that is about the way it is?" he modified his previous answer thus: "I would say more a matter of judgment than just a rank speculation." . . .

It thus appears that while some of the doctor's testimony, standing alone, supports defendant's claim, taken as a whole it does not. Although he did not state positively that it was his judgment that there would be a recurrence of the disease, the evidence clearly justified the inference that such was his belief. . . . Undoubtedly the verdict included damages for future disability due to a recurrence of the tubercular condition.443

Here the court approves as one item of damages susceptibility to a future specific disease.

Again a lower California court in 1957 upheld a verdict of $2,500 for injuries in the nature of a severe sprain or strain of the muscles in the plaintiff's shoulder and neck sustained when she fell in defendant's building. The court included as one justification for affirmance the statement: "[S]he would have intermittent episodes of muscle trouble for a long time with the probability of its being permanent." 444 Here again, as in the *Mooney* case, the expert testimony as to the likelihood

443 Id. at 428-29.
of future injury was based on a judgment concerning a physical condition already existing and the possible future injury would be a continuation or recurrence of this same specific injury.

In upholding a $2,500 verdict for the plaintiff the Nebraska court in another recent case said:

There is evidence that plaintiff suffered a severe cerebral concussion of the brain and that pain, suffering, and disability could normally first manifest itself within a period of years after the accident. There is evidence that plaintiff had an abnormal blinking or twitching of one eye, which the medical witnesses could not rule out as not being caused by the concussion. The evidence shows that plaintiff not only might show manifestations of damage to his nervous system for a period of years in the future, but there was evidence that he in fact was manifesting such damage at the time of the trial.\(^445\)

This could be treated as allowing evidence of only increased future severity of a presently manifested injury.

The Minnesota court in a very recent case also had occasion to consider future injuries not yet manifested and upheld them as an item of damage in the following language:

While there was no testimony that she was permanently injured, there was substantial opinion evidence to the effect that a disc injury such as she sustained would in all likelihood cause future difficulties and pain; and that, because of the weakened condition which usually remains in the area where such an injury occurs, there was a strong possibility of its recurrence here. . . . Based on such testimony, the trial court charged the jury that plaintiff might recover “for any future pain and suffering * * * which you have found is reasonably certain she will endure in the future.” While Dr. Gingold conceded that there was no present indication that plaintiff would suffer a recurrence of the disc injury, his opinion that there was a strong likelihood of recurrence, based upon the history of such cases generally, as well as his testimony with reference to the present arthritic condition of plaintiff, would seem sufficient to justify the instruction complained of.

. . . While he stated on cross-examination that in any particular case, including plaintiff’s, he could not say with positive certainty that there would be such a recurrence unless there was an opportunity for closer examination of the injury through surgery, nevertheless it is clear from the sum total

of his testimony that he was reasonably certain there would be a recurrence here.\textsuperscript{448}

Here a rather specific future injury could be treated by the jury as one item of recovery. Again, the injury was a recurrent one, not a different one. The damages were awarded, however, for injuries that would manifest themselves later; recovery was allowed for likelihood or increased susceptibility.

\textbf{(b) Cases Involving Injury of a Type Different from Current Injury}

In a Nebraska case, \textit{Schwarting v. Ogram},\textsuperscript{447} a $15,000 judgment was upheld as not excessive and one of the items of damages was a prediction of a future injury that had not yet become apparent but which might result from injuries to the head. The court did not discuss the question of the validity of including this future development but did point out in justifying the verdict:

\ldots [I]t was testified that, as a result of these conditions, traumatic epilepsy will develop, all as a result of this accident, and that this condition is permanent and cannot be cured; that the trouble with her ear is due to a change in the brain tissues that has come from a contraction of the scar formed at the basal skull fracture. One physician testified that she is progressing towards traumatic insanity.\textsuperscript{448}

This is approval of a specific future injury, not increased susceptibility to diseases generally. The future injury was only one item of damages among several.

In a case involving a severe burn to a metal worker through a fellow worker's negligence, the North Carolina court said:

It is assigned as error that the court permitted the physician to state that the character of the plaintiff's wound was such that a sarcoma, or eating cancer, was liable to ensue. We recognize the general rule that an expert physician testifying to the consequences of a personal injury should be confined to probable consequences, but in this instance we do not think the physician indulged in pure speculation. \ldots The word "liable" is defined as "exposed to a certain contingency more or less probable." \ldots The word was used by the witness in the sense of probable, and was doubtless so understood by the jury.\textsuperscript{449}

\textsuperscript{448} Derrick v. St. Paul City Ry., 89 N.W.2d 629, 633-34 (Minn. 1958).
\textsuperscript{447} 123 Neb. 76, 242 N.W. 273 (1932).
\textsuperscript{448} Id. at 87.
\textsuperscript{449} Alley v. Charlotte Pipe & Foundry Co., 159 N.C. 327, 330, 74 S.E. 885 (1912).
Here a specific future disease was one of several items of damage, but the evidence was allowed and probably influenced the jury somewhat in determining the amount of the award.

In both the Nebraska and North Carolina cases the holdings go further than the previous ones in that the future injury was not just a recurrence of an existing injury but rather was of a new kind.

(2) Radiation Cases

In two of the cases discussed in connection with breach of the standard of conduct the courts apparently included as an item of damage the future possibility of cancer occurring as the result of X-ray injury. In the case of *Gross v. Robinson*\(^{450}\) the Missouri appeals court said that the testimony of the expert witness that an X-ray burn "... would probably become malignant," was properly considered. Likewise in *McElroy v. Frost*\(^{451}\) the supreme court approved evidence indicating that the X-ray burns of the plaintiff's testicles ultimately would develop into a cancer of a fatal type.

One other case involving radiation burns has dealt with the possibility of a future disease. In *Coover v. Painless Parker, Dentist*\(^{452}\) the California appellate court upheld the verdict of $10,250 for damages resulting from X-ray burns caused by overexposure during dental X-ray photography. The defendant contended that the amount was excessive among other reasons because the evidence admitted as to the possibility of future development of cancer was wholly conjectural. The court said:

While the actual condition of cancer may have been conjectural and uncertain, the record contains positive evidence that a condition actually exists which makes this dread disease much more likely. We think this predisposition in itself is some damage, and when caused by the wrongful act of another it is an interference with the normal and natural conditions and rights of the other, which must be held to be a real and not a fanciful element of damage. The necessity of constantly watching and guarding against cancer, as testified to by the physician, is an obligation and a burden that the defendant had no right to inflict upon the plaintiff.\(^{453}\)

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\(^{450}\) *Supra* note 159 at 121.

\(^{451}\) *Supra* note 148.

\(^{452}\) 105 Cal. App. 110, 286 Pac. 1048 (1930).

\(^{453}\) *Id.* at 115. (Emphasis added.) See also *O'Connell v. Westinghouse X-Ray Co.*, 16 N.Y.S.2d 54 (1939), reversed on contributory negligence grounds, 24 N.Y.S.2d 268 (1940), reversed and remanded for trial 288 N.Y. 486 (1942).
This is the only radiation case found which seems clearly to have considered the justification for allowing recovery for predisposition only and then allowed recovery, because the courts in the Gross and McElroy cases merely mention the evidence of predisposition and approve its admission without discussion. In each case the amount awarded apparently was fully justified by other very serious injuries.

In all three cases the future injury was a specific one, cancer, but in a real sense it was not a recurrence of an existing condition. On the other hand, it was a development from an existing compensable injury, the X-ray burn.

In none of the cases discussed did the court consider how probable or certain a future injury must be to justify recovery.

(3) The Standard of Proof Required to Prove Future Injury

The doctor’s testimony in the Coover case included the following answer to a question as to whether or not Mrs. Coover might be in danger of a cancerous growth:

I do not say that she has a cancerous growth, she does not, but a cancer may develop on this area—it is common. . . . On this senile skin not infrequently develops new growths, little neoplasm, warty growths, and from these warty growths, the carcinoma develops; sometimes that is a year, sometimes it is two years—sometimes it is three or four years before they develop.454

The doctor was allowed to testify as to a condition that only “may develop” but the opinion does not indicate that the court was giving serious consideration to how probable the occurrence of the future injury must be.

Two other cases involving future injuries give some indication of how certain proof of the future injury must be. One is Light v. Foreman,455 decided rather recently in the sixth federal circuit. The court upheld a $51,500 verdict against an objection that the plaintiff doctor had testified to the “loss of earning ability at some time in the future when appellee would become unable to continue his present employment because of injury to the first sacral nerve root, which would probably become worse over a period of years and cause complete inability to work.” Against defendant’s objection that such damages must be

454 Id. at 113-14. (Emphasis added.)
455 238 F.2d 817 (6th Cir. 1956).
shown with "reasonable certainty" the court said that the witness's testimony could not be treated as a conjecture, and "The fact that it dealt with future probabilities does not make it incompetent." 456 The court's ruling allows evidence of a specific future injury disability to be considered by the jury.

The Louisiana appeal court in Guillory v. Lemoine apparently approved the lower court's allowing of about $2,500 of the verdict because of the severe fracture of the skull which "might [emphasis added] cause trouble in the future." The expenses had been $1,911 and the award of $2,500 was considered sufficient by the trial court since it felt that "there is very little, if any, permanent disability." 457 Perhaps the court is approving reducing the amount of recovery proportionate to the degree of certainty that the injury will occur.

A much less liberal attitude in a non-radiation case was expressed by the Vermont court in Howley v. Kantor, 458 where the plaintiff's witness, a doctor, testified that an abnormal growth in plaintiff's left breast was caused by the blow and stated that in his judgment, taking the situation as found on physical examination, it would "run about eighty per cent cancerous." The doctor also testified that "as it stands it may be one as well as the other," and "what it is at this stage is pure speculation." The court held that it was erroneous to refuse the defendant's request to charge the jury that the evidence was not sufficient to justify a finding that cancer existed and that they should not consider it as an element of damages.

To support such a claim, the evidence must be of such a character that the jury can find that there is a reasonable certainty or a reasonable probability that the apprehended future consequences will ensue from the original injury. Consequences which are contingent, speculative, or merely possible are not entitled to consideration in ascertaining the damages.

The record before us does not disclose any opinion of the medical witness as to the probable future development and result of the plaintiff's breast condition. His answer, "run about eighty per cent. cancerous," does not have the effect claimed for it. The witness did not say that in his opinion the chances are eighty per cent. that the growth is cancerous, but, rather, as is clearly indicated, that from his experience and the history of other cases injury to the breast producing tumor developed about eighty per cent. cancerous. 459

456 Id. at 818. The two cases cited for the latter proposition do not really support the conclusion.
457 87 So.2d 798, 802 (La. App. 1956).
458 105 Vt. 128, 163 Atl. 628 (1933).
459 Id. at 133.
This clearly is denying recovery for the predisposition to cancer, contrary to the suggestion in the Coover case. It seems to be placing the emphasis upon whether or not the cancerous condition actually exists at the time of trial.

The test apparently applied by the courts in these few decided cases is similar to that applied in determining whether to allow the jury to consider future pain and suffering as an element of damages for physical injury. There has been a considerable difference of opinion among courts in the United States as to whether, in considering future pain and suffering, the test should be one of "reasonable certainty" or "reasonable probability," there being a thousand opinions dealing with the point.\(^{460}\) It surely is fair to question whether the difference between reasonably certain and reasonably probable has any significance for a jury, the distinction being rather subtle at best. The application of this same test in predicting future injuries (not pain and suffering) is well illustrated in a recent New Jersey opinion in Budden v. Goldstein.\(^{461}\) The case involved a hernia, negligently caused by the defendant, and the expert testimony included speculation as to what possibly might happen when a person had a hernia, some of the possibilities, though not likely, being fairly serious. The court felt that the testimony allowed too much speculation.

In the admeasurement of damages, it is well known that no recovery can be allowed for possible future consequences of an injury inflicted by a wrongdoer. . . . In order for suggested future results to be includible as an element of damage, it must appear that they are reasonably certain or reasonably probable to follow. . . .

The A. L. R. annotation, supra, indicates that many of the authorities throughout the country use the expression "reasonably certain" or "reasonable certainty" as the test and consider "reasonably probable" or "reasonable probability" inadequate and erroneous; others accept the latter statement. Our cases do not seem to have dealt specifically with the question of whether the two have the same significance in relation to quantum of proof, and so may be used interchangeably. It seems to us that in a resolution of the conflicting interests involved, reasonable probability is the just yardstick to be ap-

\(^{460}\) Annot., 81 A.L.R. 423 (1932), a long annotation listing at least 1,000 cases on the problem, not all of which have been read by the present authors. For a recent case on pain and suffering, see Denco Bus Lines v. Hargis, 204 Okla. 339, 229 P.2d 560 (1951), where the court said it could award for such future pain and suffering "as may be established by the evidence." (at 342).

plied. Basically, our view comes down to this: a consequence of an injury which is possible, which may possibly ensue, is a risk which the injured person must bear because the law cannot be administered so as to do reasonably efficient justice if conjecture and speculation are to be used as a measure of damages. On the other hand, a consequence which stands on the plane of reasonable probability, although it is not certain to occur, may be considered in the evaluation of the damage claim against the defendant. In this way, to the extent that men can achieve justice through general rules, a just balance of the warring interests is accomplished.\footnote{Id. at 346-47.}

A similar result was reached in a recent Wisconsin case where the doctor testified, "All I can say is there is a possibility." The court said that to justify the assessment of damages for future permanent disability "it must appear that such continued disability is reasonably certain to result from the injury complained of."\footnote{Kowalke v. Farmers Mutual Automobile Ins., 88 N.W.2d 747, 756 (Wis. 1958).}

(4) Conclusions

(a) When a Specific Injury Is Feared

Although few decisions have dealt specifically with predisposition caused by radiation, it may be predicted with some assurance that, where a specific type of injury such as leukemia, cataract, or bone cancer can be predicted as resulting from a specific exposure to radiation, there will be recovery, at least if there is expert testimony indicating either a reasonable certainty or a reasonable probability of occurrence. The existence of other present compensable injuries should not be required although none of the cases found involved only future injury. There would seem to be no justification for applying the stricter standard of proof that is generally applied to the mental disturbance or mental anguish cases where the courts have been so concerned with the possibility of fraudulent claims. If the future injury is of a physical rather than mental nature, and likelihood of occurrence is proved by competent medical testimony as to probability, the usual rule of "more probable than not," used in negligence cases as to present injuries, should apply. If reasonable probability, or perhaps the stricter test of reasonable certainty, indicates that something higher than eighty percent certainty is demanded (as apparently required in Vermont),\footnote{See Howley v. Kantor, supra note 458.} this puts an unreasonable burden on the plaintiff. Unless the law is to adopt
some insurance scheme whereby the defendant is charged in accordance with the probability he has created, even if it is less than fifty per cent, as is suggested in the discussion of proof of causation, then in the case of potential future injuries it might be better to adopt simply the preponderance of probability as the test.

The one other possibility is to adopt the idea suggested in the Coover case, that damages could be awarded for an existing predisposition to a future injury, the assumption being that the amount of damages would be greater or less as the predisposition to the future disease or injury is greater or less. The difficulty with all of the existing tests is that they inevitably either lead to windfalls for those plaintiffs who are awarded damages but do not develop the injury or disease later on, or unfairly penalize other plaintiffs where the likelihood of future injuries is not great but the injury actually does develop. This is inherent in our present system of damages, where recovery is based on an all-or-nothing philosophy, and a line must be drawn somewhere between one hundred per cent certainty and one chance in a billion.

(b) When Future Injury Is Only Increased Susceptibility to Disease Generally

All of the cases discussed above deal with the possibility of a specific injury occurring in the future. They in no way indicate whether recovery would or should be allowed where the possibility is not the development of some specific injury or disease but is simply the reduction of the ability of the body to fight off diseases in general, whether it be the common cold, pneumonia, or any other disease, common or rare, communicable or not. The Coover case is not authority for recovery for this item of damages. It dealt with the predisposition to a specific injury, i.e., development of cancer in the area which had suffered the X-ray burns. In addition, the likelihood of such development was great, according to the testimony, possibly even sufficient to satisfy the reasonably probable or reasonably certain rule. The language of the Nevada court in Murphy v. Southern Pacific Co. is probably in the same category as that found in the Coover case. The plaintiff's leg was hurt in a train accident and varicose veins later developed in his leg. The jury found that the varicose vein condition resulted from the leg

466 Infra, recommendations discussion following note 1123.
468 Supra note 452.
467 31 Nev. 120, 101 Pac. 322 (1909).
bruises and awarded $7,500 damages. In upholding this verdict the court said:

So, if a physical injury, the result of negligence, leaves the constitution of the injured person in a broken and shattered condition, creating an increased susceptibility to a particular disease, and that disease follows, although after a considerable lapse of time, and death results from it, the person or corporation inflicting the injury may be liable, if, in the opinion of the jury, the injury, the disease and debility following it, concurred in and contributed to the attack of the particular disease which finally carried the injured person off. 468

The court, however, here speaks of the "constitution" of the plaintiff, apparently referring to the general condition of health rather than a particular part of a body such as injured skin as in the Coover case.

In allowing a $4,000 verdict to stand, the Arizona court in Coppinger v. Broderick 469 held that future pain and suffering of the injured person was a proper item of compensation and said:

The apprehended future consequences of an injury, in other words, should be reasonably certain. They are seldom or never susceptible to anything like absolute accuracy of calculation. From their very nature, they must be measured by a rule more or less flexible. The injuries may be so serious as to indicate that the person injured will suffer pain the rest of his life, and yet the restorative processes of nature may in an unexpectedly short time heal the wounds. The injuries, on the contrary, may seem trivial, but progressively undermine the constitution of the injured person. 470

The court at the end of its opinion concluded that the jury's verdict was not excessive in the light of the evidence and said, "That her general health was affected and that she will probably suffer throughout her life as a result of the blow and shock seems evident." 471 Here again the court speaks of the "constitution" of the injured person and of her "general health." No reference is made at all to a specific injury that might result.

A similar kind of reference to the general effect on health is found in Foster v. Donora Southern R. R. 472 where the federal district court found $25,000 not excessive since the residual pain would call for

468 Id. at 126, quoting from 1 Thompson, Negligence §154 (1901). (Emphasis added.)
469 37 Ariz. 473, 295 Pac. 780 (1931).
470 Id. at 476. (Emphasis added.)
471 Id. at 479.
treatment over an extended period of time and there is evidence "sufficient to support the conclusion that plaintiff's pain will continue for the remainder of his life, with a strong probability of his physical condition deteriorating." The court here again seems to be accepting deterioration in general physical condition as an item of damages which will support a very substantial verdict.

The case of Caylor v. Virden, decided by the Court of Appeals for the Eighth Circuit perhaps is pertinent here. The plaintiff had been forgotten by the doctor and stayed under the treatment machine for three and one half hours instead of the fifteen minutes that should have been the maximum period. He got panicky and stumbled out of the room after falling off the table when no one answered his calls for help. The court concluded that the jury was justified in saying that he may have received a physical injury while he was under the X-ray machine, not just mental anguish and shock. He had testified that "Everything made me nervous and I was just nervous and everything bothered me. I don't know how to explain how I knew I was nervous nor how the nervousness demonstrated itself." The court considered this testimony sufficient to justify the denial of defendant's motion for summary judgment. In its opinion the court said:

The mere fact that plaintiff may not have been able to explain the nature of his alleged injury is not, we think, proof that he suffered no physical injury. He was apparently a well, robust man when he was placed on the operating table with this X-ray machine trained on the growth on his cheek.

In other words a general deterioration in health was sufficient to support a verdict for the plaintiff.

Along the same line is language found in Alley v. Charlotte Pipe & Foundry Co., referred to above. This was a case in which the testimony was to the effect that plaintiff's wound was such that a cancer was likely to ensue. The court also said:

We think the evidence competent also as tending to prove acute mental suffering accompanying a physical injury. The liability to cancer must necessarily have a most depressing effect upon the injured person. Like the sword of Damocles, he knows not when it will fall.

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473 Id. at 298. (Emphasis added.)
474 217 F.2d 739 (8th Cir. 1955).
475 Id. at 743.
476 Ibid.
477 Supra note 449.
478 Id. at 331.
These cases do not specifically hold that increased susceptibility to disease is a recoverable item. They do, however, indicate recovery is permissible for the kind of mental suffering likely to accompany the possibility of a future injury when there has been overexposure to radiation. 479

Taken as a whole, the cases discussed indicate that evidence of increased susceptibility to a specific disease (and perhaps to diseases generally) is at least admissible provided the necessary degree of certainty is shown. While none of them deal specifically with the question of a motion to strike such evidence, the opinions lead one to conclude that such a motion should be denied. The cases also fail to indicate whether a specific instruction to the jury permitting them to consider such an injury as a separate item of damages is permissible, but statements by the courts in many of the opinions makes it fairly clear that this is permissible.

One general caution, however, should be kept in mind in considering these cases. Many hold that such evidence does not invalidate a verdict of a substantial amount without holding specifically that it is permissible to consider it anything but a make-weight in granting general damages. Nevertheless, the general tenor of many of the opinions is such as to indicate that a substantial award can be made for increased susceptibility as a separate item of damages at least if a specific future injury is shown.

Until more is learned about the scientific aspects of the matter, it is impossible to predict what a court will do when presented with the claim of a person whose overexposure to radiation increases his chances of future disease. If such overexposure should mean that he will be twice as susceptible to common colds or other virus infections, or will be twice as susceptible to pneumonia or some other serious disease, should his present predisposition be a recoverable item of damages? If not, the future injury will likely not result until the statute of limitations precludes his right to sue the defendant, 480 certainly a most unfair result from the plaintiff's standpoint.

On the other hand, to allow full recovery for future injury when the chances are only fifty or seventy-five per cent is unfair to the defendant if the future injury actually does not arise. As to this problem, however, the radiation cases present nothing more unrealistic or unjust than those cases in which the future possibility of pain and suffering or

479 See, e.g., the Benjamin Zawacki case, infra Chapter V at section 12 (7).
480 Infra note 1038.
physical injury is allowed as a collateral item to damages for existing injuries. This again demonstrates that we need to re-evaluate our damage solutions in tort cases and develop a scheme which handles the probability question more adequately. 481

e. Shortened Life Span

Another injury that can result from overexposure to radiation is a shortening of the life expectancy of the person so exposed, a type of injury closely related to decrease of resistance of disease. In many cases the contracting of a disease that a person otherwise might not have suffered may either cause death itself or sap some of the body's vital energy causing death at an earlier age than otherwise would be the case. The radiation problem has somewhat different dimensions, however, for there is responsible scientific opinion to the effect that one almost can equate the number of days, weeks, or years that a man will lose from his normal life span to the amount of radiation exposure he has had. 482 It even is asserted by some that every exposure to radiation reduces the life span to some extent, and that its effect is cumulative so that if a person is exposed negligently to radiation he has enough respectable scientific opinion at the present time to go to the jury on the question of whether he has lost a week, month, year, or decade from his life. When these cases are brought to court, will recovery be allowed for this type of injury? On this question there is more authority than for some of the other injuries previously discussed.

In analyzing the problem account should be taken of several different possibilities, although courts seldom have done so. A person may be exposed to sufficient radiation to cause death almost immediately, although this is rather unlikely. 488 More likely, in the case of exposure to a lethal dose of radiation, is death within a period of a few weeks during which time the prospective decedent, if told the facts, would be perfectly aware that he was going to die. In this case it would be almost inevitable that death would occur before trial to recover damages for the injuries. A case that will arise much more frequently is that in which the amount of irradiation is sufficient that experts could testify with some degree of certainty that the person exposed would live a shorter life by days, weeks, months, or years, depending upon the

481 Infra recommendations following note 1123.
482 Infra discussion at notes 1085-93.
amount of radiation received. In deciding what recovery to allow, if any, a court should take account of the possible distinction between (1) the economic loss in the form of lost wages which the injured would have received had he not been overexposed, and (2) the damages which he should be allowed because something of considerable value to him, i.e., his expectation of continued life, has been taken away. As to wages lost a difference should be made perhaps between recovery for (a) diminution in wages earned while he lives and (b) the wages lost for the period after his death but which he would have earned had his life not been shortened. One other most important set of distinctions must be kept in mind, i.e., the differences between the damages to be awarded to the injured party in his own right, those damages due his estate under the survival statute, and those to his beneficiaries in their own right under the typical wrongful death statute aimed at compensating persons who were dependent on and could reasonably expect to be supported by the injured party. Actually, the courts do not always seem to have kept these distinctions in mind.

In the following analysis, however, unless the contrary is mentioned specifically, each case discussed deals with the element of shortened life span as separate from any other item of recovery, although this element may be awarded as only one item among many. Recovery in some cases may be allowed for shortened life span under a survival statute, but in each case it includes a separate item for shortened life unless otherwise indicated. Sometimes suit has been brought by the victim but he dies before trial, and sometimes death has occurred immediately after the accident but the victim is considered to have a cause of action which survives. In none of the cases cited as supporting recovery for shortened life span is recovery for this element made a substitute for lost wages or medical expenses during the period of survival or for pain and suffering during this period. Neither is recovery for losses by beneficiaries under wrongful death statutes affected by a shortened life span award, except where this is clearly indicated in a few cases.

The most frequent shortening of life span injury arising from overexposure to radiation is a reduction of a few months or years in the normal life span, e. g., the victim will now die at 65 instead of 67, assuming nothing else happens. The overexposure causes premature aging. Most of the decided cases deal with situations in which the shortening is much greater than this but it is essential to analyze what the cases say about shortening of life as a separate item of recovery for it is a difference in degree only.
With the advent of extensive use of radiation it seems important to look at this subject and determine what relief should be afforded to various interested parties. It would seem that the difficulty will be particularly acute in radiation cases because the shortened life span may be the only item of compensable injury, thus differing from the usual personal injury action in which ordinarily there will be physical damage of a nature sufficiently ascertainable to justify a substantial award quite aside from the loss of enjoyment of a full life. Particularly when the injury leads to the possibility of future pain and suffering, which is a compensable item in most jurisdictions, the significance of allowing recovery for the mere loss of life expectancy has not been too important. If such expectancy becomes the only substantial item of damage, however, it will then become extremely important. While in some ways the subject involves metaphysics and religion more than it does the law, nevertheless, the legal question certainly will be raised more often in the United States than heretofore, and the law will have to make a decision as to whether or not to allow recovery for such an invasion of the human body. In any event here again is exemplified the great need for a thorough and comprehensive re-evaluation of our old concepts of damage recovery in tort cases. The confusion in results reached in the cases also exemplifies the great significance of really determining what our theory of damage recovery is to be.

The subject has been one of fairly recent development and most of this development has taken place in England and Canada. For this reason it seems important to observe what some of the Commonwealth countries have done with it before looking at the relatively few cases that have arisen in the United States.

1 English Cases

There is a considerable difference in theory between the English and Canadian approach to the matter of damages for shortened life span and that followed by the courts in the United States. Nevertheless, in terms of practical consequences in dollar awards in damage actions the difference in result may not be so great as the difference in theory would seem to indicate.

The first English case squarely dealing with damages for reduced life

484 Infra discussion beginning at note 982.
485 Jaffe, "Damages for Personal Injury: The Impact of Insurance," 18 Law & Contemp. Prob. 219, 221 (1953) says, "[T]he crucial controversy in personal injury torts today is not in the area of liability but of damages."
expectancy is *Flint v. Lovell* \(^{486}\) decided in 1935. The plaintiff, seventy years old, was injured in an automobile accident. The trial court found that for his age he was a man of vigor and vitality, with a life expectancy before the accident of seven or eight years, that he was in excellent health, yet that, as a result of the injuries, he probably would die within a year. The trial court was clear that the plaintiff had lost the prospect of an enjoyable, vigorous, and happy old age which medical testimony showed might have gone on for a number of years. £4,000 damages were awarded for the loss of these years. On appeal to the Court of Appeal, Lord Justice Greer held that “under the rules as to measure of damage laid down in *Hadley v. Baxendale* the plaintiff’s claim to damages on the ground that his life would be shortened was one on which he is entitled to succeed.” \(^{487}\) Lord Justice Slesser also found no reason why the shortening of life should not be considered in the assessment of damages, but Lord Justice Roche felt that evidence of shortening of life should be permitted only for the purpose of showing the seriousness of the injuries; consequently, the award of £4,000, he thought, was excessive and should have been limited to £3,000. Roche’s view was never followed in England, but it bears a striking similarity to the American rule. As an interesting collateral fact, it may be noted that three years later, in another case, \(^{488}\) the House of Lords was informed that plaintiff Flint was still living, contrary to the prediction of his expert medical witnesses.

For a short time after *Flint v. Lovell* \(^{489}\) was decided it was not clear whether recovery for shortened life span was dependent upon the injured person being aware of the fact his life expectancy had been shortened and also upon his being alive at the date of the action. In *Rose v.*

\(^{486}\) [1935] 1 K.B. 354 (1934). Smith, in his article, “Psychic Interest in Continuation of One’s Own Life: Legal Recognition and Protection,” 98 U. of Pa. L. Rev. 781, 790 (1950), asserts that the point was involved in an earlier case, Phillips v. London & South-Western R.R., 5 Q.B.D. 78 (1879). The trial court in the Phillips case at 80 instructed the jury that “an active, energetic, healthy man is not to be struck down almost in the prime of life, and reduced to helplessness with every enjoyment of life destroyed and with the prospect of a speedy death, without the jury being entitled to take that into account, not excessively, not immoderately, not vindictively, but with the view of giving him a fair compensation for the pain, inconvenience and loss of enjoyment which he has sustained. Then, after you have considered what sum you think it is right to award on that ground, the next head which you have to consider is the amount of expense which he actually incurred.” The Court of Appeal in discussing the instruction as a whole made no comment on these specific words, but the issue was not really raised by defendant’s counsel.

\(^{487}\) Flint v. Lovell, supra note 486 at 359.

\(^{488}\) *Infra* note 490 at 854.

\(^{489}\) *Supra* note 486.
however, the House of Lords rejected both requirements. A healthy twenty-three year old woman was seriously injured because of the defendant's negligence and died four days after the accident in spite of the amputation of one of her legs in an attempt to save her. During the four days she was either unconscious or in a coma which made it impossible for her to understand her condition. No objection was made to the awarding of £300 damages to the father and mother as statutory beneficiaries under the wrongful death act. In addition, however, as administrator the father claimed damages for pain and suffering, loss of the leg, and loss of normal life expectancy which he claimed were preserved by the survival statute. The trial court allowed £500 for pain and suffering and for loss of the leg but refused to award damages for shortened life expectancy on the ground that since she was not aware of her condition she could not have suffered mental anguish from concern over an early demise. The Court of Appeal found that the pain and suffering and the loss of a leg warranted only nominal damages, £20 and £2, respectively, since she died so soon after the accident. Two of the three judges denied recovery for shortened life span, one on the ground that at common law there could be no damages for death and the other on the additional ground that where death ensues before action is brought the civil damage remedy is merged in the felony charge. The three judges agreed that if damages were to be awarded for shortened life expectancy the amount should be £1,000. The basis for computing this amount was not stated. The House of Lords upheld the Court of Appeal as to the £22 awarded but held that £1,000 should have been awarded for shortened life span.

Lord Atkin saw no justification for the argument that the action merged in the felony. He further held that the right to recover for shortened life span did not depend either upon surviving until the date of the action or upon awareness by the victim that she would die prematurely. He felt that the loss was capable of being estimated in terms of money but expressly reserved opinion as to how it should be computed, indicating that some troublesome questions were involved:

How the damages are to be calculated is a question which this House has not to decide. . . . Whether the rich man's life has greater potentialities of pleasurable enjoyment than the poor man's, and what consideration should be given to physical weaknesses other than those caused by the accident and

492 Supra note 490 at 835. See also opinion of Lord Wright at 846.
not affecting the duration of life I prefer to consider when, if ever, the points are raised.\footnote{493}{Id. at 834-35.}

Lord Roche agreed with the others that the cause of action arose immediately upon suffering the injury and the survival statute preserved this cause of action to the administrator of the estate of the deceased. He also recognized the difficulty of determining the amount of damages to award:

I regard impaired health and vitality not merely as a cause of pain and suffering but as a loss of a good thing in itself. Loss of expectation of life is a form in which impaired health and vitality may express themselves as a result. In such a loss there is a loss of a temporal good, capable of evaluation in money though the evaluation is difficult. . . .

Nevertheless, it is this question of the assessment of damages which gives me more anxiety than any other part of this case. \footnote{494}{Id. at 859.}

All of the Lords agreed that the loss of the leg and pain and suffering warranted only nominal damages since the loss lasted only two days. Otherwise, said Lord Wright, she would be getting double damages since recovery was permitted for loss of life expectancy. He was not concerned with the argument that such a reduction put the defendant "in the paradoxical position of being entitled to plead in mitigation of damage that he had not merely maimed but killed the plaintiff." \footnote{495}{Id. at 846.} Apparently the importance of this argument was nullified by granting damages for shortened life span.

After this decision it was settled in England that there could be recovery for shortened life as a separate item of damages, at least when the injured party died before trial or could prove death was rather imminent. What remained to perplex the courts was the question of how much damages, i.e., what is the pecuniary value of lost years? One aspect of this matter was the significance of plaintiff's state of mind regarding his loss of years of life. In \textit{Roach v. Yates} \footnote{496}{[1938] 1 K.B. 256 (1937).} the plaintiff, thirty-three years old, became a hopeless invalid and mentally unbalanced as a result of injuries sustained in an automobile accident. The trial judge recognized the applicability of \textit{Flint v. Lovell} and \textit{Rose v. Ford} but awarded only £2,200 general damages on the ground that if the plaintiff could speak on the matter, he would prefer to have his life
shortened as much as possible. This was held to be error because a judge or jury may not consider the plaintiff's desire for life after the accident, but should consider only whether the length of life which he would have been entitled to anticipate had been diminished by the accident. Thus, the total award was increased to £6,542, of which £2,000 was for future nursing and similar expenses, and £542 was for lost wages and expenses to date of trial. The rest was for pain and suffering, loss of expectation of a happy life, and future lost earnings.

In *Morgan v. Scoulding*, plaintiff's decedent, twenty-three years old, was killed *instantly* in an automobile accident and defendants argued that no action vested which could pass to the father under the wrongful death act or to the father as administrator under the survival act. £1,000 was awarded for loss of life expectancy under the survival act, the court holding that the gist of the action was not the death but the negligence and injury which, as soon as it occurred, gave rise to a cause of action for shortened life span. In such a case, the court reasoned, the only real effect of the death was to enable the court to see clearly to what extent the life expectancy had been shortened. £300 was awarded also under the wrongful death act for loss of expected support.

The House of Lords was finally called upon to consider the size of awards being granted by the lower courts for shortened life span. In *Benham v. Gambling*, it reduced the damages from £1,200 to £200 for the loss of life expectancy of a two and a half year old child who died on the same day as the automobile accident that caused the injuries. The action was by the administrator under the survival act, no claim being made under the wrongful death act. The analysis of the problem made by Lord Simon who wrote the opinion for the House is worth setting out at length:

... The present appeal raises the problem of the assessment of damage for "loss of expectation of life" before this House for the first time, and it is indeed the only issue with which we are now concerned.

... Since the child was unconscious from the moment of the accident till his death, there could be no claim for pain and suffering, and the only question, apart from funeral expenses, was that of damages arising from the diminution of the child's expectation of life.

In the first place, I am of the opinion that the right conclu-
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sion is not to be reached by applying what may be called the statistical or actuarial test. Figures calculated to represent the expectation of human life at various ages are averages arrived at from a vast mass of vital statistics; the figure is not necessarily one which can be properly attributed to a given individual. And in any case the thing to be valued is not the prospect of length of days, but the prospect of a predominantly happy life.

The question thus resolves itself into that of fixing a reasonable figure to be paid by way of damages for the loss of a measure of prospective happiness. Such a problem might seem more suitable for discussion in an essay on Aristotelian ethics than in the judgment of a Court of law, but in view of the earlier authorities, we must do our best to contribute to its solution. The learned judge observed that the earlier decisions quoted to him assumed "that human life is, on the whole, good." I would rather say that, before damages are awarded in respect of the shortened life of a given individual under this head, it is necessary for the Court to be satisfied that the circumstances of the individual life were calculated to lead, on balance, to a positive measure of happiness, of which the victim has been deprived by the defendant's negligence. If the character or habits of the individual were calculated to lead him to a future of unhappiness or despondency, that would be a circumstance justifying a smaller award. [T]he test is not subjective and the right sum to award depends on an objective estimate of what kind of future on earth the victim might have enjoyed, whether he had justly estimated that future or not. Of course, no regard must be had to financial losses or gains during the period of which the victim has been deprived. The damages are in respect of loss of life, not of loss of future pecuniary prospects.

The main reason, I think, why the appropriate figure of damages should be reduced in the case of a very young child is that there is necessarily so much uncertainty about the child's future that no confident estimate of prospective happiness can be made. . . . I see no reason why the proper sum to be awarded would be greater because the social position or prospects of worldly possessions are greater in one case than another. Lawyers and judges may here join hands with moralists and philosophers and declare that the degree of happiness to be attained by a human being does not depend on wealth or status.

It remains to observe . . . that, stripped of technicalities, the compensation is not being given to the person who was injured at all, for the person who was injured is dead. The truth, of course, is that in putting a money value on the pro-
spective balance of happiness in years that the deceased might otherwise have lived, the jury or judge of fact is attempting to equate incommensurables. Damages which would be proper for a disabling injury may well be much greater than for deprivation of life. These considerations lead me to the conclusion that in assessing damages under this head, whether in the case of a child or an adult, very moderate figures should be chosen...

... I believe that ... the proper figure in this case would be 200l., and that even this amount would be excessive if it were not that the circumstances of the infant were most favourable. In reaching this conclusion, we are in substance correcting the methods of estimating this head of loss, whether in the case of children or adults, which have grown up in a series of earlier cases ... and are approving a standard of measurement which, had it been applied in those cases, would have led, at any rate in many of them, to reduced awards. I trust that the views of this House, expressed in dealing with the present appeal, may help to set a lower standard of measurement than has hitherto prevailed for what is in fact incapable of being measured in coin of the realm with any approach to real accuracy.  

After Benham v. Gambling a marked reduction in the size of awards for loss of life expectancy was discernible. In one case involving two deceased sailors, one thirty-nine and the other nineteen and a half years old, awards of £350 and £500, respectively, were granted under a survival type of statute, the judge noting that the measure of damages should not “vary with the number of years of the allotted span which may be said to lie in front of the deceased persons.”  

By 1950 it could be said that “£500 is generally recognised as the maximum sum recoverable ... even allowing for the depreciation ... of the pound sterling.”

In 1953, in Harris v. Bright’s Asphalt Contractors, £500 was awarded a plaintiff who was thirty-five years old at the time of the accident, thirty-seven at the date of the trial, and who had a life expectancy, as reported by a medical witness, of between six months and two years.

501 Id. at 165-68.
502 Bishop v. Cunard White Star, Ltd., [1950] 2 All E.R. 22, 25 (P. D. & A. Div.). The court held that if the difference in amounts were based on different life expectancies the lower court was in error but assumed the lower court based it on other differences not described. An award was also made for each death under the wrongful death act.
503 “Assessment of Damages in Fatal Accidents,” 100 L. J. 312 (n. s.) (1950).
The court computed damages on the basis of an eighteen month expectation. Plaintiff was permitted to recover wages lost for the time he would remain alive only and not for the period when it was expected that he would be dead. Loss of earnings after death, however, may "be considered under the item of damages for loss of expectation of life, in the sense that they are one of the elements which indicate that a person earning a reasonable livelihood is more likely to have an enjoyable life. . . ." 505 £500 was granted for shortened life expectancy in consideration of plaintiff's age, prospects, and wages which showed that he would not have been forced to live in penury. In addition to this amount, however, £5,000 was allowed for past and prospective pain and suffering based on the eighteen months of life left.

These cases make it clear that English courts recognize loss of normal life expectancy as a separate element or, as the English say, head of damage. Whether the injured party dies simultaneously with the injury, shortly thereafter, or is a living plaintiff expecting to die at an earlier than normal date, is immaterial. To avoid duplication of damages, however, he may not recover for pain and suffering or loss of wages for a period extending beyond his death, expected or actual.506 For a time, substantial awards were granted under this item, but at a word from the House of Lords reductions followed.

No adequate guide has been developed for the trial courts in Great Britain by which the loss may be translated into monetary terms. Actually little guidance can be afforded; and while the Benham case lists certain elements that may not properly be considered in evaluating lost years, no helpful indication is given as to what should be considered. Of course this is not a new problem confronting those who assess damages. The same criticism may be made of any award not based on compensation for pecuniary loss. Pain and suffering and psychic injury are analogous situations where "guesstimates" are made.

(2) Canadian Cases

In a 1937 case, Stebbe v. Laird,507 the court accepted without question the proposition that damages may be awarded for loss of expecta-

505 Id. at 402.
506 This was made clear in Rose v. Ford, supra note 490; Roach v. Yates, supra note 496; and Harris v. Bright's Asphalt Contractors, Ltd., supra note 504.
507 [1938] 1 W.W.R. 173 (K.B. Manitoba 1937). In an earlier case $600 was awarded for shortening life span of man destined to die of cancer anyway, but leg fracture cut off 1 to 1½ years. McGarry v. Canada West Coal Co., 2 Alberta 299 (1909). Plaintiff lived through judgment but not appeal. Amount went to his estate,
tion of life. The case involved an eleven year old child who was injured by an automobile and died nine days later without regaining consciousness. The administrator of her estate sued for damages under a survival statute. Because of the unconscious state of the child, no recovery was permitted for pain and suffering or injury to health. No claim was made for lost wages. The only element of damages, therefore, was compensation for shortened life. The court stated that nothing could be awarded for lost wages or inability to support dependents because those are items to be recovered under a wrongful death act not as a part of damages for shortened life span. To determine the quantum of damages, the court turned to the English decision of *Rose v. Ford*.\(^{508}\) In its discussion of the difficulty of making an award, the Canadian court said:

\[
\ldots \, \text{[T]} \text{o fix a money value for years taken from another person's life cannot be done with any degree of accuracy. The factors which enter into making life worthwhile are so numerous, so uncertain, and may vary so much from time to time, that the task is beyond the wit of man. Some may think that good health is important; yet many great and useful men have suffered physically a large part of their lives. Riches in themselves do not bring happiness; indeed they often destroy the value of life. \ldots I make these few observations merely for the purpose of showing the great difficulties in making an assessment in such a case as this. It is very largely conjecture and speculation. The one thing that is in some sense certain is the number of years by which the life has been cut short. This would seem to be the important factor. \ldots}
\]

The result of *Rose v. Ford* . . . is that *prima facie* every life is of temporal value. . . .

\[
\ldots \, \text{If there is any distinction, it is that the child in this case had perhaps larger opportunities for a full, happy life, and was deprived of several more years of her life than Miss Rose was deprived of.}
\]

\[
\ldots \, \text{I am unable to see why the plaintiff should receive less than the plaintiff did in *Rose v. Ford*.}^{509}
\]

The court granted $5,000 damages and placed emphasis on the number of years by which the life had been shortened.

In the period before the English decision in *Benham v. Gambling*\(^{510}\) was handed down, $2,000 was granted the estate of deceased, a thirty year old deaf mute.\(^{511}\) The recovery was for shortened life span and was

\(^{508}\) *Supra* note 490.  
\(^{509}\) *Supra* note 507 at 185-86.  
\(^{510}\) *Supra* note 499.  
permitted under the survival statute. No recovery was allowed under the wrongful death statute for he supported no one. Some time later, and after the House of Lords had set the standard for computing damages in England, a smaller award of only $1,500 was granted under the survival act for pain and suffering and loss of life expectancy in accordance with the principles laid down in *Benham v. Gambling*, taking into account the depreciation in value of money since that case was decided.\(^\text{512}\) In addition, £6,000 was awarded to the wife under the wrongful death act for her loss of support. Deceased was sixty-six years old, slightly deaf and died sixty-six days after the accident. Apparently the court assumed that the principles of the English case should be followed in Canada.

The manner of applying the *Benham* case was treated by the Court of Appeal for Manitoba, however, in *Anderson v. Chasney*.\(^\text{513}\) Deceased, a five year old boy, died of suffocation caused by a sponge left in his nasal area after an adenoids operation. The action was brought by the administrator of the child's estate under the survival statute. Adamson, J. A., criticised Lord Simon's rejection of the use of the statistical method for estimating the prospective length of life. He felt that this method is better than guesswork and is the only one used by insurance companies and government agencies. He also asserted, contrary to Lord Simon, that it was not necessary to establish that the person was destined to have a happy and prosperous life, saying:

> Happiness does not determine the value of a life. Happiness is very largely a matter of disposition. There are many happy people whose expectancy of life is not of great value. Many people in mental institutions are said to be happy. Many people living busy, useful, valuable lives are not happy. . . . Ambition and work may make a life valuable and yet may not bring happiness. I reject the hedonistic philosophy of life as a standard by which to value a life.\(^\text{514}\)

Adamson proposed two measures that could serve as guides: the "quality" of the life—whether to the deceased, his family, or society—and the anticipated length of that life. In case of a child, the estimate, he realized, was more difficult because quality is less certain; therefore, one might use the expectancy of quality based on an average for the country in which he lived. He felt that:

> There is, too, a difference between the value of life in England and in Canada. In Canada we take it for granted—and I


\(^{514}\) *Id.* at 366-67.
think, properly—that an average child of five years has prospects for a long, satisfactory and valuable life. I am unable to value such a life at a mere £200, which is nothing more than nominal.\textsuperscript{515}

In contrasting loss of limb with loss of life (Lord Simon having said that the former would demand greater compensation), Adamson pointed out:

Presumably, if the boy were to have lost both legs, he [Lord Simon] would allow him substantial and reasonable compensation for being deprived of a full life. Yet when he loses his life, the compensation is to be something nominal! I am unable to endorse the dictum that it is "cheaper to kill than to maim" to the extent of giving only nominal damages for killing.

In \textit{Benham v. Gambling}, a most pessimistic view of the prospects and value of lives of English children has been taken. The values in \textit{Rose v. Ford} are more in accordance with Canadian standards. We in Canada are, and can with justification be, optimistic both as to the length and quality of the life of a young person.\textsuperscript{516}

In the case of children, the judge concludes, a good yardstick to use in computing damages for shortened life is the sum the parents have spent in rearing the child, which is roughly $1,000 a year. He therefore would have awarded $5,000 for this element of damage, but a majority of the court thought that $3,000 was sufficient. Coyne, A. J., agreed with Adamson that although the \textit{Benham} judgment was entitled to respect, it was inappropriate to Manitoba, was not binding, and should not be followed.

According to these cases, appellate courts in England and Canada had approved two different tests for use in computing damages for loss of life expectancy. In England, the standard was the \textit{average} happy life, with the admonition that the award must be moderate; in the province of Manitoba, usefulness, past history, and future prospects may be considered, with no restriction as to the maximum amount.

The later case of \textit{Rodzinski v. Modern Dairies Ltd.}\textsuperscript{517} involved injuries to a thirty-three year old married man, who had not been steadily employed and who had spent a great deal of time in prison on various charges. The injuries resulted in his becoming a paraplegic. The court stated that it concurred in the view of the \textit{Anderson} case with reference

\textsuperscript{515} \textit{Id.} at 367.
\textsuperscript{516} \textit{Id.} at 369.
\textsuperscript{517} [1949] 2 W.W.R. 456 (K.B. Manitoba).
to the statistical or actuarial method of estimating prospective length of life. Since no evidence on this point had been presented, the court took judicial notice of the fact that a thirty-three year old man was likely to live twenty-five or thirty-five years longer.

The principles in both cases, the court felt, justified taking into consideration the circumstances of plaintiff's life up to the time of the accident.

It is a fair assumption, I think, that he was living the kind life he wished to live, and that it was the kind of life that made him happy. But it was a life of crime and laziness.

* * * * *

I am satisfied that judging by his past life, which is all I have to go on, but taking into consideration the possibility—remote, I fear, in this case—of a reformation, the quality and usefulness of his life based on the average for the country in which he lives was not such as to justify me in assessing damages under this head at any substantial sum. I feel I cannot allow more than $1,000. An additional $4,000 was awarded for lost earning power. Over $30,000 was granted for pain and suffering, past and prospective. The court apparently ignored the principles established in England and adhered to those expressed in the Anderson case, although it was able to find other reasons for keeping the life expectancy award at a "moderate" figure.

The following year, in Maltais v. Canadian Pacific Ry. Co., the court for the province of Alberta had to choose between the Benham and Anderson cases. The plaintiff's wife was killed instantly in a collision between a car and a train. She was forty-one, the mother of three boys, and helped with the farm chores. Damages were sought under both the wrongful death and survival acts. The Anderson case was followed in determining damages under the survival act. The principles applicable in Manitoba were equally applicable in Alberta. The court repeated the arguments and views presented in the Anderson decision and concluded that, in the absence of special circumstances, a useful and happy life of average duration would be assumed. Damages were fixed at $5,000 for loss of normal life expectancy. In addition, $2,500 was awarded under the wrongful death act to dependent husband and two children for losses to them resulting from the woman's death.

518 Id. at 465.
519 Id. at 466-67.
In 1953 the issue of computing damages for loss of life expectancy was presented squarely to the Canadian Supreme Court. The court followed the English House of Lords.\textsuperscript{521} The deceased, twenty-three years old, engaged to be married, and receiving a good salary, died shortly after an automobile accident but was in a coma during the intervening period. The trial judge awarded $10,000 for loss of life expectancy under the survival act, basing his judgment on the \textit{Maltais} and \textit{Anderson} cases. This award was reduced by the Court of Appeal to $7,500. On appeal to the Supreme Court, that tribunal recognized that differences existed between England and Canada, but felt that "they may be taken into account without departing from the ratio of the House of Lords decision (\ldots) in \textit{Benham v. Gambling}."\textsuperscript{522} Apparently this court held the same fears as to excessive damages as those which prompted the House of Lords to order moderate awards. A $7,500 judgment was permitted to stand but only because it had already been reduced and because appellate courts generally should not interfere too much with money judgments. It was stated expressly, however, that the trial court's award was too high.

Following the Supreme Court decision, there was a marked reduction in Canada in the amount of damages assessed, just as had been the case in England after the House of Lords pronouncement. In one case\textsuperscript{523} $2,500 each was granted for a husband and wife killed in an automobile accident, the decedents having been fifty-six and fifty-four years old, respectively. The awards were made to the administrator for each of them under the survival act. No claim was made under the wrongful death act. In another,\textsuperscript{524} $2,500 was awarded under the survival act for shortened life span to the estate of an eighteen year old boy, fatally shot in a hunting accident. In this latter case, the court discussed the development of the law in Canada relating to awards for shortened life span, and concluded that the principles enunciated by the House of Lords must be applied—\textit{i.e.}, the awards must be moderate. $4,000 was awarded under the wrongful death act to a surviving mother and sister as damages suffered because of loss of expected support. Her recovery under the wrongful death act was reduced by the amount of her recovery under the survival act.

Today, no real distinction exists between the law of England and

\textsuperscript{522} Id. at 180.
that of Canada. Both recognize as a separate item of damage the loss of life expectancy. Both award moderate amounts based on how happy the prospective life would have been. As a matter of fact, the basis seems not too important, as the amount of damages in all cases apparently will be approximately the same, and all must be quite moderate.

(3) Other Commonwealth Cases

Several Scottish cases have involved situations in which damages for shortened life span apparently were involved, but there is no actual holding either accepting or rejecting the English rule. As early as 1885, in *M'Master v. Caledonian Ry.*, reference was made to this element of damages as possibly justifying an award for damages objected to by defendant as being excessive. A sixteen year old boy, employed as an ironworker, was injured and sued for damages, but he died before the trial. His father continued the action and the jury awarded £400. The defense claimed that since he had died the only award should be for his "losses" before death and an amount for pain and suffering while he survived. The Lord President stated that he was not satisfied that this necessarily was the limit of damages. He stated that he did not mean to give any very decided opinion but that the death suggested various considerations:

If it had been foreseen that the man was to die very shortly after the occurrence of the injury, or very shortly after the time when the trial was to take place, there may be a question whether he would not have been entitled to damages for the shortening of his life. And so it may be a question whether his executor, as now representing him, is not entitled to damages for that very same thing, it being now ascertained beyond all dispute that his life was shortened in consequence of this injury. But I am rather disposed to think upon the whole that the jury were entitled in a great measure to take this matter into their own hands, and so long as they did not do anything very extravagant that their verdict should stand. . . .

All but one of the other Lords writing opinions agreed that the amount should not be reduced because of the intervening death. The other opinions, however, seemed to be based on a theory of survival of the action which the deceased himself would have had if he had not died, and

525 [1885] 13 Sess. Cas. 252 (Scot. 1st Div.). Smith, supra note 486 at 791, cites M'Enaney v. Caledonian Ry., [1913] 2 Scots L.T.R. 293, as another example but the award seems to be based on pain and suffering, unless "patrimonial loss" is to be interpreted as meaning shortened life span. Walker 611, apparently so interprets it.

526 Id. at 254.
perhaps were allowing a large verdict for pain and suffering and some lost wages, rather than for shortened life span.

An earlier case perhaps indirectly recognizes such a cause of action, but the clearest recognition of a separate right for shortening of life span seems to have been made by the Lord Ordinary in the Court of Sessions in Reid v. Lanarkshire Traction Co., decided in 1933, prior to the first English case. The Lord Ordinary said that if the decedent "had been pursuing the action he would have been entitled to put before a jury evidence to prove that the effect of the accident would inevitably be to shorten his expectancy of life, and the jury would be entitled in assessing damages to take that evidence into account," indicating that the victim's mental anguish from anticipating the earlier death is the basis of compensation for shortened life span. The Court of Sessions found that the damages awarded to the executrix were sufficient but that the theory of the Lord Ordinary was incorrect because there need not be proof of mental anguish or conscious suffering, although "the weight to be given to this element must be moderate." In upholding the award of £300, Lord Sand indicated very clearly how difficult is the measurement of this item.

... In China, I understand, it is possible to purchase a suicide for a comparatively modest sum. A man who is justly suspected of a capital offense will get another man who is entirely innocent to commit suicide and leave a written confession. The suicide cannot enjoy the money himself, but it gratifies him, to have the money to leave to his family. Now the thought occurs, if, instead of making a bargain of this kind, the one party mortally injures the other, why should he get off more cheaply? Why should the other not get as much for his life thus violently taken as he would have been willing voluntarily to accept?

On the other hand, I recognize that this reasoning is inapplicable to Europeans by any strict analogy. Damages cannot be assessed upon the basis of how much would this man have taken for his life. Still there is something in it which I confess puzzles me once it is conceded that a man is entitled to compensation for the shortening of his life. But the matter is so hedged with metaphysics that, were I charging a jury, I think I should be disposed to be content to tell them that the short-

527 Neilson v. Rodger, [1853] 16 Sess. Cas. 325, 327-28 (Scot 2d Div.), where Justice Hope said a claim for shortened life is personal to the victim and does not pass to the executor of his estate after he dies.
529 Id. at 81.
Negligence of life was an element which they were entitled to take into consideration in measuring the damage suffered by the deceased, and to leave it to them, without any strict analysis of the content of the idea, to assess the damages, contenting myself with warning them that the weight to be given to this element must be moderate, and that they must not consider what price the man would have put upon his life. 531

In a 1952 Scottish case, 582 a child of three was very seriously injured and her life expectancy was reduced to two or three years. The jury awarded £4,000 to cover all items of damages. The report does not indicate what weight the jury could give to the shortened life span but clearly refers to the fact of shortened life expectancy. It is possible to argue, as does one Scottish author, that “It is not apparent to what extent, if at all, loss of expectation of life affected the award. It [the court] may have diminished the sum which might otherwise have been awarded under other heads.” 533 He concludes “It is not clear from any Scottish case whether this head of damages has yet been fully accepted in respect of a living pursuer.” 534

The Scottish author then generally discusses damages for shortened life.

Consideration should not be given to the fact that the pursuer is prevented from earning wages over the period between the date of his death and the date to which he would reasonably have lived but for the accident, though such notional earnings are one of the minor elements indicating that a person earning was more likely to have an enjoyable life. Like pain and suffering loss of expectation of life is independent of financial position and station in life and must be assessed without regard to these factors.

It should be observed that there will be over-compensation if damages are given both for loss of wages in respect of being prevented from working for the normal period of working life, and for loss of expectation of life. The two are inconsistent. 535

A modified use of shortened life span was also permitted in a 1948 South African case. 536 The plaintiff’s counsel stated that while he claimed no specific sum for shortened life he did claim that the general

531 Id. at 56.
533 Walker 583.
534 Ibid.
535 Id. at 584.
recovery, which includes pain and suffering, loss of health, and loss of amenities of life, should be increased because of the prospect of an abnormally early death. Ettlinger, A. J., held that this was proper, but in accordance with the English cases, the amount of general damages should not be "materially enhanced," because of shortened life span.\(^\text{537}\)

In addition to the increase in general damages permitted because of the shortened life span, a sum was awarded for lost wages during not only the period of life expectancy after the accident but also for wages that would have been earned during the full life expectancy before the accident shortened it. This is contrary to the limitation on recovery for wages imposed by the English court five years later in *Harris v. Bright's Asphalt Contractor's Ltd.*\(^\text{538}\) The English court held that wages that would have been earned during the full life expectancy before the injury should not be included in determining damages. Ettlinger, for the South African court, said:

> In so far as loss of future earnings is concerned, this would prima facie be the present value of the anticipated loss of earnings during the period of the prospective life the plaintiff would have had but for the wrongful act. This is what the plaintiff, or his estate, has lost and this is in my view the basis for computing what he should receive by way of compensation. In this regard I would refer to the decision in *Roach v. Yates*, (1936 1 K. B. 256) in which this view of the position seems to have been accepted.\(^\text{539}\)

The court did reduce the allowance for future earnings by the amount it would cost him to maintain himself,\(^\text{540}\) but any recovery for these lost wages is directly contrary to the English view and that expressed by the Scottish author. They take the position this amounts to double damages.

(4) United States Cases

Apparently the Connecticut Supreme Court in *Murphy v. N. York & N. Haven R. R.*\(^\text{541}\) decided the first United States case dealing with this problem of shortened life expectancy as separate from claims of beneficiaries for economic loss caused by a wrongful death. The plain-
tiff was the administrator of the estate of a decedent, a six year old child, who was killed instantly when hit by a train negligently operated by an employee of the defendant. The court upheld the lower court judgment for the plaintiff (the amount of damages not being mentioned) against an argument that since the child was killed instantly there could be no cause of action because there could have been no injuries suffered by the deceased; there was no cause of action to survive. The court said:

The intestate's right of personal security has been wrongfully invaded, and that is distinctly alleged as the cause of action. In both cases the law attaches an injury to such a wrongful act.

But aside from this inference of law, it is alleged in the declaration that the blow was so violent as to produce the death of the intestate. And is this no injury? If to take one's liberty or one's property without justification is an injury, how much more is the taking of human life? The elementary books, in speaking of absolute rights, classify them thus:—1st. The right of personal security; 2d. The right of personal liberty; and 3d. The right to acquire and enjoy property. If these rights are valued in this order of preference, then every man of common understanding would at once pronounce it absurd to hold it is no injury to a person to take his life, while it is to strike him a light blow. Such a distinction is not worth talking about, and has no foundation or existence in the law, as it has none in common sense.542

The court held under the Connecticut survival statute that the cause of action accrued to the administrator even though the death was instantaneous. The rationale of this decision apparently has been followed in subsequent Connecticut cases, including in one case the allowance of $6,000 where the decedent was killed instantly through the defendant's negligence,543 and in another case, $3,500 when the injured party died, though the defendant claimed that it was unjust to allow recovery since the proceeds under the laws of inheritance would go to the husband and son "whose negligence was the sole cause of the injury."544 This line of Connecticut cases apparently is unique in the United States and has been ignored both by courts and most commentators.545

542 Id. at 187-88.
543 Mezzi v. Taylor, 99 Conn. 1, 120 Atl. 871 (1923). The court said the cause of action is "after death with an enlarged right of recovery for ensuing death." (at 7).
545 Smith, supra note 486, discusses the 1861 case but no mention is made of it in what little has been written on the subject in American sources: Annot., 97 A.L.R. 823
All of the decisions by other supreme courts in the United States hold that damages for shortened life span as a compensable injury in and of itself are not allowable although the estate may be allowed to recover lost earnings during the full period of normal life expectancy. The line between proper and improper use of such evidence was drawn by an Illinois appellate court in Krakowski v. A., E. & C. R. R. The trial court allowed the plaintiff, who was injured in a train accident, to prove a shortened life span as well as loss of wages and pain and suffering. The appellate court in reversing held:

By the foregoing, it is clear that appellee is not entitled to recover any damages under the law for loss of any portion of his life, nor for any earnings he might be supposed to make, if living, in that part of his life lost by reason of his injuries. After reconsidering this case, however, we are convinced that appellee was entitled to the benefit of the evidence in question to show the extent of injury, his consequent disability to earn a living, if any, for the time he shall live, and his bodily and mental suffering, if any, which will result from such injuries. Other jurisdictions hold this to be the law and our Supreme Court seems to sanction the same doctrine, when there is evidence, as in this case, that death is reasonably sure to follow as a result of such injuries.  

Several cases have been decided by the Indiana court. In 1897 in Richmond Gas Co. v. Baker an eighty-five year old plaintiff was injured in a gas explosion in his home and the jury was instructed that it could include a sum for shortening of life expectancy. The Supreme Court of Indiana decided that the instruction was erroneous, holding that, while evidence of shortened life span might be used to determine the extent of the injury including the inability to earn a living and mental suffering, there could be no damages for the loss of life itself, since, "The value of human life cannot, as adjudged by the common law, be measured in money. It is, besides, inconceivable that one could thus be compensated for the loss or shortening of his own life." The court disallowed the award of $4,600 and ordered a new trial. In two

(1935); 131 A.L.R. 1351 (1941); Comment, 33 Ill. L. Rev. 967 (1939); 22 U. of Chi. L. Rev. 505 (1955); Conway, "Damages for Shortened Life," 10 Ford. L. Rev. 219 (1941); Hannigan, "Recent English Decisions in Damages for Injuries Ending in Premature Death," 18 B.U.L. Rev. 275 (1938). McCormick 339 mentions the survival statute in Connecticut as the sole remedy in death cases.


146 Ind. 600, 45 N.E. 1049 (1897).

Id. at 609.
later cases the same distinction between using such evidence to measure the extent of the injury and using it as a separate item for compensation was followed. In a later case involving a living plaintiff the Supreme Court followed the Richmond Gas Co. decision and added:

It is true that a consideration of the nature and extent of the injuries may lead indirectly to some consideration of their probable effect, but the jury should not be told to award damages to an injured party for the years taken off his own life by his injury.

Nothing in the case indicates the other elements of damage claimed, except for nursing care.

In Maine the only authoritative decision was rendered by the federal courts in a case in which the victim received a skull fracture and was unconscious for about five days until his death. Under the survival statute his widow sought compensation for his estate for curtailment of his life expectancy, computed as thirteen years before the accident, alleging that he was deprived of the right and pleasure of growing old gracefully and enjoying the amenities of life. The wife already had recovered under the wrongful death statute for her loss of future support. The court held that, in the absence of any Maine decisions, the federal court could not create a new right since there were no American cases following the English law on the subject. The court indicated its own attitude, however, when it said, “where the injured person never regains consciousness, it seems a thin distinction to say that the executor cannot recover for the death, but can recover for the shortening of the life expectancy. All one ever does in killing a person is to accelerate the moment of his death.” The court indicated, however, that recovery could be had for medical expenses and property damages.

In 1953 a similar view was expressed by the federal court in Massachusetts in O’Leary v. U. S. Lines Co. The case involved injury to a longshoreman on a vessel in Boston. He died before trial and the plaintiff brought an action under the wrongful death statute and also under the survival statute. The claim under the latter statute was for pain and suffering, medical expenses, lost time from work, and “general damages” for “loss of the enjoyment of the amenities of life, . . .

549 Cleveland, C. C. & St. L. Ry. v. Miller, 165 Ind. 381, 74 N.E. 509 (1905) (injury to person still living at time of trial); Muncie Pulp Co. v. Hacker, 37 Ind. App. 194, 76 N.E. 770 (1906).


551 Farrington v. Stoddard, 115 F.2d 96, 101 (1st Cir. 1940).

a material diminution of his normal life expectancy, . . . [and] a shortening of his life.” The court, in denying recovery for the shortened life expectancy said that there was no Massachusetts decision allowing a claim for loss of expectancy as an item of damages distinct from mental anguish from fear of an early demise and there was no indication that the state would adopt the English view. The court also gave three reasons why it believed that the Massachusetts courts would deny recovery: (1) another provision of the Massachusetts statute prescribed that damages for the death of another should be assessed with reference to the degree of culpability, and that to allow recovery for loss of expectancy would be to base it upon the degree of damage rather than culpability; (2) the English rule had not proved entirely satisfactory as indicated by the practice of allowing only small flat sums; and (3)

... [T]he English rule is set in a context where duplication of damages is much less likely than it would be in Massachusetts. In England, survival damages, awarded, e.g., for shortening of life or pain and suffering, are deducted from recoveries of relatives under the English death act. . . . In this Commonwealth, however, survival damages, including suffering from the fear of loss of life, are in addition to damages recovered by relatives under the Massachusetts wrongful death statute.

Nevertheless, evidence of shortened life span is permissible for some purposes in Massachusetts. In Choicener v. Walters Amusement Agency the court used the following language:

He rules, in substance, that if they found on the medical testimony that the accident shortened the life of the deceased and also found upon the facts and the reasonable inferences to be drawn therefrom that he was aware or believed that the condition from which he suffered before the accident was aggravated, intensified and increased, and that because of the collision death might be hastened, they could take into consideration his apprehensions, fears and consequent mental suffering so caused.

553 Id. at 746.
554 Id. at 747.
556 Id. at 343.
The victim brought the cause of action for personal injuries but died before trial and his administratrix was substituted. No action was brought under the wrongful death statute.

In 1943 the New Hampshire Supreme Court was faced with a case in which the defendant utility company had trespassed upon the plaintiff's land before condemnation proceedings had been started. The plaintiff sought damages for trespass to real estate and for mental suffering and the loss of health. He died during the pendency of the action and his executrix continued the action under the survival statute and added an item for the loss of his life. The court held that the decedent's loss of life entitled his estate under a survival statute to recover for his loss of earning capacity only, but that such had not been claimed in this case.

Beyond that loss the law gives no recovery for causing death in an action brought before death. . . . In the nature of things one may not himself receive compensation for the wrongful loss of his right to live, and claim for the loss cannot be an asset of his estate in any fair view of the compensatory principle of allowable elements of damages. While allowance for bodily and mental suffering is granted as in justice imposed on a wrongdoer, the estimate must be within the bounds of justice. To allow for the enjoyment of continued life would mean an entrance into a boundless field of arbitrary assessment, for which no policy of the law exists. . . . It is sometimes said that a wrongdoer is better off in causing death than in causing severe and lasting injury without death. If this may be considered in the balance of adjustments in social relations, it does not serve to outweigh the reasons which bar allowance for damage on this account.558

Although the case did not involve a claim for damages for shortening the life on behalf of the deceased, an argument used by the Michigan Supreme Court in 1867 suggests an interesting argument that also could be made against allowing recovery for shortened life span. The court, not mentioning any of the other American cases, said:

To the cultivated and enlightened mind, looking at human life in the light of the Christian religion as sacred, the idea of compensating its loss in money is revolting, and it can only become reconciled to such an idea by the strong necessity which has grown out of the new modes of travel and business

557 Ham v. Interstate Bridge Authority, 92 N.H. 268, 30 A.2d 1 (1943).
558 Id. at 275-76.
in modern times, by which great numbers are compelled to trust their lives to the skill and vigilance of the servants of corporations, and others in similar positions of responsibility—a state of things which seemed to call for a remedy which should make railroad corporations, steamboat managers, and parties to whom others are compelled to trust for safety, more sensible of their responsibilities, and more careful to secure a high degree of vigilance in protecting the lives entrusted to their care, and at the same time afford relief for cases of great individual hardship, which might otherwise be suffered by those dependent upon the person whose life may be lost. . . . And it will be fortunate in the future if it shall be found that habituating the public mind to the idea of pecuniary compensation for human life has not tended to weaken its safeguards, and to render it less sacred in the popular estimation. 560

The objection most commonly stated in the American cases, however, against allowing recovery for loss of expectancy is the great uncertainty of standards used in measuring the damages and the discretion it gives the jury in tort cases. This attitude is forcefully, if somewhat extremely, stated by Conway in his article written in response to the English cases. He says:

But now in England there is bestowed upon judges and jurors an added foresight which approaches the supernatural. Necromancy and crystal-gazing seem to have been sanctioned in the law. Judges and jurors are to be veritable fortune-tellers. They may forecast one’s future state of happiness and, in addition, express its value in terms of cash, with the sole condition that they be not too liberal. 561

Regardless of the reason given, it is clear from the above cases that, except for Connecticut, in those United States jurisdictions which have spoken there can be no recovery for shortened life span as a separate item of damages, although evidence of such shortening is admissible in some jurisdictions for proof of (1) the extent and seriousness of the injury, (2) inability or decreased ability to earn a living, and (3) bodily and mental suffering, the latter presumably caused by the prospect of an earlier than normal demise.

On the other hand, the general rule in the United States is that lost earning for the whole period of the injured person’s normal life expectancy before the accident is recoverable apparently often without

560 Id. at 191-92.
561 Conway, supra note 545 at 228-29.
recognition that no living expenses will be incurred after death, but
damages for pain and suffering are computed on the basis of the plain-
tiff's expected life span at the time of trial, after the injury.562

(5) Some Suggestions Concerning Compensation for
Shortened Life Span

(a) Comparison of Results under British and
American Views

Actual results reached under the British and American views may
not be nearly as far apart as the principles upon which recovery is al-
lowed would seem to indicate. A shortening of life expectancy under
the British view is a separate item of damage apart from loss of wages
and pain and suffering. The victim does not need to be conscious of his
loss. In addition, though, there has been but little discussion of damages
for loss of wages in the English opinions. Those discussions which have
dealt directly with the subject have awarded damages under this head
only for the period of life that is to be expected after the injury, in
other words, only for the shortened period of life.668 Recovery under a
survival statute may reduce any recovery under the wrongful death

562 The following are some of the cases supporting this view: Prairie Creek Coal
Min. Co. v. Kittrell, 106 Ark. 138, 153 S.W. 89 (1912); Murphy v. National Ice
Cream Co., 114 Cal. App. 482, 300 Pac. 91 (1931); T. W. & W. Ry. v. Baddeley,
supra note 546; Hughes v. Chicago, R. I. & P. Ry., 150 Iowa 232, 129 N.W. 956
(1911); Scott v. Chicago, R. I. & P. Ry., 160 Iowa 306, 141 N.W. 1065 (1913);
Borough v. Minneapolis & St. L. Ry., 191 Iowa 1216, 184 N.W. 320 (1921); Thordson
v. McKeighan, 235 Iowa 409, 16 N.W.2d 607 (1944); Daniell v. Boston & Maine
R.R., 184 Mass. 337, 68 N.E. 337 (1903) (slightly different rule for breach of con-
tract where damages awarded on basis of how long plaintiff could have performed his
duties in a thorough, honest, and businesslike manner and for this purpose evidence
of probable length of life is admissible); Fournier v. Zinn, supra note 555; Choicener
consider apprehensions, fears, and consequent mental suffering caused by earlier ex-
(1904); Olivier v. Houghton St. Ry., 138 Mich. 242, 101 N.W. 530 (1904); Crecelius
v. Gamble-Skogmo, Inc., 144 Neb. 394, 13 N.W.2d 627 (1944); West v. Boston &
Maine R.R., 81 N.H. 522, 129 Atl. 768 (1925); Alberti v. N.Y., L.E. & W.R.R.,
118 N.Y. 77, 23 N.E. 35 (1889); Magee v. City of Troy, 48 Hun. 383, 1 N.Y.S. 24
(1888); Jones v. Eppler, 266 P.2d 451 (Okla. 1954); Maher v. Phila. Traction Co.,
181 Pa. 391, 37 Atl. 571 (1897); Richardson v. Spokane, 67 Wash. 621, 122 Pac. 330
(1912). See Comment, 22 U. of Chi. L. Rev. 505 at 509-10 (1955), and McCormick
347-43.

568 Roach v. Yates supra note 496; Harris v. Bright's Asphalt Contractors, Ltd.,
supra note 504. The South African court, however, allowed lost wages to be recovered
for the full life expectancy without deduction of the amount it would be cut short by
the injury.
In the United States the courts have refused to allow shortened life span as a separate item of damage but they allow compensation for lost earning capacity for the full life expectancy unaltered by the accident (apparently without deduction for maintenance expenses that will not be incurred because of the early demise), although again as in the English cases there has been little discussion of the problem. Actually, considering the flat, rather moderate sum established in England for measuring damages for the shortened life span it is very likely that the injured Englishman recovers less in money award than does an American (unless he is retired), who theoretically is given no recovery for shortened life span. As suggested by one writer:

Neither the English nor the American solution appears to be theoretically justifiable. The British courts may be correct in recognizing that there is a loss of years off the plaintiff's life which is not compensated for either by damages for economic loss or for pain and suffering. However, there has been no good explanation put forth as to why this circumstance demands compensation . . .

If the American courts, on the other hand, are correct in rejecting loss of life expectancy as a separate item of damages, they appear inadvertently to overcompensate the plaintiff for his future economic loss. Recovery for wages lost during years which the plaintiff will not be alive ignores the simple fact which is recognized by our death and survival statutes: a dead person's maintenance involves no expense. To give a plaintiff full wage recovery is to give him (and indirectly his beneficiaries) a windfall. The plaintiff has not only been cut off from years of pleasure, but years of expense as well. This difference between a living and a dead plaintiff is readily recognized by those decisions which limit recovery for pain and suffering to those years the plaintiff will actually live.

Undoubtedly there is a natural appeal in the British view which allows some kind of compensation for death, the ultimate injury to a human being. Certainly it is true that even American courts allow money awards to be made for other than economic and physical losses; e.g., recovery is allowed for mental suffering or anguish as well as for physical pain, and some courts allow recovery for a reduced ability to enjoy the niceties of life because of some physical injury. In these

564 Supra notes 498, 521.
566 Smith, supra note 486 at 795-803. He makes an impassioned argument for recognizing that death takes away the most precious thing we have.
cases, however, the award is made to a living person for his own benefit and not to others after his death. Certainly the determination of the value of life to a man who has just lost it borders on the metaphysical. The difficulties involved in this metaphysical concept are stated so pungently, if somewhat unfairly, by an editor of the Economist (London), that the statement bears repetition here.

As the duty of valuing lives in this way will almost certainly present itself more and more often so long as the law remains in its present admirable state, we have in the hope of being helpful to His Majesty's Judges and to the juries on whom the work of valuation will fall, given serious consideration to working out a "state of happiness" index number, which will be published as soon as certain minor difficulties have been overcome. In the meantime, we have drawn up a provisional schedule of life values according to occupations, on which the authorities may base themselves till the index number is ready. The judicial directions, fortunately, are clear and unambiguous. We have to value life as a whole without taking into account wealth, social position, or earning capacity, but concentrating on the question of how far the life lost was a good thing, an amenity—how far the dead person was likely, if he had lived, to pass his life in rest and quietness. Money and social position do not count, and to the legal personal representatives a dead tramp, if he was happy before he died, is a better investment than a wealthy but worried stockjobber. The issue, it will be seen, is simple, and it remains only to express the result in sterling, to which end we venture to submit to their Lordships for their future serious consideration a few valuations of dead folk according to their occupation and their respective enjoyment of rest and quietness:

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These figures can, of course, be taken only as a basis and will need to be weighted for individual cases in different ways. For example, in a British Court of Law regard must surely be had to the relations of this world and the next; and evidence must be heard as to whether the deceased person was likely to find himself better or worse off after his decease. For if the continuance of life is only a postponement of a future
life, the value to himself of a man's life here must depend partly on what it is that is being postponed. If, therefore, we had evidence that a deceased civil servant had been a very good man, orthodox in his views and impeccable in his private life, we should be inclined to knock 50 per cent. off the valuation and give his legal representative £5,000 instead of £10,000. And vice versa, if the plaintiff could prove the deceased to have been a very bad man we might raise the damages to £20,000. A judgment from the House of Lords on this aspect of the law will be eagerly awaited. In the meantime, both the legal profession and the personal representatives of the deceased persons may face the future in confident anticipation of a satisfactory harvest.568

As the British courts themselves have recognized, it probably becomes even more difficult when a child, an unemployed person, a hopelessly insane, or an unconscious person is the one whose life expectancy has been shortened.

One further consideration is important in comparing the British and American results. The distinction drawn by most American cases between denying recovery for shortened life span, but admitting it as evidence to show the extent and seriousness of the injury itself is of questionable practical significance. It does not escape the notice of the courts that evidence of shortened life span may affect the jury in unexpected ways. It is certainly possible to argue that a plaintiff who introduces such testimony may have reason to fear that a lower verdict will be reached because his period of pain and suffering will be diminished to the extent that his life expectancy has been shortened. One court held that the admission of such evidence, even though error, could not be prejudicial to the defendant. The court said:

The reason why this is true is obvious. If it had any effect at all it would have been to reduce rather than increase the amount of plaintiff's recovery since while plaintiff was entitled to his pecuniary loss based on his life expectancy before the injury, the recovery for future mental and physical suffering would depend upon expectancy in his injured condition.569

If this be an accurate estimate of the effect of such evidence a defendant might even consider offering it to reduce the recovery for pain and suffering, which is generally assumed today to be the cause of the large amounts being awarded by juries.570 Yet it is open to question

568 Quoted from "Is Life a Boon?" 14 N.Z.L.J. 65 (1938).
570 Plant, supra note 381.
that a defendant would be acting wisely in introducing such evidence. Although it may not be considered by the jury as a separate element of damage, surely such evidence might sway the sympathy of the jury and cause it to give a higher judgment on the other items. The technical rules of law included in instructions to juries are interesting to lawyers and much discussed in law school courses, but what happens when these instructions and the evidence are taken by the jury into the privacy of the jury room may be something quite different from the desires of the lawyers and judges. From the defendant's point of view, once evidence of shortened life span is admitted, an instruction that it may not itself be the basis for an award as a separate item of damage would be no assurance that it would not have this effect as a practical matter.

(b) Effect of Wrongful Death and Survival Statutes

An additional difficulty is created by the existence of death statutes, both wrongful death and survival. All American jurisdictions have some type of statute creating a special cause of action for a wrongful death, usually in the form of the original English Lord Campbell's Act. The theory of these acts is to recognize that the death may have caused pecuniary losses to survivors closely related to the deceased, i.e., those who received financial support from him. Recovery usually is dependent upon a showing of some beneficiary of this class who actually has suffered loss of support and, in theory, the amount of the recovery generally is unrelated to the injuries suffered by the deceased.

The typical survival act is based upon a different policy. The common law rule was that the cause of action in tort died with either the plaintiff or defendant if death occurred before judgment. Survival acts have been adopted in every American jurisdiction to preserve at least some causes of action such as injury to personal or real property and even other non-personal injuries. About half of them also provide for survival of personal injury actions and these are the ones of concern in considering damages for shortened life span.

The theory of recovery under this typical survival act is quite different from that of the wrongful death statute. Recovery by the personal representative or administrator of deceased's estate is permitted to the extent that decedent would have had a cause of action. This is deriva-

tive action, dependent upon the rights of the deceased and the amount recovered becomes a part of his estate.\textsuperscript{573} Recovery under such statutes would include damages for pain and suffering, medical expenses, and loss of earnings during the interval between injury and death.

In some jurisdictions recovery can not be had under both statutes but in many jurisdictions which have both types of statutes, the theory of recovery under each being different, there are two causes of action and recovery under one does not preclude recovery under the other. In many cases this means that the same beneficiaries will recover under the wrongful death act and also under the survival statute since the persons who take the estate of the deceased often are the same close relatives protected by the wrongful death statute. The duplication is even more obvious in those jurisdictions which allow the estate to recover under the survival statute for loss of earnings during the full life expectancy of the deceased without regard to the injury inflicted by the defendant, often as pointed out before, without deduction for the maintenance costs that the victim would have incurred and which, therefore, would have reduced the amount left in his estate.

The existence of both statutes in one jurisdiction has created real difficulties for the courts and the result has been something less than logical and just in many situations.\textsuperscript{574} To apply the dictates of these statutes and the common law tort rules and to reconcile the results of cases in which the estate of the deceased is suing with those in which the beneficiaries under the wrongful death acts are seeking recovery, and both with the rights of the victim himself while he still lives, without unduly modifying the "plain meaning" of the legislative language is too much to ask of any court. What is needed is a reconsideration of the whole matter.

(c) A Suggested Reconsideration of the Rule of Damages

Our first conclusion in reconsidering what rules should be applied to recovery for shortened life span is that there is little justification for becoming involved in a deep philosophical concern with man's psychological welfare (important as this is), at least so far as he might contemplate what he will be allowed to recover if he should be killed. The

\textsuperscript{573} Prosser 708-10.

problem is one of deciding what kinds of interests should be recognized by a pecuniary award in an action arising from an unintentional tort. Lawyers and judges should not try to answer questions best left to theologians.

A reconsideration of this area of the law of damages should take account of two basic factors: (1) the rights of a person while he is still living to recover for mental anguish suffered by him, including possibly his suffering as he contemplates a shortened life expectancy, but not for the death or shortened life itself; and (2) the rights, if any, of survivors who might have expected something from the deceased if he lived his normal number of years. Whatever the type of statute and whatever the form of action, these would seem to be the two potential elements of damages that should be considered.

(i) Recovery When the Injured Party Dies Before Judgment

In considering the rights of the injured party himself, it is important to draw a distinction between the case in which he dies instantly, never recovers consciousness, or dies relatively soon after the accident (probably within the period between the accident and trial), and the case in which there is no other injury except an ascertainable shortening of the life span with no real danger of death in the immediate future, as so often will be the situation in radiation exposure cases.

When the injured party dies before judgment or settlement of the claim, it seems quite unrealistic under a survival statute to hold that the death itself is an item of damages, so far as the deceased is concerned, and survives under the statute. The injured person who dies can in no way enjoy such compensation, except possibly in the form of psychological satisfaction of being able to pass assets on after death. In the case of instantaneous death, or death before consciousness is regained, even this is non-existent, and the law ought to recognize that any such recovery is in effect simply a recovery for the beneficiaries or heirs and, in some states, creditors. Notwithstanding possible theological assertions of some religions to the contrary, it would seem best that the legal rules be based on the philosophy that "you cannot take it with you," at least as to assets of a pecuniary nature. This would not be inconsistent with most western religions since they do not consider worldly goods of any particular value in any life hereafter. The law should not go further. If this view be accepted, the English rule allow—

McCormick 340.
ing an absolute right of recovery for loss of life expectancy even where the injured person dies instantly or is not aware of the shortened life span and therefore can suffer no mental pain and anguish as he contemplates an earlier than normal demise is incorrect.

(ii) Recovery When Injured Party Survives but Has Shortened Life Expectancy

A different situation is presented, however, when the injured person survives the trial but has a shortened life expectancy. To the extent that the law recognizes that there should be recovery for injury to psychological interests of the injured party himself, and there is a considerable growth of legal recognition of this right in many areas, then the recovery ought to be adjusted to the particular case and applied only to allow compensation for the mental anguish suffered by the injured because of his concern about his shortened life span. If a money award is to be given for injury to such psychological interest, there ought to be both proof that the injury to this interest actually occurred, and also a reasonable relationship between the money awarded and that needed to purchase services or enjoyment having a reasonable relation to the value of the period cut off the man's life. Under this heading it might even be possible for such a person to recover enough to allow him, during his shortened life span, to take a trip toward which he had planned and saved. Though this example may be too extreme, this would be the kind of interest which, though psychological, ought to be recognized as sufficiently tangible for monetary compensation to be made. Probably much more realistic from the standpoint of helping the injured party would be a greater liberalization in the recovery allowed for medical expenses so that a program of rehabilitation, including mental therapy if needed, could be utilized fully to make the remaining years of life as enjoyable as is reasonably possible. This suggestion would reject the English practice and also would call for modification of the rigid American rule under which recovery has been denied in the jurisdictions which have passed upon the question. Compensation would thus be allowed for the mental disturbance to the person who knows his life span is being shortened. This would not extend the law substantially beyond present practices in cases in which the injured person lives and makes a claim, not for shortened life span, but for a lessening of desirable enjoyable activities during his normal life span because of some physical injury. As pointed out before, this kind of right has already been recognized in many jurisdictions including
some which have denied recovery for shortened life span as such. If psychological interests are recognized in these cases, so also should they be when shortened life span is involved. There is no reason, legal or moral, however, for carrying this item beyond the grave, the indignant rejection by the Connecticut court of such a barbaric distinction notwithstanding. The material aspects of the recovery certainly do not pass beyond the grave to the best of our knowledge but go to the surviving kin or other beneficiaries. Since this is true, the award should be justified under the theory of our wrongful death acts.

It is recognized that this suggestion seems to be in conflict with the theory of the typical survival statutes that whatever cause of action the victim had, his estate keeps after his death. The suggestion made would permit recovery for damages to the injured victim, including any mental disturbance, pain and suffering, and loss of enjoyment of life generally, only if he survives judgment; if he does not, recovery would be denied to his estate. We do not mean to suggest that contracts and other property rights, including the right to recover for destruction of property, should be wiped out upon the death of the injured party. These rights are capable of being measured in monetary terms and seem to be a legitimate part of the estate of the deceased, should he die before trial. Survival statutes are aimed at preserving this kind of right. It is submitted that there is no justification, however, for adding to the estate of the deceased an item for damage to his psychological interest, which so far as this world is concerned is now gone, and is rather unimportant in the next if we can believe the experts.

Any monetary awards that are given in such a case usually go to the survivors who would recover under a wrongful death statute. If death ensues before trial or settlement, recovery should be awarded only to the survivors protected by the death statutes for loss of expected support. The concern in cases awarding monetary compensation should be with the living and not with the dead. Any recovery for invasion of psychological interests ought to be resolved between the defendant and the injured party and the amount keyed to compensating him, not the survivors. The logical time to determine this is at the time of the trial, which usually will be long enough after the injury so that it will be known whether the injured party is going to live for a reasonable period of time beyond the injury. In any event, in most cases it will make a clear-cut distinction between the amount to be awarded to the injured


\[577\] \textit{Supra} note 541. See also Prosser 709.
party for damage to his peace of mind, and the amount to be awarded to the persons who have lost expected financial support because of the death or serious shortening of life expectancy of the injured person. Their interests are of quite a different nature.

In any event, if the victim survives judgment, having proved that he will die one, ten, fifteen, or twenty years prematurely, but a considerable period after the trial, his recovery should not include lost wages, expenses, or pain and suffering and mental anguish for the period between his expected premature death and the life span he would have enjoyed but for the accident. In many cases of radiation exposure in which only a few years are cut off of life expectancy, there may be no decrease in earning capacity and no pain and suffering and probably not much, if any, mental anguish, premature death being so long delayed. The period cut off actually may be non-earning years, after retirement, unless retirement plans begin to take account of premature aging. Any award of damages to the surviving victim should take account of the mitigating factors.

(iii) Recovery by Dependents for Lost Support

Recovery by persons normally included as beneficiaries in wrongful death statutes should be determined on the basis of support they could have expected from the deceased had he lived his normal life. Under this approach, a determination must be made of what these beneficiaries would have received from the decedent had he lived, taking into account, of course, the maintenance costs of the decedent during the period of his normal life expectancy. It should take account of the fact that in most radiation cases only a few years should be taken off the end of the victim's life at a time when all of his dependents, except for his wife and perhaps other disabled relatives should have no longer expected any financial support. In such cases no recovery should be allowed for dependents. It would be best to postpone such determination until the victim actually dies.

(d) Advantages and Disadvantages of the Recommendations

The proposed separation of the damage rights of the injured party and of any dependents who lose financial support because of his actual or expected early demise should help make possible a fairer determination of how much damages to award to whom. The injured person, if
he lived until judgment or settlement, would recover the type of damages now allowed, such as for pain and suffering, medical expenses, lost wages (during his reduced life span only), etc., but all damages should be limited to what is suffered during the period he now is expected to live in his injured condition. If he dies before judgment, the length of his life is now definitely known instead of estimated and other than expenses actually incurred during his life, all recovery should be for lost support by dependents. The result would prevent recovery for shortened life span itself, contrary to the Connecticut and English Commonwealth view. It also would prevent recovery of lost wages for the full period of normal life expectancy allowed in some American jurisdictions which purport to deny recovery for shortened life span.

On the other hand, it would permit a separate determination of the rights of surviving dependents whose recovery should then not be affected in any way as to amount because the injured person also may have recovered. Realistic amounts should be awarded to such dependents. There is no reason to carry over into a determination of their needs the great uncertainties that are involved in deciding how much to allow the injured party for his pain and suffering and his mental anguish caused by contemplating an early demise. Any psychological interests of the injured victim which have been invaded should be measured by the time he actually lives or is expected to live. The needs of survivors have no logical policy relationship to this amount. Their recovery should be determined in accordance with their reasonable expectations of support after their benefactor’s death.

The result suggested probably could be achieved if courts were willing to interpret somewhat more liberally common law and death statute damage rules but this perhaps would involve a certain amount of judicial legislation in some states. It would be better if a statute were enacted recognizing the interrelationship of the rights of the injured victim, his estate, and his dependents as now protected under most wrongful death statutes. The result would be more consistent with the general theory of compensatory damages in unintentional tort cases where life span has been shortened by a defendant who fails to meet the required standard of conduct but who should not be punished so that others can receive a windfall.

Administration of these suggestions will present some difficulties. Juries will have difficulty keeping separate the different items of damages but probably less difficulty than they now have when they are told
not to allow recovery for shortened life span, although they may con-
sider it in determining how seriously plaintiff has been hurt, and also
are told to estimate his wages during his full life expectancy. The
separation should help differentiate the various elements of damage on
a more logical basis. It would permit findings of fact on specific items
of damage.

Another difficulty arises under our suggestions if the injured person
lives until after judgment but his expectation of further life is very
short. Under these circumstances should the dependent beneficiaries of
a wrongful death statute be allowed to have a further cause of action? If
so, when does it arise—at the same time as the injured party’s right
or only after he dies? A related difficulty arises if there is an ascer-
tainable shortening of life span but the victim is expected to live for as
many as forty or fifty years. This is very likely to happen in radiation
exposure cases. Who should be counted as beneficiaries and how much
should they be allowed to expect from the victim had he lived?

One writer has made the ingenious suggestion that the injured party
should recover his own losses and also those of potential beneficiaries
at his death, all in one action. He would be allowed to recover the
total amount on the theory that if he dies it then will be passed on to
the persons he wanted to protect anyway. The alternative would be to
allow a separate action for loss of expected support by the beneficiaries
who could sue if he died. The writer objected to this alternative be-
because “[t]his not only makes it impossible to ascertain the recipients,
but also leaves the court without the base for calculating the re-
wards.” His suggestion, however, involves the same difficulty he was
trying to avoid. Determination of the beneficiaries and of the amount
of support they could expect is just as difficult no matter who brings
the cause of action.

Our suggestion would be to adopt what might be described as a “wait
and see” doctrine—allow the beneficiaries a separate cause of action
under a wrongful death theory, to arise at the time the injured plain-
tiff dies, not before. Any statute of limitations problem could be
handled simply by holding that the cause of action does not arise until
the death occurs. Difficulties arise from the possibility of disappearance,
death, or bankruptcy of the defendant, but these seem not nearly so
objectionable as guessing who the beneficiaries will be, how long they
will live, and how much support they would have received from the

579 Ibid.
deceased during the time of his normal life expectancy. Our suggestions involve the lesser evil.

The most important difficulty arising if the action by death beneficiaries is postponed until the actual death of the victim is that it may delay actions for many years, twenty or more being perfectly possible. This does create a very serious concern, not only as to whether or not the insurance coverage of a defendant will be continued for this period of time for the particular injury (or other funds if insurance does not cover the injury), but also as to preservation of the evidence surrounding the original injury.

Several possibilities for alleviating this problem to some extent can be suggested. One is to adopt an arbitrary period, for example ten years after the date of injury. If the injured person lives for ten years perhaps it is fair to assume that the beneficiaries' pecuniary losses and expectations of support have been reduced to a sufficiently low order that the law should ignore them. This should take care of all but the most unusual case as to child beneficiaries but may not be satisfactory for spouses who are dependents. It may be a fair compromise even then, however, since in most states today they recover nothing under wrongful death statutes if the decedent survives until after judgment in his own action for tort damages.

Another possible solution to the problem of a long delayed but accelerated death is to limit the recovery of death-act beneficiaries to those cases in which the deceased himself has recovered damages from the defendant which would mean that the initial cause of action itself has been brought within the period of the statute of limitations, and that the basic facts of the defendant's liability for the accident would have been established. The fact that beneficiaries probably would not have participated in the original trial presents the matter of binding parties by a judgment in which they did not participate. The whole cause of action is such, however, that in a real sense it is dependent on the right of the injured party to recover if he survives. Only because of a statute especially concerned with such beneficiaries do they have any cause of action at all. It does not seem arbitrary, therefore, to condition the right to recover under the wrongful death act on establishment by the deceased himself of a right of recovery for his own injuries based on the defendant's negligence, even though the amount of damages is determined on a different basis in the two cases. The only difficulty with this suggestion will be when the only recoverable damage is shortened life span, and our recommendation is that the victim not be allowed recovery for this item. In such case perhaps he or the beneficiaries...
should be forced to sue soon after the exposure to establish the defendant's liability. Under the usual statute of limitations this situation would arise under these suggestions only if the injured person lives longer than at least a year and more typically two or three years after the injury occurred.

A difficulty still exists if the defendant is willing to admit liability, at least in a compromise situation, and settles the claim with the injured plaintiff. If the two causes of action, for the injured plaintiff and for the injured beneficiary, are separated as suggested here, there is the question of how to determine the amount of damages and the persons to whom recovery should go for the premature death with consequent loss to the group of beneficiaries protected by the wrongful death statute. Here again settlement of their rights and preservation of any award could be entrusted to the injured plaintiff on the assumption that he will make it available on his death anyway. On the other hand, the rights of beneficiaries could be kept separate and recovery delayed until the injured party dies, again with an arbitrary time limitation of a decade or so, if a longer period is administratively unsound or at least unsatisfactory to the insurance companies. One other possibility is to guess who the beneficiaries will be at the time the victim is expected to die and allow settlement with them, with appointment of a guardian for those not yet in existence or underage, if this seems necessary. Our recommendation is that the settlement be with beneficiaries separately or with their guardians ad litem.

If the two interests are separated, the rule that any action of beneficiaries under wrongful death acts is lost if the injured plaintiff lives until he has recovered judgment would be changed.

(e) Conclusions

Shortening of life expectancy cases are certain to result from exposure to radiation according to present scientific theory. Present damage theories as applied to this subject must be re-evaluated. Under existing rules results often will be unjust because the cases are likely to be of the kind that gives the most trouble under existing law. The proper solution should be determined before too many cases arise. Lawyers and their clients should see that a comprehensive and fair statutory scheme is enacted.

580 This seems to be an assumption approved in a somewhat different way by the writer of the comment in 22 U. of Chi. L. Rev. 505, 512 (1955).

581 See Annot., 39 A.L.R. 579 (1925); Annot., 99 A.L.R. 1091 (1935); 22 U. of Chi. L. Rev. 505, 513 (1955); and arguments pro and con in Southern Bell Tel. Co. v. Cassin, 111 Ga. 575, 36 S.E. 881 (1900).
f. Other Types of Damages

In addition to the items of damages already discussed, certain others involving some psychological or emotional disturbance features may arise in radiation situations. They are sufficiently different from the most closely analogous problems arising in the usual tort case to warrant brief mention.

(1) Inability to Continue in Nuclear Work

One of the situations that may arise is the exposure of an individual to the maximum permissible level of radiation beyond which there exists a serious risk of injury, although as yet there are no observable disabling physical manifestations. This most likely would happen in connection with employment in nuclear activities, and also could occur in other tort liability situations. For example, a nuclear physicist or engineer through the negligence of a doctor might be exposed to sufficient radiation to make it unwise for him to continue to work in an environment where he is exposed regularly even to small doses of radiation, or where there is a chance of an accidental exposure of significant proportions. A similar problem could arise in connection with an accident which discharges radioactive material over a populated area and exposes to a fairly high level of radiation, a nuclear engineer, who at that time, is not engaged in his occupation. The amount of exposure could be such that there would be no present physical disability and hence no injury in the ordinary sense. Yet, if this person is to take normal advantage of his experience and training, he must work in situations where somewhat greater than normal risks of exposure to radiation are involved. If it is inadvisable for the worker to continue in his chosen field, can he recover damages for the inability to do so, or can he recover for the necessity of changing occupations which may mean undertaking a long period of training in an educational institution and perhaps an additional substantial period for practical experience?

It is generally agreed that in any suit for compensation for personal injury, one of the elements of damage is impairment of earning capacity. There are many cases in which this item has been allowed,

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but the recent case involving Maureen Connolly, the famous young woman tennis champion, illustrates as well as any the willingness of courts to sustain a very substantial award by the jury for loss of earning capacity, in this case for $95,000.\textsuperscript{584} Her injury prevented her from continuing her tennis career from which she could expect, on the basis of actual offers for the coming year, anywhere from $30,000 to $75,000, if she would turn professional. While the award included present pain and suffering and possible future suffering from the loss of blood supply to her foot, it is clear that the major item of recovery was for the loss of expected earnings. In upholding the jury’s verdict as not excessive, the court said:

> Loss of earning power is an element of general damages which can be inferred from the nature of the injury, without proof of actual earnings or income either before or after the injury, and damages in this respect are awarded for the loss of ability thereafter to earn money.\textsuperscript{585}

Where there is a present observable injury to the plaintiff in cases of overexposure to radiation, it would seem clear that one of the items of damages which the jury could award would be lost earning capacity, if the radiation of the plaintiff actually makes it impossible for him to earn as much after the accident as before. This kind of situation would seem to be covered by the general rule, although the measurement of this item is difficult.

In all of the cases decided up to the present time there has been an actual, present physical impairment which to some extent observably reduced the ability of the plaintiff to carry out with former ability the job he had been doing before the accident. No case has been found dealing with a situation in which recovery was allowed for lost earning capacity simply because it would not be wise from the standpoint of plaintiff’s health to continue the work for which he had been trained.

Under the language ordinarily used by the courts in defining the term “personal injury,” it would not be difficult in radiation cases to find that a person who has been irradiated even to a small degree has received an “injury.” An early Massachusetts opinion defines “injury” about as well as any:

> In common speech the word “injury,” as applied to a personal injury to a human being, includes whatever lesion or change in any part of the system produces harm or pain or a lessened

\textsuperscript{584} Connolly v. Pre-Mixed Concrete Co., 49 Cal.2d 483, 319 P.2d 343 (1957).

\textsuperscript{585} Id. at 489.
facility of the natural use of any bodily activity or capa-
bility.\textsuperscript{586}

This broad definition of injury literally covers a person who has been
exposed to any significant amount of radiation, because present scien-
tific opinion holds that even small amounts of radiation either destroy
body cells or at least reduce their ability to divide and replace them-
selves.\textsuperscript{587} This might serve as the necessary injury upon which to base
the item of impaired earning capacity.

The difficulty with accepting this analysis is that, in awarding dam-
ages for impairment of earning capacity resulting from "personal in-
jury," the statements of the courts have been made in cases in which
there was an observable impairment of a physical function which itself
created a physical disability to continue activities previously carried on
by the plaintiff. From this it certainly could be argued that "personal in-
jury" means that which is itself compensable in a tort action, aside
from the lost earning capacity. Therefore, such cases are not direct sup-
port for recovery where there is no disability in the ordinary sense and
where the only significant loss that can be measured in pecuniary terms
is the lost earning capacity resulting from the necessity of changing pro-
fessions in order to avoid the health danger created by further exposure.
The presence of an actual physical impact and some impairment of
bodily functions, however, will give a court the necessary foundation to
support an action for lost earning capacity, if it feels some physical
injury to the plaintiff is a necessary prerequisite to allowing such re-
covery. Actually the policy question is the same whether or not we find
a presently observable change in bodily functions, so long as it is found
that no further work in the nuclear energy area should be carried out by
the particular plaintiff. The question really is: As a matter of social
policy, should recovery be allowed in such cases? So stated, it is difficult
to justify denial.

The only cases found which are in any way closely analogous to the
situation here posed are the allergy cases arising in connection with
workmen's compensation claims.\textsuperscript{588} In Arkansas Nat'l Bank of Hot
Springs v. Colbert, the Arkansas Supreme Court affirmed the commis-
sion's award for a "disability" arising from dermatitis caused by con-
tact with nickel and carbon, and also approved the modification of the
award by the circuit court to make the disability a "permanent, total

\textsuperscript{586} Burns's Case, 218 Mass. 8, 12, 105 N.E. 601 (1914), cited in 1 Larson, Work-
men's Compensation §42.11 (1952) as the best definition of "injury" found.

\textsuperscript{587}infra note 1090.

\textsuperscript{588} See Larson, supra note 586 at §41.60.
disability."  The claimant had worked many years as a cashier for business houses and finally for the employer bank for whom she was working at the time the dermatitis became acute. The condition finally forced her to resign. The court found that the allergy was caused by "dust" coming from the nickels and from carbon paper and that this made it a disabling injury from an occupational disease within the terms of the workmen's compensation act. The court stated that the act should be liberally construed, provided compensation was to be paid to an employee actually disabled. The court upheld the finding of permanent disability even though the dermatitis seemed to clear up completely when the claimant stayed away from coins and carbon paper. Yet, whenever she returned to a setting where these were present the dermatitis reappeared.

A similar result was reached in *LeLenko v. Wilson H. Lee Co.*, where a linotype operator developed dermatitis from an allergy to the antimony coming from the molten metal used in the linotype operation. Here again this allergic dermatitis was held to be an "occupational disease." This apparently is a usual result in compensation cases, though it must be remembered that frequently such awards are made on a more liberal basis than if similar questions are raised in ordinary tort cases. If the inability to continue work in a given profession is proved, however, there seems to be no reason why it should not be a compensable injury under tort rules as well. The effect on the worker will be the same in either case.

The *LeLenko* case did not deal specifically with the problem of alternatives open to the claimant to earn a living in some other occupation but the statement of facts is such as to permit this assumption. In the *Colbert* case the court was faced with a specific argument by the employer that since the claimant was "an unusually intelligent woman, with a pleasing personality, she should be able to secure remunerative employment in some other business or profession." The court answered this argument by showing that there was no finding in the testimony that she could secure such employment, and that there were very few occupations open to women, especially of her age and training. It seems to be true that where compensation is claimed for loss of earning capacity in the ordinary tort case the defendant has the right to reduce the amount of the award by the amount that the plaintiff could reasonably or

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589 209 Ark. 1070, 193 S.W.2d 866 (1946).
590 128 Conn. 499, 24 A.2d 253 (1942).
591 Supra note 588.
592 Supra note 589 at 1074.
actually earn during a period of less than total disability and most jurisdictions follow the same rule in workmen's compensation cases.

The ordinary worker whose job does not require any very special technical training or extensive education surely will be treated like the truck driver or seamstress whose foot injury made it difficult to continue the same occupation but does not really decrease substantially the ability to perform a similarly remunerative task.\(^{593}\) There will certainly be employment of this sort in atomic energy and under such circumstances this element of damages can be minimized.

The problem may not be nearly so simple for an experienced nuclear engineer who has had as much as seven or more years of college training preparing him for his career. It may be that such a person could find an administrative position where his exposure to radiation would be nil and which would be just as remunerative. It is also possible that such a person could return to college and pursue another profession if he were willing to spend the necessary time and effort to earn a graduate degree. His age might seriously prejudice his chances to make a name for himself and to get an equally rewarding position. The only fair conclusion would seem to be, therefore, that such injuries be compensated, even though no presently observable physical injury has manifested itself. There is no reason, however, to go as far as the court did in the Colbert case in allowing this kind of injury to be treated as a total disability. Aside from the expense to society it would seem poor social policy to encourage a person so injured to remain idle instead of finding other types of employment. His age, training, and experience and the feasibility of shifting profession of course should be taken into account in determining if he will be able to find an equally remunerative job. The period of time required to prepare for a new occupation and the money lost while attaining an equal position should be included.

Our conclusion, therefore, is that recovery for the type of injury here posed should be allowed even though there is no presently manifested injury. This assumes that there has been proof of the fact that the plaintiff has received exposure up to the point where it is not safe for him to continue in work where the risk of exposure to radiation is somewhat greater than normal.

\(^{598}\) 4 Restatement, Torts §924 (1939); McCormick 308, n. 40 and cases there cited. See Trombetta v. Champlain Valley Fruit Co., supra note 583, where a $50 a week truck driver could not show loss of earning capacity from a $10 a week job he took, partly to satisfy his obligations to his father. For workmen's compensation rule see 2 Larson, supra note 586 at §§57.5, 57.61, 58.00.
(2) Psychological Injuries

Because the general public's introduction to radiation injuries has been through atomic bombs, beginning with the destruction of Nagasaki and Hiroshima and continuing to the present concern about fall-out from the nuclear tests, atomic energy and radiation have a fearful connotation for most people. Added to this is the fact that the science is of relatively recent development and is mysterious to the layman because radiation cannot be felt, seen, heard, or tasted. This is the very situation where the psychological reaction of a person who has been or thinks he has been irradiated probably will assume rather great proportions. The whole problem of mental or emotional disturbance is one that has given the courts considerable concern and the movement certainly is in the direction of giving greater recognition to this type of injury as more is learned about the workings of the human mind.

For the purpose of discussing radiation injury cases as they involve mental disturbance, the present state of the law can be fairly summarized as follows: 594 (1) Where there has been an actual physical impact on the plaintiff by a force set in motion by a negligent defendant (and the impact need not be at all substantial), 595 recovery may be allowed for mental disturbances, such as fright, pain, suffering, and similar types of mental anguish. 596 (2) While in some jurisdictions it is still necessary to find a physical impact of some kind, 597 the trend in recent cases clearly is in the direction of allowing recovery for mental disturbance where there is no physical impact, so long as the mental disturbance manifests itself in some physically observable way, such as a traumatic neurosis. 598 (3) If the only psychological injury is one that could not


595 E.g., see Porter v. Del., Lack. & W.R.R., 73 N.J.L. 405, 63 Atl. 860 (1906) (dust in plaintiff's eyes). See cases collected in Smith & Solomon, supra note 594 at 164 and Appendix A at 159. See also Prosser 178-79, n. 7-12.


be reasonably foreseen if the plaintiff were a person of average constitution, including average emotional stability, the defendant has not breached the required standard of conduct and, therefore, is not negligent and not liable. If the defendant, however, acted unreasonably with respect to the average person, he will then be liable for all of the results that flow from this action, even though the plaintiff can be shown to have been peculiarly vulnerable to this kind of psychological stimulus. This is similar to the “thin skull” cases in which damage more severe than would have been expected results from defendant’s negligence because the plaintiff was peculiarly susceptible to injury from this kind of force. Whether or not the defendant was negligent in the action from which psychological injury results is to be tested by a person of average constitution; and in determining if the plaintiff’s fears were reasonable under the circumstances, the test is what a reasonable layman in a similar situation would have thought and done, not what a scientist would know to be the actual danger. (4) Where the only result of defendant’s negligence is mental disturbance without any accompanying physical symptoms, there is general agreement that recovery is not allowed.

Here again radiation exposure situations will call for a reexamination of the underlying assumptions of damages rules; for it is apparent that there has been a lack of clarity in analysis, certainly on the part of courts, and it would seem even on the part of legal writers. There has not been sufficient recognition of the real need for relating and reconciling the rules controlling breach of the standard of conduct, those controlling the kind of recompensable injuries flowing from negligent actions, and those

609 Smith, supra note 594 at 256-61. The cases cited clearly support the conclusion drawn.

600 2 Restatement, Torts §461 (1934); Smith, supra note 594, particularly at 260, n. 200. See, e.g., Owen v. Dix, 210 Ark. 562, 196 S.W.2d 913 (1946); Nelson v. Black, 266 P.2d 817 (Cal. App. 1st Dist. 1954); Sterrett v. East Texas Motor Freight Lines, 150 Tex. 12, 236 S.W.2d 776 (1951); Oliver v. Yellow Cab Co., 98 F.2d 192 (7th Cir. 1938); Offensend v. Atlantic Ref. Co., 322 Pa. 399, 185 Atl. 745 (1936); dicta of Judge L. Hand in Pieczonka v. Pullman Co., 89 F.2d 353, 357 (2d Cir. 1937): “We do not forget that if a victim is so susceptible that the tort starts up a disease, or exacerbates his suffering, as it would not have done in the case of a normal man, he may recover in full, no matter how unlikely the result.” See also Coover v. Painless Parker, Dentist, 105 Cal. App. 110, 286 Pac. 1048 (1930) for item of nervousness from X-ray burns.

601 Smith, supra note 594 at 259.

602 Id. at 265. Cf. Ferrara v. Galluchio, 176 N.Y.S.2d 996, 152 N.E.2d 249 (1958), in which $5,000 was awarded for severe cancer-phobia because of the possibility of cancer developing.

which determine the persons protected when somewhat unusual results follow, particularly in psychological injury cases.

Applying the above principles to radiation situations, even in those jurisdictions which require impact before there can be any recovery at all, it would not be difficult to show scientifically that irradiation has a physical impact on the exposed person. In those jurisdictions which do not require a physical impact the problem does not arise. If existing rules are applied with strict logic, whatever mental anguish would be suffered by an average layman when told that he had been irradiated would be a compensable injury even though in fact there was no basis in scientific knowledge for fearing a noticeable physical consequence from the amount of radiation received. Yet this would actually be quite like a case in which the only real impact on the victim is a psychological one, the very case in which under existing case law recovery would be denied.

Moreover, if the scientific conclusion that impact from radiation causes some kind of physical injury is accepted, then, applying existing rules with strict logic, mental anguish would be compensable even if the victim exposed had an unreasonable fear of injury. The mental anguish is a permissible item of damages when there is impact and at least some physical injury. There would be a finding of breach of duty owed by the defendant to the plaintiff which caused a physical injury, although not one the plaintiff would feel other than psychologically.

If there is a purely psychological injury (in the sense that scientists feel there is no real risk from the small amount of radiation received) but some laymen reasonably might fear injury in spite of scientific opinion, the present writers feel that recovery should be denied so long as there are no real physical manifestations resulting from the fear itself. Even under existing rules, if there are actual physical manifestations of the fear such as some kind of traumatic neurosis, then the injury suddenly becomes more acceptable to the law and recovery may be allowed. Also, if there is actual physical impact, recovery is allowed for even unreasonable emotional reactions. On the other hand, if there is only a disturbance of mental tranquility, and we assume that a minor irradiation is not an impact, then laymen who reasonably fear for their future health would not be allowed recovery.

It is submitted that these conclusions amount to an illogical mixture of the "thin-skull" doctrine with psychological injury principles. It becomes somewhat ridiculous to use the average layman to determine whether or not the defendant was negligent, but any neurotic layman

Infra note 1090.
to test the extent of injuries. At least where radiation levels are low so that the impact really is only a psychological one, perhaps the standard used in determining negligence ought to be whether or not the defendant was negligent in the sense that the radiation released might cause a person of average mental stability to have fear and concern for his future health. Liability for mental disturbance should not be determined by whether or not the defendant was negligent in the sense that he created an unreasonable risk of physical harm of a kind which did not actually result. The rule of recovery should not be changed when the damage question is reached. There should be no allowance for harm resulting from the fact that the exposed person is peculiarly neurotic. When courts assert that a negligent wrongdoer can be held liable for all of the injuries which are the proximate result of defendant’s negligent action, using the “thin-skull” philosophy, they are assuming the answer to the question that should be faced and answered on the basis of social policy.

A recent California appellate decision well illustrates the kind of results that can follow from mixing the “average person’s reaction test” to determine breach of duty, and the “thin-skull liability for all consequences test” to govern the extent of damages. In Nelson v. Black\(^{606}\) the plaintiff’s neck was injured slightly when his truck was hit in the rear by defendant. The injury seemed quite minor at the time. Shortly after leaving the scene of the accident he noticed that his neck was hurting badly and went to his doctor. Over a period of months he had symptoms of serious pains and headaches that were hardly attributable to the initial jolt and injury to his neck. The jury found for the defendant, but the appellate court reversed, stating that under the evidence the plaintiff should recover since the defendant’s medical expert testified that the pain and suffering were real, even though they were not caused by the injury itself but because of a psychoneurosis under which plaintiff was suffering at the time of the accident. The court said:

> It is admitted that the collision actually occurred and even if plaintiff suffered no actual physical injury as a result of the collision the effect on his nervous system testified to by defendant’s only witness on the subject was none the less compensable.\(^{606}\)

In so holding, the court very clearly was assuming that the only reason for the suffering and pain was the “pre-existing quality of the emotional

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\(^{606}\) *Supra* note 600. See also as possibly involving such neurotic injuries, Flood v. Smith, 126 Conn. 644, 13 A.2d 677 (1940), apparently applying the “thin skull” doctrine whether the preexisting condition is “physical or nervous.”

\(^{606}\) Nelson v. Black, *supra* note 600 at 819.
stability of his personality.” The court then stated the usual rule that the tortfeasor must take the person whom he injures as he finds him and even if this includes susceptibility to greater than normal damage the defendant still is not exonerated. The court said that in California this rule applied even in cases where the susceptibility was caused by mental instability.

A similar case is *Purcell v. St. Paul City Ry.* in which the plaintiff suffered a miscarriage allegedly from fright resulting when the car on which she was riding seemed about to collide with another cable car, although it did not actually do so. The court said that so long as there was a physical manifestation of admittedly only mental shock (no impact) there still could be recovery.

In such a case, though there comes, as an intermediate cause between the negligence and injury, a condition or operation of mind on the part of the injured passenger, negligence is nevertheless the proximate cause of the injury.

Although proximate cause often is referred to as the reason for decision in these cases, it really is little more than a conclusion that social policy dictates that this particular type of injury should or should not be compensable. The policy question should be faced squarely and a decision made as to whether or not this kind of recovery should be allowed. It was reasonable in *Nelson v. Black* to expect or foresee an injury to the plaintiff’s neck if his car was bumped sharply from the rear. It is not reasonable to foresee that a particular plaintiff will be a psychoneurotic person who from such a slight impact will suffer unusually severe reactions. One wonders whether it is socially justifiable to conclude under these circumstances, because an unusual risk of one kind is foreseeable, that another kind of damage should be compensable. In this sense the *Nelson* case differs from the *Purcell* case, because many persons on the cable car undoubtedly had real fear of impact, although actually none took place. The fear undoubtedly would be normal to any person, not just to an especially neurotic one. Therefore it might be said that it was reasonably foreseeable that there would be a psychological shock from the impending accident. Even in the *Purcell* case the application of the “thin-skull” rule where the only impact is a mental one seems somewhat questionable, since it can be argued that the only reason there was any damage was because of the special condition of one of the passengers. In one sense it is always foreseeable that anybody

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48 Minn. 134, 50 N.W. 1034 (1892).

Id. at 139.
who comes within the line of force negligently set in motion by the de-
defendant may have some special condition which will make the injuries
particularly damaging. Whether or not to allow recovery for the par-
ticular injuries as a matter of social policy cannot be answered by this
kind of foreseeability because the result is always foreseeable by hind-
sight, and in most cases can be foreseen ahead of time if a person is
imaginative enough and thinks of enough possibilities.

In analyzing the policy question involved in radiation cases in which
mental disturbance occurs several different situations must be considered.
First, some cases will involve actual physical injuries of a compensable
character resulting from the physical impact of the radiation. Other
cases will arise in which a physical symptom manifests itself and is very
real to the victim but has not been caused by the physical impact of radia-
tion and is rather the result of the psychological reaction of the victim.
Still others will occur in which the only manifestation is mental anxiety
and loss of general peace of mind. The latter can arise both when there
is other physical injury and when there is none. One must remember also
that the uninformed average person as well as the seriously neurotic may
experience a psychological reaction leading to real physical symptoms in
situations in which a scientist would feel that there was no danger of
actual physical injury from radiation exposure. It also is true that pre-
venting fraudulent claims for psychological injuries is not easy. The
decision as to whether or not to allow recovery in any case, however,
should turn on the question of what damages society should charge to a
person who has acted negligently in some respect and who is handling a
substance of great social value but which presents some risks of injury.

If actual recoverable physical injury results from irradiation, the
Nelson case rule would permit full recovery for all physical manifesta-
tions of psychological origin no matter how neurotic and unreasonable
the disturbance was. This is an unwarranted extension of the “thin-
skull” cases and should not be carried over into the psychological reac-
tion cases. Such claims in radiation cases are likely to arise and recovery
should be permitted only if a person of normal emotional stability would
have suffered the injury.

If a person using a radiation source is negligent, he should be held
accountable for any physical injury it causes, even to the person unusu-
ally sensitive to radiation. This is the “thin-skull” situation. It is sub-
mitted that this result should not be applied where the only injury is
because of purely psychological reactions. The courts could hold, though
they should not, that there has been physical impact which killed a few
cells; they should treat them as purely psychological injury cases. If so, the person who is unusually neurotic will not be allowed to recover under existing case law.

The most difficult case of all is that in which the layman of normal emotional stability would suffer anxiety if he reasonably feared he had been exposed to radiation and its serious consequences, even though the nuclear expert would feel confident that the person should not be concerned. Under the *Purcell* case, recovery for any physical symptoms would be permitted. Applied to the case of an accident in which many persons are seriously exposed and many others just slightly, and it is impossible for the public to know who was exposed to what extent, a tremendous number of claims could arise. If recovery for psychological injuries is permitted, this would prejudice the possibility of compensating fully those with actual physical injuries who also have a claim against available funds. Allowing recoveries for purely psychological injury to all persons frightened in this situation seems doubtful social policy.

If some radiation in excess of permitted levels is released but not enough to result in physical harm so long as it is not repeated, it may be questionable policy to allow recovery for all who as a part of the uninformed public reasonably fear some physical result. The standard of conduct required of the non-negligent operator is purposely set very low so that an accumulation over a period of years will not cause injury. It may be negligent to release any more than this amount but if it happens only once no real harm can result. Perhaps recovery should be denied for even physical symptoms resulting from the public's uninformed psychological reaction to news that excess radiation has been released. The alternative is to be sure the public does not know of the incident but this is worse social policy because it may prevent a person with a legitimate claim for a physical injury from knowing that a particular source of radiation may be responsible. So long as the exposure was not intentionally caused, even though the defendant has been negligent, it seems questionable social policy to allow recovery to a large number of persons or to a single person simply because he fears injury rather than actually experiencing it, real though his symptoms may be to him.

(3) Lost Business Profits and Proximity of Atomic Installation

Most of the lost business profits cases that will arise because of release of nuclear radiation should create no unique problems for the courts.
The problems in this area are not easily resolved and the answers are not clear for all cases, but there is adequate analysis available.\textsuperscript{609} For the most part atomic energy cases will fit into the present pattern of rules concerning damages.

In general the courts have been reluctant to allow recovery for lost profits where a business is interfered with and is damaged solely because of the negligence of the defendant rather than because of intentional action on his part. On the other hand, as discussed above, if persons have been injured physically, loss of earning capacity is a compensable item;\textsuperscript{610} and when personal property or realty has been damaged so as to prevent its use in carrying on business operations, a recovery for the lost value of the use of the property is permitted, at least to the extent of normal profits, although a particularly profitable arrangement may not be compensated.\textsuperscript{611}

Many cases can be found in which a general statement is made to the effect that a destruction or interruption of a business, or an injury to a business operation, caused by the wrongful act of another is a proper element of damage.\textsuperscript{612} The cases do not depend on whether the action was in tort or contract, but nearly all involve what might be called intentional interference, although there are a few in which the loss was caused by negligence. The proof of the amount of profits lost, whether past or anticipated, is not always easy and the burden of proof, of course, is on the plaintiff.\textsuperscript{613} Some courts hold that anticipated profits are sufficiently certain to permit recovery only if they are derived from an established business, not a new one.\textsuperscript{614} Most of the cases involved losses because of physical injury, and where the operation of an atomic energy facility actually causes damage to the property of the business by radioactive fall-out, there is no reason to apply any different rule than in other kinds of cases. The results should be the same.

One somewhat unique situation may arise, however, from the use of


\textsuperscript{609} See discussion of lost earning capacity, \textit{supra} note 582 ff.

\textsuperscript{610} See discussions cited \textit{supra} note 609.


radioactive materials involving lost business profits. Will recovery be permitted for damages to plaintiff’s business if they result solely from the psychological effect of the presence of the nuclear activity? Very few cases and little discussion of this type of injury is to be found and the answer to the question is not at all clear. Yet, at least until the general public learns more about nuclear installations and radiation hazards, such situations are likely to arise frequently in the vicinity of large atomic energy facilities.

Even though there has been no accident or release of radioactive material affecting surrounding property, the mere presence of a reactor or similar installation may depress land value, whether the land is used for business or residential purposes, in the surrounding area. It is possible that patrons of a business may cease to deal with the plaintiff because of the fear generated by his proximity to the reactor. This could involve reducing the ability of the employer to hire employees to work so close to a reactor, or it could involve a loss of patronage of the general public as might be the case with resort hotels, schools, and mercantile establishments so dependent upon the patronage of the public for success. It is quite possible that public apprehension alone, even though it has no scientific basis, may be enough to damage seriously the plaintiff’s business operations. Should the school or the resort owner be allowed to prove that the public, whether ill-advised or not, stayed away because of the presence of the reactor?

Cases in which the interference with a business results from libel or slander which destroys the confidence of the public are not directly applicable because such statements are made knowingly, usually with the express purpose of injuring the plaintiff’s business—i.e., they are intentional torts. In the case of the reactor or other atomic energy facility, not only would there be little likelihood of proving an intent to injure the plaintiff’s business but the operations probably would be licensed and therefore approved by the AEC, such approval being granted only after a finding that public health and safety are not substantially endangered.

The only cases that seem at all analogous are those involving the maintenance of a nuisance. Whether a nuisance is the kind of wrong for which damages for interference with business profits would be permissible is not easy to answer. The general subject of nuisance has been thoroughly discussed by text writers.615 A determination usually is based on a balancing of “the gravity of the harm against the utility of

615 Prosser ch. 14; Harper & James §§1.23-1.30. See also discussion infra Chapter IV on strict liability.
the defendant’s activity in the light of the suitability of the area for the respective competing uses.” 618 There also are cases in which “conduct producing apprehension or fear of physical danger may, if the fear is extreme, be sufficiently annoying to amount to a nuisance, as the storing of powder or high explosives in large quantities in a thickly populated portion of a city, or the maintenance of a hospital for persons afflicted with contagious diseases in a residential section.” 617

The types of cases coming closest to the matter here under consideration are those supporting the statement by Prosser to the effect that “Fears and feelings common to most of the community are to be considered; and the dread of contagion from a pesthouse, common to ordinary citizens, may make it a nuisance, although there is no foundation in scientific fact.” 618 The hospital cases supporting this statement are as close as analogy to the reactor situation as can be found. In each situation there is apprehension, although an apparently unreasonable one from a scientific standpoint, that harm will result from the kind of activity being carried on nearby. Fear of harm from bacteria in the hospital cases produces a psychological effect similar to the concern about harm from radiation in the case of reactors; both are little understood by the general public.

In *Stotler v. Rochelle*, typical of these cases, the court said:

The question is not whether the establishment of the hospital would place the occupants of the adjacent dwellings in actual danger of infection, but whether they would have reasonable ground to fear such a result, and whether, in view of the general dread inspired by the disease, the reasonable enjoyment of their property would not be materially interfered with by the bringing together of a considerable number of cancer patients in this place. 619

The fear in this case was caused by the presence of cancer patients. As Prosser points out in his discussion, 620 there are decisions to the contrary where an injunction against the alleged nuisance was refused

616 Harper & James 74.
617 *Id.* at 77.
618 Prosser 396-97. The undertaking establishment cases are not the same for it is not fear of physical danger but generally depressed feelings from closeness to death which is complained of in those cases. See 39 A.L.R.2d 1000 (1955). Radioactive wastes stored in a Pennsylvania community caused enough public concern, apparently unjustifiably, that they were removed. BNA, Atomic Industry Rep. 4: 322, 4: 382 (1958).
619 83 Kan. 86, 91, 109 Pac. 788 (1910). Similar statements are found in the cases cited by Prosser 397, n. 78.
620 Prosser 397.
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when there was no showing that there was an actual existing danger. 621
It is interesting to note that the decisions denying relief are the most
recent of all those found, and none even dealing with this type of prob-
lem have been found since 1926. This may result from a change in the
general attitude of the public toward hospitals and a better realization
of the lack of actual danger involved. Or it may be a recognition that
the balance of interest clearly is in favor of the maintenance of such in-
stitutions. The difficulty with these cases as analogy for our problem is
that they all involve equitable relief rather than damages.

The assessment of damages if a nuisance should be declared is some-
what complicated, but there would seem to be no reason to expect the
courts to measure the damages in any unique way in atomic energy
cases. 622 Of all the cases that have been examined dealing with the
problem of damages for nuisance, only one has been found dealing
squarely with the problem of the loss of business profits caused by a
nuisance—Johnson Oil Refining Co. of Illinois v. Elledge. 623 In that
case the court allowed the plaintiff to recover the profits from his filling
station operations lost through the defendant’s maintenance of a nui-
sance in the form of coke dust which settled on the plaintiff’s property.
In several other cases the courts have either stated or clearly implied
that the loss of business profits was permissible, but in each case the
courts have found that the evidence of the loss was insufficient to
maintain plaintiff’s burden of proof. 624

The facts of Central Georgia Power Co. v. Pope 625 come as close as
any to our suggested case of loss of business because of the mere prox-
imity of a reactor. The defendant had built a dam and it was alleged that
mosquitoes bred in the backed-up water, driving most of the people from
the surrounding area. The plaintiff was a store owner who alleged that
his very profitable business was almost ruined because his customers
were gone. While there is a dictum in the official headnotes that lost
business profits might be recovered if a nuisance kept customers from

621 Board of Health v. North American Home, 77 N.J. Eq. 464, 78 Atl. 677 (1910);
Jardine v. City of Pasadena, 199 Cal. 64, 248 Pac. 225 (1926).
622 See discussion in McCormick §127. For much less complete discussions, see Pros-
623 175 Okla. 496, 53 P.2d 543 (1936).
624 Guttinger v. Calaveras Cement Co., 105 Cal. App.2d 382, 233 P.2d 914 (1951);
Bollinger v. American Asphalt Roof Corp., 224 Mo. App. 98, 19 S.W.2d 544 (1929);
Harriu v. Great Neck Motors, 143 N.Y.S.2d 472 (1955), aff’d, 153 N.Y.S.2d 568
625 141 Ga. 186, 80 S.E. 642 (1913).
ingress to plaintiff's place of business, the court denied the claim in this case because the defendant's wrongful act affected the customers, if anyone, and not the plaintiff businessman. The court said that, in actions based upon negligence only, injuries or death of one with whom a plaintiff is doing business is not a recoverable damage to plaintiff.

It is not pretended that the defendant killed some of the plaintiff's customers, and made others sick, for the purpose of destroying his business. The damages sought to be recovered on this account are too remote. If the plaintiff could recover on this basis, it is not readily perceived why a merchant might not bring an action against a railroad company for loss of custom arising from the death of a good customer caused by its negligence; or why, if one person should create a nuisance in a neighborhood, which should cause one of the residents to move to another place, every merchant with whom such person dealt before his removal could not recover because his patronage had been lost after his change of residence. It will be readily seen that such claims for damages might be extended into almost limitless ramifications. They do not fall within the rules in cases where property has been physically injured, or there has been some interference with an easement or right connected with or appurtenant thereto.

The court then distinguished the case in which, by a nuisance, plaintiff's place of business itself is rendered so unhealthy or unpleasant as to drive away the customers. In many ways the reactor also involves a neighborhood nuisance situation which keeps customers away, not because of any physical deterioration of the plaintiff's property but because of a psychological fear of the neighborhood generally. So interpreted, the Central Georgia Power Co. case stands for no recovery in our psychological nuisance situation—the injury, if any, is to the customers, not to the businessman, or at least his injuries are too remote.

On the other hand, one could argue that the psychological nuisance really is not too unlike the coke dust and other cases in which there is a physical interference with the plaintiff's property, in which case there can be recovery of business profits if the losses are properly proved. He could argue that his own property really has become psychologically unpleasant for customers, not just the neighborhood. If recovery were allowed for this psychological nuisance, the reactor owner would have to compensate all established businesses and all homeowners or others.

626 This is the only authority cited by Prosser 417, n. 91, for recovery of lost profits of an established business, though this statement of the court is apparently dictum.

627 Supra note 625 at 189-90. (Emphasis added.)
with property within a radius limited only by the psychological lines drawn by the imagination of the general public.

No doubt the effect upon the federal reactor program of a state court holding the reactor operator liable for such psychological nuisance damages would be significantly burdensome. This raises the question of the effect on state law of the fact that large atomic energy installations are licensed by the federal government. Are such damages thereby precluded?

(a) Effect of Licensing—Constitutional Questions

Since all the uses of radiation sources which will create a serious possibility of radiation injury (such as reactor operators, fuel core fabricators, companies processing radioisotopes or handling the disposal of radioactive waste material), are now federally licensed and will be so licensed for the foreseeable future, it is important to consider the effect of this program on the possibilities of bringing nuisance suits against such operations. Treatise writers seem to agree 628 that so long as the licensee acts within the terms of the license and does not act negligently or in disregard of the rights of others, his activity cannot be abated on the ground that it is a public nuisance. Prosser and also Harper and James, however, state that constitutional principles place a limit on the extent to which legislative authority can immunize the licensee from damage actions by surrounding property owners. They agree in distinguishing between “minor” and “major” 629 or “small” and “great” 630 private nuisances. The cases cited in the two treatises to support their conclusions are in point, but not only are all of the cases rather old, 631 a fact which makes them particularly unreliable authority in constitutional law matters, but also the terms “minor-major” and “small-great” are not very helpful, even if they can be considered as accurately descriptive. Actually the problem is one of a balancing of interests, in which case the distinction is not between how great or small is the inconvenience to surrounding landowners, but rather it becomes a matter of determining how much of an inconvenience it is balanced against the general desirability of allowing or encouraging the particular activity. Certainly many substantial inconveniences have been held to be non-recoverable because the activity was licensed.

The cases that have arisen so far have involved situations in which

629 Prosser 421.
630 Harper & James 87.
631 All before 1904 except for one in 1914. Supra note 628.
the licensing authority has been a part of the same government, whether state or federal, whose courts have tried the damage actions arising out of the licensed activity. This will differ from atomic energy operations which are likely to present the problem of psychological nuisance merely from the existence of the reactor, fuel core fabricating plant, or disposal operation. In the atomic energy area only the federal government issues the licenses, but, for the most part, it will be in the state courts that the damage actions will be brought. This, therefore, raises the question whether the federal government, by licensing an activity that would otherwise be considered a nuisance under state law, can immunize the licensee from an action to abate either a public or a private nuisance or prevent a damage action for the nuisance created. There is also the further question whether, assuming the federal power, the Congress in setting up the Atomic Energy Commission with its regulatory power and in providing for government indemnity for legal liability imposed upon licensees, intended to preclude either injunctions against operating or damage recovery for losses occasioned by psychological nuisance. If Congress has attempted to preclude such actions and has the power to do so, state law on this question is unimportant. Actually no state at the present time has a real licensing program for major installations, but regulatory programs are being developed and the problem will become important.

(i) The Power of Congress

The general power of Congress to regulate practically all aspects of atomic energy operations and to supersede state regulation seems clear. But this does not answer the question whether such power extends to the point of withdrawing the cause of action that otherwise would exist in the state courts against the operation of a nuisance. The question whether Congress has the power to preclude an injunction or a damage action in the state court must itself be divided into two questions: Can the federal government encroach upon the power of the state in this connection, and can the federal government encroach upon the rights of individuals not to be deprived of their liberty or property without due process? It is also important to recognize that a different answer might be given in the case of damages from that given when an injunction is sought.

632 See infra Part III, Chapter V, on state regulation and also federal pre-emption.

Interference with State Power. No cases have been found dealing with the right of Congress to interfere with the exercise of state power so far as federally licensed nuisances are concerned, but surely Congress may do so. Beginning with Gibbons v. Ogden, where the court invalidated state laws granting a steamship monopoly in New York waters, the court has consistently held that where Congress itself has power delegated to it by the Federal Constitution it may supersede state power in the area even without any expression of congressional intent. This is true even when state regulations admittedly are justified, such as in the field of public health and safety, which traditionally is thought to be primarily the concern of the states. That such federal pre-emption precludes the power of state courts to enjoin action which is illegal under state law is made clear by such cases as Amalgamated Ass'n of Street, Elect. Ry. & Motor Coach Employees of America v. Wisconsin Employment Relations Board, in which the court held that, in the light of the federal statute, a Wisconsin injunction against a peaceful strike for higher wages was not valid. The court also has held that a state may not revoke an interstate carrier's license even though the licensee was using the state highways repeatedly in violation of the state load limit regulation. So long as Congress is acting within the scope of one of its delegated powers, it does not make any difference that it has an effect on a relationship, such as even marriage, which is peculiarly a state matter. The state power to regulate can be superseded by congressional act.

A most recent example of this power to supersede the jurisdiction of the state, or one of its political subdivisions, is City of Chicago v. Atchison, T. & S. F. Ry. in which the court held that the city could not force a transportation company carrying passengers between railroad stations in Chicago to get a state license to operate, since the activity was within the power of the national government even though the op-

634 9 Wheat. 1 (1824).
635 See many of the cases discussed infra Part III, Chapter V, Section E on federal pre-emption.
erations of the company took place solely within the boundaries of the city. The court said:

We are fully aware that use of local streets is involved, but no one suggests that Congress cannot require the City to permit interstate commerce to pass over those streets. Of course the City retains considerable authority to regulate how transfer vehicles shall be operated. It could hardly be denied, for example, that such vehicles must obey traffic signals, speed limits and other general safety regulations. Similarly the City may require registration of these vehicles and exact reasonable fees for their use of the local streets . . . [but] the City has no power to decide whether the Transfer can operate a motor vehicle service between terminals for the railroads because this service is an integral part of interstate transportation authorized and subject to regulation under the Interstate Commerce Act. . . . [The] company was not obligated to apply for a certificate of convenience and necessity and submit to the administrative procedures incident thereto before bringing this action.\textsuperscript{641}

One week following the decision in the Chicago case the Supreme Court decided that the state of Washington could not raise constitutional objections to participation by contract by the city of Tacoma in a federal power project, except in a manner provided by federal statute, even though the state court had held that the city had no authority under state law to make such a contract with the federal government against the wishes of the state.\textsuperscript{642} A lower federal court had held that a federal statute could give such authority to the city \textsuperscript{643} and the Supreme Court had denied review by writ of \textit{certiorari}.\textsuperscript{644} The Supreme Court said the decision of the Ninth Circuit Court of Appeals was not subject to collateral attack since the federal statute dictated how objections were to be raised.

On the same date that the Supreme Court decided the Tacoma case, it handed down a decision in a case arising out of a reclamation project being carried out in California jointly by the state and federal governments. The court held that the federal government, in the spending of federal money and in releasing the water collected by the use of federal money, could distribute the water in such a way as to ignore the vested rights, under California law, of landowners to use water for irrigation

\textsuperscript{641} Id. at 88-89.
\textsuperscript{642} City of Tacoma v. Taxpayer of Tacoma, 357 U.S. 320, 78 S.Ct. 1209 (1958).
\textsuperscript{643} Washington v. Federal Power Comm., 207 F.2d 391 (9th Cir. 1953).
\textsuperscript{644} 347 U.S. 936, 74 S.Ct. 626 (1953).
purposes. These cases show that within its delegated powers Congress is supreme and supersedes state regulatory power.

There seems little question, then, but that Congress has the power, under commerce, war, or disposal of property powers, to supersede state laws to the extent deemed appropriate by Congress and to control the conditions under which licensees may operate in the atomic energy area. Less clear is the power of Congress to wipe out the interest, contract or property, of private individuals which have been affected by the existence or the operation of the facility.

Interference with Private Property Interests. The Supreme Court has dealt with two situations which are fairly analogous to the problem created by the atomic installation. Both of them involved the operation of a railroad and consequent injury to private persons in the neighborhood. In the first case, Baltimore & Potomac R. R. v. Fifth Baptist Church, the railroad company had been authorized by Congress to build the line together with the necessary buildings such as roundhouses. A roundhouse was erected very close to the plaintiff church, which brought an action asking damages for the discomfort occasioned by the operations. The court held that, because of the legislative grant of authority, any incidental inconvenience which unavoidably followed the use of the street by the trains did not give a cause of action, even though the noise and disturbance attending their use were bothersome. Such incidental discomforts to which all members of the public in the vicinity are subject must be endured for the general good. At the same time, after stating that the railroad company had been unreasonable in the selection of its site for the roundhouse, the court held that the defendant must respond in damages for the special injuries inflicted on the plaintiff by the roundhouse operations.

It admits indeed of grave doubt whether Congress could authorize the company to occupy and use any premises within the city limits, in a way which would subject others to physical discomfort and annoyance in the quiet use and enjoyment of their property, and at the same time exempt the company from the liability to suit for damages or compensation, to which individuals acting without such authority would be subject under like circumstances. Without expressing any opinion on this point, it is sufficient to observe that such authority would not justify an invasion of others' property, to an extent which would amount to an entire deprivation of its use and enjoyment, without compensation to the owner. Nor could such au-

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authority be invoked to justify acts, creating physical discomfort and annoyance to others in the use and enjoyment of their property, to a less extent than entire deprivation, if different places from those occupied could be used by the corporation for its purposes, without causing such discomfort and annoyance.

The acts that a legislature may authorize, which, without such authorization, would constitute nuisances, are those which affect public highways or public streams, or matters in which the public has an interest and over which the public has control. The legislative authorization exempts only from liability to suits, civil or criminal, at the instance of the State; it does not affect any claim of a private citizen for damages for any special inconvenience and discomfort not experienced by the public at large.647

In 1914 the Supreme Court decided Richards v. Washington Terminal Co.648 involving an almost identical situation except that the damages were claimed for diminution of property value of surrounding property caused by the gases and smoke discharged from a long tunnel within the city limits. The court here drew a distinction between the gases and smoke necessarily incident to the usual running of the trains and those collected from the whole length of the tunnel and discharged at one spot in such a manner as to peculiarly affect the plaintiff's property. The court said:

We deem the true rule, under the Fifth Amendment, as under state constitutions containing a similar prohibition, to be that while the legislature may legalize what otherwise would be a public nuisance, it may not confer immunity from action for a private nuisance of such a character as to amount in effect to a taking of private property for public use. . . .

But the question remains, in cases of the class now before us, What is to be deemed a private nuisance such as amounts to a taking of property? And by a great and preponderant weight of judicial authority, in those States whose constitutions contain a prohibition of the taking of private property for public use without compensation, substantially in the form employed in the Fifth Amendment, it has become established that railroads constructed and operated for the public use, although with private capital and for private gain, are not subject to actions in behalf of neighboring property owners for the ordinary damages attributable to the operation of the railroad, in the absence of negligence. Such roads are treated as

647 Id. at 331-32.
public highways, and the proprietors as public servants, with the exemption normally enjoyed by such servants from liability to private suit, so far as concerns the incidental damages accruing to owners of non-adjacent land through the proper and skillful management and operation of the railways. Any diminution of the value of property not directly invaded nor peculiarly affected, but sharing in the common burden of incidental damages arising from the legalized nuisance, is held not to be a “taking” within the constitutional provision. The immunity is limited to such damages as naturally and unavoidably result from the proper conduct of the road and are shared generally by property owners whose lands lie within range of the inconveniences necessarily incident to proximity of a railroad. It includes the noises and vibrations incident to the running of trains, the necessary emission of smoke and sparks from the locomotives, and similar annoyances inseparable from the normal and non-negligent operation of a railroad.\(^649\)

The court proceeded to emphasize that normally such incidental inconveniences as are really necessary are protected by the legislative authority. The court then said:

The present case, in the single particular already alluded to—that is to say, with respect to so much of the damage as is attributable to the gases and smoke emitted from the locomotive engines while in the tunnel, and forced out of it by the fanning system therein installed, and issuing from the portal located near to plaintiff’s property in such manner as to materially contribute to render his property less habitable than otherwise it would be, and to depreciate it in value; and this without, so far as appears, any real necessity existing for such damage—is, in our opinion, within the reason and authority of the decision just cited. . . . The case shows that Congress has authorized, and in effect commanded, defendant to construct its tunnel with a portal located in the midst of an inhabited portion of the city. The authority, no doubt, includes the use of steam locomotive engines in the tunnel, with the inevitable concomitants of foul gases and smoke emitted from the engines. No question is made but that it includes the installation and operation of a fanning system for ridding the tunnel of this source of discomfort to those operating the trains and traveling upon them. All this being granted, the special and peculiar damage to the plaintiff as a property owner in close proximity to the portal is the necessary consequence, unless at least it be feasible to install ventilating shafts or other devices for preventing the outpouring of gases and

\(^{649}\) *Id.* at 553-54. (Emphasis added.)
smoke from the entire length of the tunnel at a single point upon the surface, as at present. *Construing the acts of Congress in the light of the Fifth Amendment*, they do not authorize the imposition of so direct and peculiar and substantial a burden upon plaintiff's property without compensation to him. If the damage is not preventable by the employment at reasonable expense of devices such as have been suggested, then plaintiff's property is "necessary for the purposes contemplated," and may be acquired by purchase or condemnation (32 Stat. 909, 916, c. 856, § 9), and pending its acquisition defendant is responsible. If the damage is readily preventible, the statute furnishes no excuse, and defendant's responsibility follows on general principles.\(^{650}\)

The court then remanded the case to the lower court to solve what it admitted to be a difficult problem of distinguishing between that part of the smoke which was attributable to the gases and smoke necessarily arising from train operations from the gases and smoke issuing from the tunnel.

Applying the rationale of these cases, one might surmise that if the reactor operator, for example, should, through negligence or even without negligence, emit more radioactive material into the air or into a stream than was permitted under the federal license there would be a cause of action in favor of an injured party. On the other hand, any damages that might result from material discharged within the limits set in the license might be called necessarily incident to the normal operation of the facility as licensed by the government. The curtailment or destruction of the business of a resort hotel, housing development, school or similar institution because of the purely psychological nuisance created by public fear of a nearby reactor or other atomic energy facility would seem to be the very kind of damages necessarily incident to the existence of the reactor. The Atomic Energy Commission specifically finds as to each major installation that the site, as well as the operation, will not constitute an unreasonable hazard to the public health and safety.

It is not accurate to describe this as a minor or small loss so far as the plaintiff is concerned. Nevertheless, balancing this admittedly significant loss against the needs of the country for these operations in developing atomic energy, it would seem unwise to allow damage actions which would be a continuing burden on the operation of the nuclear installation. This is true when the AEC has found the operation to be a safe one.

\(^{650}\) *Id.* at 556-57.
The fact that the Baltimore & Potomac and Richards cases involve nuisances not within a state but within the District of Columbia (federally owned territory) does not affect the application of the principles to cases arising out of reactors situated in states. So far as its effect on individuals is concerned, the constitutional limitation upon the legislative authority to permit a "nuisance" is the same. It is derived from the Due Process Clause. Since the cited cases are rather old and involve operations of a public utility which was a very necessary part of our economic life, the question naturally arises as to whether the same reasoning would be followed today, not only when the facility is owned and operated by a public utility (although it be an electric utility instead of a railroad), but also in cases involving research or other industrial reactors or other large plants not related to a public utility. Several research reactors are already being operated privately in this country, by both universities and industrial concerns.

No subsequent cases have been found dealing with the problem of governmental authorization of what would otherwise be a nuisance. The attitude of the present Supreme Court must be derived from other types of cases which seem to involve similar policy questions, cases in which the rights of private individuals are interfered with by the government in such a manner as to deprive the person of something of value, whether it be vested or not, by way of a regulation which results in giving some other private person a consequent advantage, such as by the avoidance of a contract or other legal liability. Since there is no specific constitutional provision against federal impairment of contract rights such protection depends upon the Fifth Amendment Due Process Clause protecting liberty and property. Cases in which federal statutes actually have taken away a contract right of some pecuniary value are useful analogies that should be considered along with those cases involving the taking of property rights in the traditional sense.

*Under War Power.* Some of the cases in which there has been the clearest invasion of a significant pecuniary interest have arisen out of the activities of the government during World War II in the exercise of the war power. The setting of maximum prices on commodities, and on rents, which in each case rolled the prices back from the levels

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at the time when the regulations were promulgated, undoubtedly had a substantial pecuniary impact on many individuals, not only prospectively but retroactively as well, since they controlled all goods sold and all rental of property after the effective date of the regulation even though the goods or the rental property had been acquired prior to the passage of the act. The over-all reciprocity of advantage involved in such price control regulations perhaps reduces somewhat the amount of the taking, just as does the reciprocity of advantage in the zoning cases. Another kind of war regulation which may come somewhat closer to an actual taking without any real reciprocity of advantage, except the general and remote one of lower taxes, arose out of the Renegotiation Act which provided for recapture by the government of “excessive profits.” The court gave a very short answer to the argument that renegotiating of profits was a taking of property contrary to the Fifth Amendment. It said “Not only was it ‘necessary and proper’ for Congress to provide for such production [of war material] in the successful conduct of the war, but it was well within the outer limits of the constitutional discretion of Congress and the President to do so under the terms of the Renegotiation Act.” The court held that the provisions of the act were applicable to even subcontractors who had no direct relations with the federal government; their contracts also were made subject to recapture of “excessive profits.”

Perhaps the clearest case of all in which the government regulations for practical purposes destroyed, for the time being at least, something of considerable economic value to the plaintiffs is United States v. Central Eureka Mining Co. The government regulations resulted in actual closing of the gold mines during the period of the war. It was claimed that while the government did not actually take possession of any of the gold, it in effect had completely destroyed the plaintiff’s economic rights to the gold by preventing all mining of it. While the lower federal court felt that this very clearly was a taking, since it amounted to a complete destruction of the plaintiff’s right, the Supreme Court reversed on the ground that any restrictions were temporary in nature and there had been no actual taking of the property. Mr. Justice Harlan dissented on the ground that the property had been taken temporarily.

655 Id. at 168-69.
656 Id. at 179.
In each of these cases arising out of wartime regulations very substantial pecuniary loss had been suffered by the plaintiff, but recovery of damages was denied. Certainly in many of the cases, particularly in the gold mine cases, there was as much, if not more, “taking” than would be involved in the loss of patronage by a business due to a reactor’s psychological nuisance effect. Undoubtedly the most profitable use of property surrounding a proposed reactor in many cases would be the existing one and this use would be damaged by the psychological nuisance. Yet the land undoubtedly could be used for other purposes of a profitable nature, and it would seem to be no more of a taking than those involved in the cases cited above.

The difficulty with using the war cases, however, is that they are an exercise of the war power. As stated by the court in the Lichter case:

In total war it is necessary that a civilian make sacrifices of his property and profits with at least the same fortitude as that with which a drafted soldier makes his traditional sacrifices of comfort, security and life itself.\(^{657}\)

As the court put it in the Eureka Mining Co. case:

In the context of war, we have been reluctant to find that degree of regulation which, without saying so, requires compensation to be paid for resulting losses of income. . . . The reasons are plain. War, particularly in modern times, demands the strict regulation of nearly all resources. It makes demands which otherwise would be insufferable. But wartime economic restrictions, temporary in character, are insignificant when compared to the widespread uncompensated loss of life and freedom of action which war traditionally demands.\(^{658}\)

**Under Commerce Power.** Cases arising under the commerce power of Congress are not subject to the same justification of wartime necessity. Many examples exist of exercise of the commerce power by Congress in a manner that substantially affects the contract or property rights of individual persons. The regulation of maximum hours and minimum wages to be paid persons producing goods for interstate commerce,\(^{659}\) and the control of the uses to which a farmer can put grain raised on his own land, even to the point of denying him the right to use it to feed his own livestock,\(^{660}\) are examples of very substantial encroachments upon the liberty and property of individual persons, and

\(^{657}\) *Supra* note 653 at 754.

\(^{658}\) *Supra* note 654 at 168. (Emphasis added.)

\(^{659}\) *United States v. Darby*, 312 U.S. 100, 61 S.Ct. 451 (1941).

\(^{660}\) *Wickard v. Filburn*, 317 U.S. 111, 63 S.Ct. 82 (1942).
the court has upheld such invasions of pecuniary interest as necessary to the control of the national economy. Compensation need not be paid for such invasions. The attitude of the Supreme Court toward regulations based upon the commerce power of Congress is exemplified by the following statements from the opinion in North American Co. v. S. E. C., where the Court upheld a decree under the Public Utility Holding Company Act of 1935, even though it forced the breaking up of property holdings of a company acquired over a long period of years.

This broad commerce clause does not operate so as to render the nation powerless to defend itself against economic forces that Congress decrees inimical or destructive of the national economy. Rather it is an affirmative power commensurate with the national needs. It is unrestricted by contrary state laws or private contracts. And in using this great power, Congress is not bound by technical legal conceptions. Commerce itself is an intensely practical matter. To deal with it effectively, Congress must be able to act in terms of economic and financial realities. The commerce clause gives it authority to act.

Another situation in which there is a real, though perhaps minor, taking of property justified under the commerce power is found in the union shop provisions of the Railway Labor Act. They provide that to keep employment each employee must join the union and pay dues. The power of Congress to impose such a requirement was questioned in Railway Employees' Dept. v. Hanson. Even though such provisions were apparently contrary to the state constitution, the Court held that whether union shops were good or bad was a policy question with which the courts should not interfere; its determination was for Congress.

Congress, acting within its constitutional powers, has the final say on policy issues. If it acts unwise, the electorate can make a change. The task of the judiciary ends once it appears that the legislative measure adopted is relevant or appropriate to the constitutional power which Congress exercises. The ingredients of industrial peace and stabilized labor-management relations are numerous and complex. They may well vary from age to age and from industry to industry. What would be needful one decade might be anathema the

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663 Supra note 661 at 705.
next. The decision rests with the policy makers, not with the judiciary.\textsuperscript{665}

The Court held that the requirement of financial support by all the workers of the collective bargaining agency was within the commerce power of Congress.

The Commerce Clause case that comes as close as any to holding that very real and substantial pecuniary rights can be prejudiced or taken away in the interests of the national economic policy arose out of the Portal-to-Portal Pay Act which Congress passed to take away the extra pay to which the workers would have been entitled for time spent walking from the gate to the work bench under the Fair Labor Standards Act as it had been interpreted in a previous Supreme Court decision. The workers claimed that their rights had vested and were protected by the Due Process Clause of the Fifth Amendment. The Supreme Court denied \textit{certiorari},\textsuperscript{666} after the circuit court held that there was no violation of the Due Process Clause. The Circuit Court used the following language:

Plaintiff could not expect that their status or rights would remain unchanged through changing circumstances and conditions. They could reasonably anticipate changes in the law. The proposition that their rights granted by the Congress under the commerce clause could not be taken away by congressional legislation under the same clause, is self-contradictory. Rights secured even by private contract may be abrogated by subsequent legislation when authorized by constitutional provisions.\textsuperscript{667}

After holding that the law was not invalidated by being in some respects retroactive since it was only a civil case, the court stated that the validity of the policy was for Congress to decide so long as Congress was not "arbitrary, unreasonable or capricious."\textsuperscript{668}

The fact that the cause of action involved rights arising from a statute certainly was emphasized by the court as justifying congressional

\textsuperscript{665} Id. at 234.
\textsuperscript{666} Fisch v. General Motors Corp., 335 U.S. 902, 69 S.Ct. 405 (1949).
\textsuperscript{667} Fisch v. General Motors Corp., 169 F.2d 266, 271 (6th Cir. 1948).
interference. Yet there should be no distinction between a legal right created by statute, where there is no reservation of a right to change an interest vesting under the statute, and rights created by common law decisions. There is no reason for one who may have relied upon a statutory right to anticipate its modification any more readily than he would expect common law rules governing contracts, property or tort rights to be changed by court decision or by statute. The basic question would seem to be whether the legislature, in carrying out some important national or state legislative policy within its general powers, can affect existing rights to the point of reducing pecuniary values if it seems appropriate and desirable. It is not a case of the government appropriating interests for its own use, as in condemnation cases, but rather of regulating the national economy and, where necessary, infringing upon private contract or property rights which incidentally are in conflict with the national policy. There seems little constitutional justification for drawing a line between cutting off a cause of action, such as for psychological nuisance damages in the case of an atomic reactor or disposal plant, and telling a worker that wages he was entitled to under a prior statute are now being taken away. It is a degree question: balancing the private interests against the necessity for the national policy. The one would seem to be no more capricious or arbitrary than the other.

The case that illustrates more dramatically than any other the extent of the congressional discretion pursuant to a delegated power to supersede the rights of private individuals, and to alter them significantly from the standpoint of pecuniary values, is *Norman v. B. & O. Ry.*, the famous "gold clauses" case. In establishing fiscal policy during the "Hoover-Roosevelt" depression of the 1930's, Congress provided that gold clauses in contracts stipulating payment in gold dollars of a certain number of grains of gold were invalid and not to be enforced. It was argued that this clearly was a taking of property in violation of the Fifth Amendment Due Process Clause. In meeting this argument, the court said:

This argument is in the teeth of another established principle. Contracts, however expressed, cannot fetter the constitutional

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authority of the Congress. Contracts may create rights of property, but when contracts deal with a subject matter which lies within the control of the Congress, they have a congenital infirmity. Parties cannot remove their transactions from the reach of dominant constitutional power by making contracts about them . . .

This principle has familiar illustration in the exercise of the power to regulate commerce. If shippers and carriers stipulate for specified rates, although the rates may be lawful when the contracts are made, if Congress through the Interstate Commerce Commission exercises its authority and prescribes different rates, the latter control and override inconsistent stipulations in contracts previously made. This is so, even if the contract be a charter granted by a State and limiting rates, or a contract between municipalities and carriers. 670

The Court then proceeded to say that:

The principle is not limited to the incidental effect of the exercise by the Congress of its constitutional authority. There is no constitutional ground for denying to the Congress the power expressly to prohibit and invalidate contracts although previously made, and valid when made, when they interfere with the carrying out of the policy it is free to adopt. 671

The Court concluded that "If the gold clauses now before us interfere with the policy of the Congress in the exercise of that authority they cannot stand." 672

Again in this case a very substantial pecuniary interest was wiped out by federal legislation. In making it applicable to existing contracts, interests of individuals of substantial proportions literally were being destroyed. It is submitted that the interest wiped out in these cases is every bit as substantial as injury to surrounding landowners and businesses resulting from the psychological nuisance of nuclear operations.

There are many other illustrations. Pecuniary expectations may be adversely affected when a suit barred by a statute of limitations is reinstated by repealing the statute, yet the court always has held this to be within the legislative power, not a taking without due process. 673 An exercise of the power of government to carry out economic policies that have a substantial pecuniary impact upon mortgages was held valid in the

671 Id. at 309-10.
672 Id. at 311.
cases upholding state mortgage moratorium laws.674 Municipal zoning ordinances have been sustained although they substantially alter economic interests of landowners who do not conform to the use limitations imposed in their area.675 Interests having substantial pecuniary value may be impaired by municipal or state regulation in the interests of public health and welfare, as is illustrated by the case involving the prohibition of the operation of a brick kiln once the city grew out around the kiln, even though it had been in operation long before the area became populated,676 and by the case in which a state regulation prohibited the use of a distilling plant manufacturing intoxicating liquor, although the plant had been in operation for a considerable period of time before the adoption of the prohibition law,677 or also in the case involving a state law which required the removal of ornamental red cedar trees without compensation so as to preserve the neighboring apple orchards attacked by parasitic fungus.678

In each of these cases there was a very substantial impairment of financial values, although imposed by states instead of by the federal government. In finding that such impairment did not violate the Due Process Clause of the Fourteenth Amendment the court used reasoning to support the use of the general police power of the states which would also justify regulations by Congress under one of its delegated powers. The reasoning equally supports the use of the commerce, war, or property powers of Congress to regulate and adjust economic interests arising out of the operation of atomic energy facilities. In all such cases it is a question of balancing the amount of the impairment against the necessity for regulation, with a decision by the legislature that certain interests must give way even though no compensation is provided.

Reciprocity of advantage is often used as one justification for the exercise of government power in zoning cases. It is important to note that there is some reciprocity to the owners of land and businesses in the vicinity of a reactor in the provisions of the federal indemnity act which provide a very large fund to compensate for physical injury to person and property by reactor incidents. The availability of such a


fund would seem to be a reasonable reciprocal advantage justifying the taking away of any cause of action for a psychological nuisance damage, assuming that Congress intended to preclude such recoveries in the case of reactor whose operation and location had been specifically approved by the AEC.

Under Condemnation Power—What Is a "Taking"? Some light also may be shed on the power of Congress to preclude psychological nuisance damage actions by cases concerning the federal government's power to condemn property. Such cases at first glance might seem inapplicable to the possible reactor nuisance since they deal with the question of for what property interests must the government pay fair compensation when the government itself takes property. They do not deal with private persons infringing the property rights of others. Nevertheless, they are valuable analogies in two respects; first, many reactors are going to be built by public utilities which either use or have eminent domain power, and second, they give some indication of the interference with property deemed sufficient to require payment of fair compensation. To the extent that property interests are considered compensably impaired by less than a complete taking, this conclusion would seem to be based upon the same reasoning involved in deciding whether a government in effect has permitted a private taking by regulating the contract or tort rights of parties in such a way as to permit similar impairments.

We are concerned especially with the court's attitude concerning the kind of peripheral or incidental damages deemed compensable as part of the taking. For example, United States v. Causby concerned regular, although not constant, flights of government aircraft at low altitudes over plaintiff's chicken farm so that the chickens killed themselves by flying into fences, and his home became an uncomfortable place in which to live. The court readily recognized this as a taking even though there was no actual, permanent, continuous occupancy of the property by government agents. The court held that not only was there a taking when the plaintiff's property was made completely uninhabitable, but a taking resulted when the government's use of the air space immediately above the land seriously limited "the utility of the land and caused a diminution in its value." The Court said that the flying of airplanes in this manner was like firing guns over a man's property, which had been held to be a taking in an earlier case. The facts in United States

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680 Id. at 262.
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v. Causby, however, differ from the psychological nuisance situation posed, because there was an actual invasion directly over plaintiff's property by a physical object put in motion by the government.

Where the government has taken less than the entire fee, such as taking a leasehold interest for less than its full period, a taking occurs for which "consequential damages" will be allowed for such expenses as moving costs and losses from destruction of fixtures, or for the going-concern value of business trade routes taken over for less than the full term of years. Where the entire fee is taken, however, moving expenses and other such incidental damages are not awarded. While these cases indicate a liberal attitude in determining the value of what is taken, they do not deal with damage to nearby lands and businesses and hence do not control the question of the psychological damage caused by a nuclear plant.

There is, however, a series of cases which comes much closer to the psychological nuisance case. They involve the awarding of damages to a landowner whose land has been taken in part, not only for what might be thought to be the proportionate market value of the part taken but also for the diminution in the value of the rest of the land resulting from the taking of only a part of it. One of the earlier cases allowing this type of award is United States v. Welch, where Justice Holmes, in one of his deceptively lucid short opinions which does little more than indicate the conclusion, found that the plaintiff was damaged not only to the extent of the land taken but also because of the diminution in value of farm land when his only access to a county road was cut off by the strip condemned. The court said that the practical destruction of the right of way amounted to a taking.

Even more illuminating is a series of circuit court opinions beginning with West Virginia Pulp & Paper Co. v. United States. The court there stated that when only part of a unitary tract of land is taken just compensation must include damages for diminution of the value of the remaining land. The court's allowance of still a third item of damages has even greater significance for our psychological nuisance case. The court said:

A part of the land acquired and held by the company as a site for plant expansion was taken for use by the government as a place for storing large quantities of highly inflammable and


685 200 F.2d 100 (4th Cir. 1952).

686 Id. at 104.
explosive gasoline; and the company was damaged not merely by the loss of the land taken but also by the depreciation that resulted in the value of the remainder of the land by reason of the proposed use. It was entitled to be awarded such sum as would put it in as good position pecuniarily as it would have been in if its property had not been taken. [Citation omitted] A land owner, a part of whose land is taken for the storage of large quantities of gasoline, is certainly not placed in such position unless he receives compensation for the damage done to the remainder of the land left on his hands as well as the value of the part taken.887

This is fairly analogous to our psychological nuisance case, and the court held that it was a proper item for compensation. The West Virginia Pulp decision was followed by the Fourth Circuit Court of Appeals in United States v. Wateree Power Co.,888 where the taking of about one-third of a total tract resulted in an award of severance damages because the acres taken bordered a river and cut off access to the river from the remaining property. Apparently there was no claim that the government's intended use of the condemned property would further depress the value of the remaining tract.

On the other hand, in Boyd v. United States889 the Eighth Circuit Court of Appeals was faced with a claim for damages for the taking of fifteen acres of plaintiff's farm to become part of a 5,000-acre government airbase. The plaintiff apparently complained of the depreciation of the remainder of his eighty-two acre farm from the operation of an airbase so close to it. The court approved the trial court's refusal of evidence to prove this kind of consequential damage. It said that none of the acres taken from the plaintiff were to be used for a purpose different from the use of other lands to which it was to be joined. The evidence could not be used to prove damages by way of depreciation of the rest of plaintiff's farm.690 The court seems to indicate that the damages for depreciation of the remaining property because of the particular use to which the government is to put the condemned property can be claimed only when it is the use of the property taken from the plaintiff that causes a depreciation and not when it is the use made of land taken from others.

The Court of Appeals for the Fourth Circuit was faced with a re-

887 Id. at 103.
888 220 F.2d 226 (4th Cir. 1955).
889 222 F.2d 493 (8th Cir. 1955).
890 Id. at 496.
lated but somewhat different problem in *Nunnally v. United States*.*\(^{691}\) Here the plaintiff complained that his vacation retreat island had ceased to be "a relaxing place to go" because the government had acquired land close to the plaintiff's island in order to carry on proving ground activities, including airplane drops of bombs for test purposes. The trial court found that the plaintiff's property had been decreased in value about $1,500 but held there was no compensable taking. The plaintiff claimed that his property was invaded by the noise and shock of test explosions and by the flight of aircraft over the island. The court said this was not like the *Portsmouth Harbor* case\(^{692}\) where the shells were fired over the plaintiff's land but rather it was a case where there were damages but not taking; here the damages were consequential only:

The damages alleged in that case were not consequential; they were the product of a *direct invasion of claimant's domain*. But damages which are the incidental result of lawful governmental action, without any direct invasion of private property, are consequential; they do not constitute a taking under the Fifth Amendment.

Plaintiff has suffered no peculiar damage. His annoyance is of the same type to which everyone living in the vicinity is subjected in varying degrees. There is, at most, a "sharing in the common burden of incidental damages". *Richards v. Washington Terminal Co.* . . . If it should be held that the facts in the present case constitute a taking, any reduction in the value of property attributable to a federal activity might be urged as a valid claim against the United States. The distinction between a "damage" and a "taking", so carefully preserved by the courts, would be obliterated.\(^{693}\)

Something fairly close to the psychological nuisance situation arose in *United States v. 329.05 Acres of Land*.\(^{694}\) In this case the lands of four different owners were taken by the government for the creation of an ammunition storage depot. Some of the land of each owner was taken in fee and some by way of a safety easement. The question before the court was the compensation to be paid to each. The depot itself was located on the land of only one of the four seeking compensation. The lands of the others were taken for the purpose of building access roads and creating safety easements restricting the use of the property so that residences and other activities bringing together large groups of people

\(^{691}\) 239 F. 2d 521 (4th Cir. 1956).

\(^{692}\) *Supra* note 681.

\(^{693}\) *Supra* note 691 at 524. (Emphasis added.)

could be prohibited. None of the buffer zones had been put to other use by the government. The lands taken were not being used currently and they were somewhat swampy in character, yet apparently a residential subdivision was a likely possibility several years in the future. The court, following the *Boyd* case, held that, when only part of the land was taken, any diminution or impairment of the remainder of the land caused by the use of the land taken by the government was compensable, but that severance damages may not include damages to any owner if the damage resulted from the use to which the government put the lands which were in the same project but which were obtained from others. Thus, only the one owner properly could claim severance damages to his remainder land resulting from the fact that the government was constructing an ammunition depot. 695

The allowance of severance damages to the extent that the physical severance itself actually causes the value of the remainder land to diminish, such as can happen when access to a waterway is cut off by the parcel taken, seems quite properly awarded as part of the compensation for the taking. This is an effect of the taking that happens only to the owner whose access to a waterway for example has been cut off. On the other hand the distinction made between the recovery for what we have termed psychological nuisance affects all adjoining land, whether it is remainder land of the owner part of whose land has been taken or adjoining land belonging to another. As to psychological nuisance damage the distinction is utterly ridiculous. The use the government is planning to make of the part condemned has no more effect on the remainder land than it does on adjoining land owned by others. The use of the condemned land as an ammunition depot or air base is just as detrimental to adjoining land as it is to remainder land.

Nevertheless, the distinction suggested by the federal cases seems to be followed by state courts as well, 696 whether it be the state itself or a public utility with a power of eminent domain that is taking the land. While some state constitutions now provide for award of damages incident to a taking of land, 697 thus avoiding the narrow construction of a compensable taking under the old rule, generally the courts keep the distinction between effects of physical severance and psychological nuisance effects. There may be an historical explanation for the rule, but it does not make sense from a policy standpoint. Nevertheless, this

695 Id. at 70-71. Citing also Campbell v. United States, 266 U.S. 368, 45 S.Ct. 115 (1924) (nitrate plant).
696 See cases collected in Annot., 170 A.L.R. 721 (1947) and 6 A.L.R.2d 1197 (1949).
697 See states listed in Richards v. Washington Terminal Co., supra note 648 at 554.
seems to be the law. What result would be reached if this doctrine were applied to the nuclear psychological nuisance case?

If the government (and probably the same is true of a public utility exercising the eminent domain power) condemns less than a whole unit of land, the owner can recover for diminution in value of the remainder arising from the psychological nuisance effect of the use made of the condemned part. The neighboring land owned by others, which would be just as diminished in value because of the psychological nuisance, has suffered no compensable loss.

When the eminent domain power is not involved, such as when an atomic installation is operated by a purely private concern for a nongovernmental purpose, it would seem that the same basic constitutional considerations should govern. If the government need not compensate for psychological nuisance damage to adjoining land, surely the government may adopt a rule that psychological nuisance damages from private plants shall not be recoverable. The preservation of the public pocketbook perhaps is not so important a factor in the case of a private concern not carrying on a public utility function. On the other hand, if the government decides that a national need exists for development of nuclear energy for commercial and war purposes and that protection should be given against recovery for psychological nuisance damage, it still is carrying out a general governmental policy and ought to be governed by the same policy considerations. In fact, as indicated by the "gold clauses" cases, usually the court will hold the government itself to a higher standard under due process than if rights between private parties only are involved.

Conclusions as to Congress' Power to Immunize. Undoubtedly Congress can supersede any power of the states so far as controlling tort liability of large nuclear installations is concerned. The Fifth Amendment, however, does provide some protection against an arbitrary interference by the federal government with private property rights. If substantial quantities of radioactive material are allowed to fall-out on private property so that it could be asserted that special damages have resulted to the plaintiff's land, there is authority in older cases that the government cannot immunize the wrongdoer from liability. In the light of more recent cases decided in connection with somewhat different kinds of situations but involving the same policy considerations, it seems rather clear that maximum recovery can be limited as provided

for in the federal indemnity statute. As to small amounts of fall-out, even under the old cases Congress seems to have the power to provide for no recovery at all, because this would seem to be not special damages but simply the damages necessarily incidental to the operation, like normal smoke and noise from operation of a railroad. Congress clearly can immunize the operator from liability for damages from the psychological nuisance created by the mere existence of the reactor in the neighborhood. The balancing by Congress of the needs of landowners subjected to psychological nuisance damage and of society for rapid development of the nuclear industry surely would not be upset by the Supreme Court. It is better policy to refuse to give psychological damages the status of a constitutional right and instead leave it to the legislature to balance the interests and decide whether this kind of damages should be allowed, and if so, to what extent and with what limitations. It is doubtful that the United States Supreme Court would say that such a law denying a cause of action for psychological damages is beyond the commerce and war powers of the federal government.

(ii) The Intent of Congress

Even after it is found that the federal government has the constitutional power to give such immunity from psychological nuisance damage actions, it still must be determined whether Congress intended to preclude such actions. Since there is nothing specific on the matter in either the Atomic Energy Act of 1954 or the 1957 indemnity amendment, the question becomes one of implied pre-emption of the field. Detailed discussions of the pre-emption question as it relates to state power to license and regulate atomic energy entrepreneurs coming under the federal act is found elsewhere. Likewise, the problem of the impact of possible federal pre-emption on damage remedies generally is treated later. These discussions need not be repeated, but application of the conclusions drawn can profitably be made here. The specific question is whether the federal program precludes a state from enjoining the operation of an atomic energy facility or awarding damages to private persons for the psychological nuisance created by the mere presence of the facility.

When the Atomic Energy Commission in a quasi-judicial proceeding authorized by statute makes a decision in a specific case that a licensee

699 *Infra* Part III, Chapter V, Section E on federal pre-emption.
700 *Id.*, discussion following note 275. See also *infra*, Part I, Chapter III, discussion at notes 1273-78.
may operate in a certain way in a particular place, this is almost sure to be held to pre-empt the field and prevent the states from requiring licenses or imposing other pre-operational regulations upon such activities.\textsuperscript{701} This is particularly true when the federal statute and the agency created by it have provided for health and safety matters comprehensively and in great detail.\textsuperscript{702} It seems fair to conclude that the Congress wanted the kind of flexibility in setting and enforcing safety designs and standards “which centralized administration makes possible so as to encourage experimentation and variation on the part of licensees in the hope of obtaining both greater economy and safety. This does not appear to be the time, for example, for the state to specify the precise amount, design, and type of shielding material that is necessary to operate a nuclear reactor or other atomic energy device and it is doubtful that Congress intended the almost inevitable frustration of its policies by such state licensing specifications.”\textsuperscript{708} It is also true that, “Not only does the Commission study the proposed atomic installation itself and the radiation safety precautions within it, but it also gives due consideration to all the local geographic (i.e., population density, \textit{etc.}), geologic, and meteorologic features as well. In short, when the license is issued, the Commission, pursuant to congressional directive, has determined that the particular licensee is qualified to construct and operate a particular atomic energy installation at a specified location, for specified purposes, and in a specified manner.”\textsuperscript{704}

As to pre-operation activities of the licensee, our conclusion is, “In the light of the above considerations, it seems reasonably safe to assume that the Supreme Court will hold that Congress has prevented any state or local government from requiring a person, who is licensed or otherwise authorized by the Commission, to obtain prior state or local permission to operate if the granting or denying of that permission is predicated upon an independent analysis of standards of radiation health and safety.”\textsuperscript{705} It also seems reasonable to conclude that “Local zoning ordinances which clearly discriminate against atomic energy uses and facilities, merely because they constitute radiation hazards deemed undesirable by the community, will probably suffer the same fate as state licensing requirements.”\textsuperscript{708} It also seems clear that any action which

\textsuperscript{701} \textit{Infra} Part III, Chapter V, Section E on federal pre-emption.
\textsuperscript{702} \textit{Id.}, see discussion in text at notes 389-423, and seven reasons listed in text between notes 423-43.
\textsuperscript{704} \textit{Id.} at text at note 441.
\textsuperscript{705} \textit{Id.} at text at note 450.
\textsuperscript{708} \textit{Id.} at text at note 453.
imposes a heavier burden on Atomic Energy Commission licensees also will be held to be pre-empted by federal action because the additional cost of meeting higher state standards undoubtedly would tend to discourage developments which Congress has indicated it wants to support,\(^707\) even though it may be possible for the states to help enforce standards and regulations laid down by the AEC.\(^708\) It must be remembered that the state can intervene in a proceeding to determine whether a license ought to be granted or not.\(^709\) Except where there is an immediate, significant threat to public health and safety, there is a route through the Atomic Energy Commission to ask for modification, suspension, or revocation of licenses. With this channel open, it seems very unlikely that the state will be allowed in a non-emergency case to use any of its own enforcement procedures.\(^710\)

In the light of these conclusions, any attempt by the state to enjoin activities specifically licensed by the Atomic Energy Commission, merely because of the psychological nuisance they may create in the public mind would surely be as invalid as would a state licensing system. The effect of an injunction, whether based upon private or public nuisance, would seem to run counter to the very policy arguments that dictate a preclusion of state licensing. The psychological nuisance arises out of the mere existence of the reactor which is in complete compliance with the federal regulations. Since the existence of this kind of facility, operating in this way, in this place, has been approved specifically by the federal agency, the state has no power to enjoin any activity, even if it considers it a nuisance, public or private. There is not even the possible justification for state action to meet an emergency health hazard in this case.

Where there is provision in the federal statute for all interested parties to participate in an administrative hearing and also provision for judicial review, the scope of federal pre-emption is made dramatically clear in the very recent Supreme Court decision, *City of Tacoma v. Taxpayers of Tacoma*.\(^711\) The case involved the right of the city of Tacoma to enter into a contract with the federal government under the Federal Power Act. The construction of a dam made it necessary to condemn a fish hatchery owned by the state of Washington. The court denied the right of the state to object to one of its own municipalities,

\(^{707}\) *Id.* at text at note 464.  
\(^{708}\) *Id.* at text at note 472.  
\(^{709}\) *Id.* at text at note 460. Sec. 189 of 1957 Act is discussed at notes 458-60.  
\(^{710}\) *Id.* at text at note 477.  
\(^{711}\) *Supra* note 642.
the city of Tacoma, entering into a contract with the federal government in such a way as to condemn state property against the state's desires. The court held that since there was provision in the federal act for any interested party to participate in the Federal Power Commission hearing, the state should have asserted its rights before the Commission. In connection with the powers of Congress to limit the action that a state could take as to its own municipality, the Supreme Court said, that there was no question but that Congress had power to set the conditions and procedures for review and the courts in which it was to take place.112 The court said:

Hence, upon judicial review of the Commission's order, all objections to the order, to the license it directs to be issued, and to the legal competence of the licensee to execute its terms, must be made in the Court of Appeals or not at all. For Congress, acting within its powers, has declared that the Court of Appeals shall have "exclusive jurisdiction" to review such orders, and that its judgment "shall be final," subject to review by this Court upon certiorari or certification. Such statutory finality need not be labeled res judicata, estoppel, collateral estoppel, waiver or the like either by Congress or the courts.118

Provisions for intervention in Commission proceedings and the power of judicial review found in the federal act referred to in the City of Tacoma case are quite similar to Section 189 of the 1954 Atomic Energy Act, which specifically provides for a hearing "upon the request of any person whose interest may be affected by the proceeding."114 Subsection b provides for judicial review of the final order in such a proceeding under the terms of applicable federal statutes regulating federal administrative procedure.116 When a state or private individual believes that the location of the proposed reactor or other atomic facility is unwise or illegal, it would seem that the proper remedy is to petition the Atomic Energy Commission to be permitted to participate in the hearing determining whether or not the license should be granted. Any later action in state courts seeking to enjoin the establishment or operation of the reactor in accordance with the terms of the federal license seems to be precluded by the federal act.

The question remains as to whether or not the right of a private person to sue for damages because of the psychological nuisance also

112 Id. at 336.
118 Id. at 336-37.
114 Sec. 189a of 1954 Act.
116 Sec. 189b of 1954 Act.
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has been pre-empted. As pointed out later,\textsuperscript{116} it is clear that there has been no federal pre-emption generally of the power to award damages arising out of nuclear incidents. From this it certainly could be argued that private suits for damages from the psychological nuisance effect are permissible, even though the injunction action would not be. Yet because of the peculiar character of the psychological nuisance damages, it is possible that this particular type of damage will be considered precluded for the same reasons as those establishing the invalidity of an injunction abating the nuisance.

In the field of labor law the Supreme Court has held that a state court may award damages resulting from illegal activities which are clearly an unfair labor practice within the meaning of the federal statute. There was no pre-emption of this portion of the field. The Court said in the Russell case\textsuperscript{117} that the primary purpose of the federal agency was to prevent unfair labor practices and that any award remedy was purely at the discretion of the National Labor Relations Board. The Court was very careful to point out, however,\textsuperscript{118} that there was no conflict in this instance between the state's power to entertain a damage suit and the power of the federal agency. This emphasis upon allowing only such state action as is obviously consistent with the congressional policy, indicates the basic reason for this writer's conclusion that in the atomic reactor situation, an action solely for psychological nuisance damages should not be permitted, for in this instance it would amount to state action, clearly in conflict with a federal action. To award damages merely for the existence of the reactor or other similar type of atomic energy facility, when there has been no physical harm of any kind, in effect would frustrate the decision of the Atomic Energy Commission that this type of activity, at this location does not present any unreasonable danger to public health and safety, and is in furtherance of the federal program to promote and develop atomic energy by private enterprise. It is submitted that to allow damages, even in a private action, for psychological nuisance would be in direct conflict with the federal determination and therefore with federal policy.

The provisions of the indemnity insurance amendment in 1957\textsuperscript{119} actually suggest that, at least so far as the indemnity program is con-

\textsuperscript{116} Infra note 1273.


\textsuperscript{118} Infra Part III, Chapter V at note 313.

\textsuperscript{119} Insurance amendment, 85-256, 85th Cong., H.R. 7383 (1957), discussed in detail infra text following note 1265.
cerned, a distinction should be drawn between what might be considered injuries resulting from an actual "nuclear incident" by way of physical damages and the apprehensions and fears involved in a psychological nuisance damage case. In defining "nuclear incident" the act provides that the term "means any occurrence within the United States causing bodily injury, sickness, disease, or death, or loss of or damage to property, or for loss of use of property arising out of or resulting from radioactive, toxic, explosive, or other hazardous property or source, special nuclear, or byproduct materials." 720 This language indicates that Congress was concerned with a specific discharge of radioactive material in such a way as to have an impact on persons or property, perhaps including in this kind of physical damage any psychological consequences of such actual impact. It also must be remembered that the federal act specifically modifies state law by immunizing the licensee who is indemnified from any liability in excess of $500,000,000, plus any amount of financial protection required of the licensee. 721 There is nothing in the act or in its legislative history to indicate that anything other than damages resulting from actual discharge of radiation or radioactive material was meant to be covered. While the statutory provision is not specified on the question of damages for psychological nuisance, it would seem to be much more consistent with the over-all purpose and policy of the federal provisions to conclude that the allowance of such damages, just as in the case of an injunction to abate a licensed activity, would be inconsistent with the federal program to provide for the public health and safety and to promote the development of atomic energy as fast as is safely possible. Yet the conclusion obviously is not as clear as one could wish, because the federal act leaves the determination of general liability questions to the states.

To dispose of the uncertainty Congress should enact a statute to make it clear that purely psychological nuisance damages cannot be recovered where a reactor is duly licensed by the Atomic Energy Commission and is placed in a permissible location under local zoning laws which do not discriminate against reactors as such. At the same time Congress must clearly recognize the right of all possibly affected parties to participate in the AEC hearing held on the granting of the license to operate the reactor. If only small quantities which are within permissible levels established by federal regulation are discharged, perhaps Congress should also make it clear that no recovery may be had for conse-

720 Id. at sec. 30.
721 Id. at sec. 4e.
quent injuries. On the other hand perhaps this should be left to the normal rules relating to compliance with administrative regulation as proof of non-negligence.  

(b) Effect of Licensing—Results under State Law

Since state law might be applied in the psychological nuisance damage case (e.g., if the courts find no pre-emption by the federal government), it is important to determine the results which might be anticipated. An even more important reason, perhaps, is that the states surely will enter into the licensing of atomic energy activities in the future as the operations become a normal business activity and Congress perhaps returns more regulatory power to the states. What effect will state licensing have on a determination of whether to treat the installation as a nuisance?

The question is not free from difficulty; broad statements frequently are made by courts which do not take account of important distinctions affecting the result. The first of these distinctions is one between actions to enjoin the licensed activity and actions for damages. It frequently has been held that an activity which is conducted strictly in accordance with legislative authority cannot be enjoined as a nuisance. This rule seems to hold, however, only in situations where there appears to be no other reasonable way to conduct the activity in accordance with the license or other legislative authority. Where possible, the license usually is interpreted to allow the conduct of the activity only in a manner which does not unreasonably interfere with the rights of other property owners. Courts, therefore, have issued injunctions against such activities as blasting rocks so as to throw stones upon the lands of others, shining bright lights onto adjoining land from a city baseball park, and the operation of a city pesthouse in a residential area despite the existence of a license or legislative authority for this kind of activity generally. It is likely, therefore, that if a state licensing agency specifically approves a site for an atomic agency installation, the activity will be deemed non-abatable since any diminution in surround-

722 See discussion of these rules generally, supra at Section B2b.
728 Fricke v. City of Guntersville, 251 Ala. 63, 36 So.2d 321 (1948) (city drainage ditch in alley blocked access to plaintiff's lot, was claimed to be "dangerous"; injunction denied); Strachan v. Beacon Oil Co., 251 Mass. 479, 146 N.E. 787 (1925) (injunction denied against licensed oil refinery which generated offensive odors, fires, and explosions).
725 Downey v. Jackson, 259 Ala. 189, 65 So.2d 825 (1953).
ing property values surely will be deemed an unavoidable consequence of its normal, non-negligent operation. Such a specific license is not just a general permit to carry on a specific type of activity somewhere at the owner’s option.

On the question whether or not the existence of legislative authority precludes a finding that an activity is a nuisance for the purpose of awarding damages, the courts take positions which, at first glance, appear to be conflicting. On the one hand, there are courts which have indicated that if an activity is conducted strictly in accordance with legislative authority, and the injury which results from the activity is a necessary result of its normal, non-negligent operation, then the activity cannot be found to be a nuisance. On the other hand, there are some courts which state broadly that “the full extent of legislative power to legalize and shield a nuisance is to exempt it from public prosecution,” and therefore the rights of private individuals to seek damages for authorized nuisances remain unimpaired. A closer examination of these two positions indicates, however, that there is little more than a verbal difference between them. In the courts which adhere to the doctrine that an authorized activity cannot be a nuisance, it still is recognized that the legislative immunity does not extend to activities which too seriously encroach upon the property rights of private individuals to the point where it may be said that their property is being "taken." The United States Supreme Court has stated, as well as any court, the general approach used by all courts:

We deem the true rule, under the Fifth Amendment, as under state constitutions containing a similar prohibition, to be that

727 Transportation Co. v. Chicago, 99 U.S. 635 (1878) (cofferdam obstructed plaintiff's warehouse docks); Messer v. City of Dickinson, 71 N.D. 568, 3 N.W.2d 241 (1942) (city dumping sewage into river so as cause offensive odors). The latter case involved a state statute, N.D. Comp. Laws 1913, §7231, which stated that “Nothing which is done or maintained under the express authority of a statute can be deemed a nuisance.” Other states have also enacted similar statutes. See, e.g., People v. City of Reedley, 66 Cal. App. 409, 226 Pac. 408 (1924) discussing the effect of a similar California statute.
728 Sadlier v. City of New York, 81 N.Y.S. 308, 310 (1903) (slush falling on plaintiff's property from Brooklyn Bridge).
729 Levene v. City of Salem, 191 Ore. 182, 229 P.2d 255 (1951). In holding that the city was liable for flooding plaintiff's land, the court made it clear that authorized acts can still be considered a nuisance. The court observed, at 197, “We need not consider whether the trespass in the case at bar was a mere nuisance or was of such a magnitude as to amount to a taking of the property in the sense forbidden by the constitution. . . . In either event, it would appear that the municipality is liable to respond in damages.”
while the legislature may legalize what otherwise would be a public nuisance, it may not confer immunity from action for a private nuisance of such a character as to amount in effect to a taking of private property for public use. . . .

It therefore is held that where there is a substantial interference with property rights, the injured party may recover damages despite the existence of legislative authority.

It is clear, then, that the courts must struggle with the "vexed question of what sort of nuisance may amount to a taking of property." The difficulty of such a question is demonstrated by the variety of semantic formulas which have been employed in attempts to answer it. Some courts and text writers have suggested that legislatures may authorize "small" or "minor" nuisances without compensation, but not "great" ones. In at least one case a distinction was drawn between "direct" injuries, which were deemed compensable, and merely "consequential" injuries, which were not. The Court of Appeals of Maryland has attempted to clarify the problem with this statement:

It is now the law of this State that acts done in the proper exercise of governmental authority which impair the use of nearby private property do not constitute a taking of property within the meaning of the Constitution, unless there is (1) an encroachment upon or physical invasion of the property, or (2) a substantial obstruction of access, or (3) a deprivation and not merely a diminution of light and air.

The Supreme Court of Massachusetts, in Sullivan v. Commonwealth, pointed out a distinction between acts which demonstrate "premeditation and intention of continuance" of interference with property rights, and acts which merely incidentally interfere with such rights. The court held that physical injury to plaintiff's property was merely an unintended side effect of blasting operations carried on in the construction of an aqueduct, and therefore was not compensable as

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782 Bacon v. City of Boston, 154 Mass. 100, 102 (1891) (city held to have unnecessarily damaged plaintiff by its manner of operating sewer system).
783 Sawyer v. Davis, 136 Mass. 239, 243 (1883) (ringing loud mill bell, under legislative authority, held a "slight" interference, and not compensable as a taking). See Prosser 421, and discussion supra at text at notes 629-32.
784 Sadlier v. City of New York, supra note 728.
785 Friendship Cemetery v. City of Baltimore, 197 Md. 610, 619, 81 A.2d 57 (1951) (flights in glide path of city airport held not a sufficient interference to constitute a taking).
a "taking" of property. The court contrasted this with cases involving deliberate firings of gun batteries over plaintiff's land,\textsuperscript{787} or repeated flying of military aircraft at a low level,\textsuperscript{788} in which a "taking" had been found.

Perhaps one of the most significant efforts to draw the line between what does and does not constitute a compensable "taking" was that made by the United States Supreme Court in \textit{Richards v. Washington Terminal Co.},\textsuperscript{789} previously discussed. This was the case in which the plaintiff complained of diminution in the value of his property both from the normal operation of the railroad, which caused noise, vibration, and dust to invade his residence, and from the location near his property of an outlet for a ventilating system which collected gases and smoke from a tunnel and forced them out by means of a fan. The court denied recovery for injury caused by the normal operation of the railroad, but held that the damage caused by the location of the ventilation outlet near plaintiff's property was a "direct and peculiar and substantial" injury which constituted a "taking" of plaintiff's property. This statement of the rule has been quoted frequently by state courts.

The Maryland court placed the problem in better perspective when it suggested simply that the question of what constitutes a "taking" is a "question of degree."\textsuperscript{740} Yet under any of the tests suggested it is to be doubted that a court would impose liability if the presence of a reactor should cause a drop in property values or a loss of business solely because of fear or apprehension arising from the installation. In states where courts have made it clear that only physical interference of some kind will constitute a "taking," such as in Maryland,\textsuperscript{741} this seems un-

\textsuperscript{787} Portsmouth Harbor Land & Hotel Co. v. United States, \textit{supra} note 681.
\textsuperscript{788} United States v. Causby, \textit{supra} note 679.
\textsuperscript{789} \textit{Supra} note 648.
\textsuperscript{740} Friendship Cemetery v. City of Baltimore, \textit{supra} note 735 at 618.
\textsuperscript{741} \textit{Id.} at 619. The U. S. Supreme Court has also indicated that only a physical invasion of some sort will constitute a "taking." In \textit{Transportation Co. v. Chicago}, \textit{supra} note 727, the city, to facilitate the building of a tunnel, had erected a temporary coffer-dam which obstructed the docks in front of plaintiff's warehouse. The Court stated at 642: "But acts done in the proper exercise of governmental powers, and not directly encroaching upon private property, though their consequences may impair its use, are universally held not to be a taking within the meaning of the constitutional provision. ... The extremest qualification of the doctrine is to be found, perhaps, in \textit{Pumpelly v. Green Bay Company}, 13 Wall. 166, and in \textit{Eaton v. Boston, Concord, & Montreal Railroad Co.}, 51 N.H. 504. In those cases it was held that permanent flooding of private property may be regarded as a 'taking.' In those cases there was physical invasion of the real estate of the private owner, and a practical ouster of his possession. But in the present case there was no such invasion. No entry was made upon plaintiff's lot. All that was done was to render for a time its use more inconvenient."
questionably the result. Also under the reasoning of the United States Supreme Court in the *Richards* case,\(^{742}\) it could be asserted that the injuries caused by fear were of the kind that "naturally and unavoidably result from the proper conduct" \(^{743}\) of the reactor, and as such are not compensable. In that case there was also a physical invasion of plaintiff's property, while there is none from a purely psychological nuisance.

Moreover, the nature of the license for the atomic energy activity, or the legislative authorization of it, may have significance, in any future cases involving claims based on a theory of nuisance. Where a legislature or licensing agency approves a specific site for the activity, it would appear that any diminution in the values of property surrounding that site is a necessary incidental effect of the normal operation of the activity; but where only a general license is issued and the choice of site left to the licensee, a court might find that the choice of location, because of the character of the surrounding property, constituted an unreasonable exercise of the authority granted under the license. It is to be remembered that the legislative immunity enjoyed by the licensee will extend only to those injuries which *necessarily* result from the authorized activity, and the scope of the license will be strictly construed.\(^{744}\)

The Minnesota Supreme Court put it this way.

> If the legislature expressly authorizes an act which must inevitably result in public injury, what would otherwise be a nuisance may be said to be legalized; but if they authorize an erection which does not necessarily produce such a result, but such result flows from the manner of the construction or operation, the legislative license is no defense. In order to justify a nuisance by legislative authority, it must be the natural and probable result of the act authorized, so that it may fairly be said to be covered by the legislation conferring the power.\(^{745}\)

Thus it is frequently held that while a defendant may be operating under a general license or legislative authority, this does not authorize him to conduct the activity in a place or in a manner which unreasonably interferes with the property rights of others.\(^{746}\) The application of

\(^{742}\) *Supra* note 648.

\(^{743}\) *Supra* note 649.

\(^{744}\) *Messer v. City of Dickinson*, *supra* note 727 at 577.

\(^{745}\) *Pine City v. Munch*, 42 Minn. 342, 345-46, 44 N.W. 197 (1890) (village allowed to abate injurious operation of a dam as a public nuisance, although construction of the dam was authorized by legislature).

\(^{746}\) *Baltimore & Potomac R.R. v. Fifth Baptist Church*, *supra* note 646 (locating and operating a railroad engine house near a church held an unreasonable exercise of railroad's authority, and damages awarded); *Bacon v. City of Boston*, *supra* note 732; *Hakkila v. Old Colony Broken Stone & Concrete Co.*, *supra* note 724; *Messer v. City of Dickinson*, *supra* note 727.
this principle may become important in the future if the licensing of
atomic energy installations, particularly those that are relatively less
hazardous, becomes more general than at present.

It also may make a difference whether the legislative sanction is in
a form which expresses positive governmental encouragement of the
activity or merely constitutes a permit allowing an activity to be carried
on. A court may be less disposed to find that legislative immunity exists
if the activity is operating under the latter type of permit, since this
form of licensing is merely a control device and does not include any
expression of the desirability of the activity from a public point of
view. A distinction of this kind was recognized in an Alabama case, City
of Bessemer v. Abott.\(^747\) The plaintiff sought damages against the city
for maintaining a nuisance in the form of a garbage incinerator which
had been erected and operated under a state statute expressly empower­
ing municipalities to establish such facilities. The Alabama court held
that the city would be liable only if it were negligent in operating the
incinerator. The plaintiff relied on an earlier case in which it had been
held that the city was liable for the maintenance of a public privy despite
statutory authority. The court in distinguishing that case stated:

But there was no question presented in that case as to the au­
thority of a municipal corporation, under a general statute, to
do an act in the exercise of its police power for the conserva­
tion of the public health and welfare. On the contrary, the au­
thority granted by the Vernon charter was effective merely to
permit the town to do, as a private corporate act, what any in­
dividual could do, and of course to do it in the same way and
subject to the same restraints and penalties. Under that au­
thority the town had no more right to maintain privies in
modes and places that would render them nuisances than any
individual had.\(^748\)

Although this is a distinction not frequently articulated by the courts,
under the reasoning of cases like the Bessemer case,\(^749\) atomic energy
installations having a quasi-public character may come under the head­
ing of acts to be encouraged in the interest of public welfare, and there­
fore would enjoy legislative immunity. On the other hand, if the atomic
energy activity is operating under a mere legalizing permit, the courts
may be more willing to rule that the license does not preclude liability for
damages on a theory of nuisance. In cases involving claims against the

\(^747\) 212 Ala. 472, 103 So. 446 (1925).
\(^748\) Id. at 473.
\(^749\) Supra note 745.
owners of funeral homes, for example, it has been held that the existence of a permit being an expression of municipal thought and opinion, may be properly considered on the question of nuisance, but it is not conclusive.\footnote{Dawson v. Laufersweiler, 241 Iowa 850, 43 N.W.2d 726 (1950). Sometimes injunctions have been granted also despite a general permit. Gunderson v. Anderson, 190 Minn. 245, 251 N.W. 515 (1933). For other cases in which injunction has been granted despite permits or zoning ordinances, see 39 A.L.R.2d 1026 (1955).}  

The time may come when the use of atomic energy may be so common that it will no longer enjoy its favored status. Someday it will be put to use in the ordinary processes of purely private industry having no official relationship to the general public interest. In that event, the fact that a permit is obtained apparently would not preclude a court from finding the activity a nuisance and awarding damages under proper circumstances. At the present time, however, both federal and state legislation clearly is directed toward encouraging research and development in the new atomic industry, and therefore licenses are likely to enjoy full legislative immunity from actions based on nuisance theories.

5. Proof Problems—Causation and Damages

a. The General Interrelationship

The unusual characteristics of radiation, particularly its imperceptibility through ordinary human senses and the cumulative character of the effects of exposure, create some unique and difficult problems in proving both causation-in-fact and damages in tort actions. Although these are two different elements of the negligence action and raise somewhat different questions, the proof aspects are in many respects common and the most nearly unique. Therefore, it seems best to deal with the problems of proof together.

In discussing causation at this point we are talking about that aspect usually called causation-in-fact. This differs from that part of causation so often treated under the title of proximate cause. Proximate cause and its effect on limiting the liability of those whose radiation in fact causes injury to others have been discussed previously in connection with the duty element. Here attention is centered on the proof problems that will arise in establishing the fact that radiation from a particular defendant's operations caused a specific damage to a particular person.

The complications arising out of radiation incidents seem to develop principally from three factors unique to atomic energy: (1) Multiple causation problems are created by the fact that radiation comes from
many sources, such as natural background radiation from many types of materials including even the bricks of the houses in which we live and the buildings in which we work, fallout from bomb tests, and medical uses of radiation in addition to whatever radiation may be released by atomic energy entrepreneurs in the course of their operations. (2) Many, if not most, of the injurious effects that are caused by radiation result from the total amount of exposure received by the injured person and not just the amount received by him at a particular time from a particular source (although there are certain injuries believed by some experts to result only in case the individual exposures exceed certain threshold levels). (3) The inability to state accurately and specifically that a given injury will be or has been caused by a specific amount of radiation received at a specific time, means that in many cases plaintiffs will be forced to depend upon statistics showing that exposure to radiation will increase by some more or less accurately determined percentage the likelihood of a certain injury occurring.

Although the causation and damage questions, particularly as to proof, which are created by these characteristics of radiation are not completely unique in tort cases, similar situations are very few in number, and courts have not had occasion to work out theories and principles for determining liability. Yet the problems will arise inevitably and with much greater frequency as the uses of radiation increase from year to year. Here again it seems that the advent of atomic energy will cause the legal profession to re-evaluate its tort concepts, particularly as they relate to causation-in-fact and the extent of damage.

b. Multiple Defendants

(1) General Considerations

Partly a Duty Matter. The problem of remoteness or foreseeability today generally is considered as a part of the duty question and this also is the manner in which we have treated the subject. It also would have been possible to have treated the question of the liability of multiple defendants as a part of duty under such headings as joint tortfeasors, proximate cause, joint enterprise, master-servant, or concert of action. Yet the difficult and unique aspects of the multiple defendant matter in the radiation cases would seem to arise out of the same characteristics that give rise to the proof problem generally. Therefore, the problem can be seen in better perspective if multiple defendants are now treated in the context of the proof questions that will arise. Never-
theless, the subject of multiple defendants is discussed prior to dealing with proof problems generally because duty considerations are just as important as those of proof of causation. On the other hand, when considering cases involving single defendants, proof of causation becomes of dominant importance. This indicates the desirability of first discussing multiple defendants and thereafter the non-multiple situations.

It is true, of course, that some multiple defendant cases are solved by cause-in-fact principles. The rule usually applied to determine whether a known force is the cause-in-fact of a specific injury to a particular person is known as the “but for” rule. In explaining this rule Prosser says:

The defendant’s conduct is not a cause of the event, if the event would have occurred without it. At most this must be a rule of exclusion: if the event would not have occurred “but for” the defendant’s negligence, it still does not follow that there is liability, since consideration other than causation, which remained to be discussed, may prevent it.751

This test will take care of most cases including a good many of those involving multiple defendants. There are certain kinds of cases, however, which have caused the courts to develop a supplementary concept usually known as the “substantial factor” rule. As Prosser says in discussing causation-in-fact:

Such a test is clearly an improvement over the “but for” rule. It disposes of the cases mentioned above, and likewise of the difficulties presented by the type of case where a similar, but not identical result would have followed without the defendant’s act. But in the great majority of cases, it amounts to the same thing. Except as indicated, no case has been found where the defendant’s act could be called a substantial factor when the event would have occurred without it; nor will cases very often arise where it would not be such a factor when it was so indispensable a cause that without it the result would not have followed.752

Whether the test be the “but for” rule or the “substantial factor” concept, the cases involving multiple defendants often create very difficult problems. Except for the discussion by Prosser753 and Harper and James754 in their recent treatises, there is surprisingly little written discussion of the subject with the exception of the application of the res

751 Prosser 220.
752 Id. at 221.
753 Id. at 224-41.
ipsa loquitur doctrine, to be discussed later. The expanded use of atomic energy should give rise to a considerable increase in cases of this nature.

Some examples of situations that very likely will arise when the use of atomic energy becomes more common will help focus attention on legal problems that need analysis.

As to reactors the following situations very possibly will arise:

(1) Two reactors, owned by different companies, may be so located that the prevailing winds could have carried the materials discharged into the air or into a stream from either one or both and caused the injury to the person or property of the plaintiff some distance downwind or downriver. Distinctions should be recognized between cases where: (a) neither reactor contributed enough to cause damage, but the cumulative effect of both does cause damage; (b) the amount discharged by each was sufficient in and of itself to have caused the damage; (c) there is no evidence as to which one discharged the radioactive material, each claiming it is not from its operation and the plaintiff is not able to prove from which it came. Whether the applicable legal principles are to be strict liability concepts or those of liability for negligence the courts must be prepared to deal with cases involving these difficulties.

(2) The same situation except that instead of two reactors there are three or more such reactors.

(3) The bulk wastes from two or more reactors are turned over to a common disposal agent (owned either privately or by the government), who then negligently disposes of such combined waste so as to cause the plaintiff injury. Assume that vicarious liability will be imposed upon the owner of the waste products but it will be impossible to identify the source of the particular material causing the damage, because the wastes are mixed and not labeled; i.e., they are fungible.

(4) There are two or more reactors, and a person lives in the vicinity of one for a time, then moves to the vicinity of another, and perhaps still another. He is able to show that the cumulative irradiation has caused personal injury although the individual contributions of any one of the sources would not have been sufficient to have done so.

(5) The waste or the discharge from one or several reactors is not enough in itself to cause any damage for which compensation could be recovered, although the discharge was negligent or absolute liability rules will be applied. Yet the plaintiff may suffer a radiation injury because of peculiar susceptibility. The same could happen if plaintiff subsequently needs medical treatment requiring use of radiation and either

\textit{Infra} text discussion beginning at note 1146.
did not know of his prior exposure from the reactor or forgot to inform his doctor of previous exposures, or the doctor may have decided under the circumstances that the risk of additional diagnostic or therapeutic radiation ought to be taken, even though the cumulative dose might be enough to cause injury to the plaintiff.

Similar situations can arise in connection with the disposal or use of radioactive isotopes for either medical or industrial purposes. For example:

(1) Two or more industrial, medical, or research users of radioactive isotopes discharge their sewage into the city system and the city sewage plant bacterial process is harmed, or a city employee is injured by radiation, or someone downstream from the sewage disposal plant is injured by the radiation, and (a) it takes the contributions of all to cause the damage, although no individual user was negligent in the amount discharged in the individual case, or (b) one user must have been negligent because the amount of radiation received exceeds what would have been received if all had released only the proper amount, but it is impossible to tell which one was guilty, or (c) it is possible to tell which one was negligent but his discharge alone would not have caused injury unless added to that of the others who were not negligent.

(2) The total amount of all contributors is not enough to cause injury but, because of the peculiar susceptibility or the necessity for later medical treatment with large amounts of radiation, the particular plaintiff is injured because of the total cumulative dose received, including that contributed by the waste disposal operations of the industrial, medical, and research uses.

(3) A person receives enough radiation to cause injury, including radiation from a particular defendant who is responsible for a part of the exposure; (a) where the other exposure alone was enough to cause the injury as was the amount received from the defendant and it is impossible to tell which exposure actually caused the injury, or (b) the exposure caused by the defendant is not enough in itself to cause injury but when added to that already received by the plaintiff in medical treatment, either carefully or negligently administered by a doctor, causes an injury, or (c) exposure caused by the defendant is not enough in itself to cause injury but does contribute to the total dose received by the plaintiff from other sources, and the total dose is sufficient to cause injury.

(4) Plaintiff's injury would occur only by accumulating several exposures, such as from his job which involves the handling of radio-
isotopes, fallout from government bomb tests,\textsuperscript{756} and fallout from the operation of a reactor or as a result of exposure from a highway accident involving waste products, and finally later medical treatment by radiation.

Many other variations can be imagined but these are illustrative of the kinds of cases that very well could happen as the use of atomic energy becomes more widespread. They present causation-in-fact and damage problems that courts will have to answer.

In dealing with multiple causation cases a part of the difficulty arises from questions of joinder, interpretation of verdicts, and the enforcement of judgments. These elements cannot always be separated completely from the substantive question as to who is liable and to what extent. For example, there may be a question of whether in a particular jurisdiction the plaintiff will be permitted under the procedural rules to join as defendants all persons thought to have caused harm, but the modern trend of procedural rules is such that this is becoming less of a problem. Certainly the multiple causation cases can be handled best when all potential defendants are present at the same time. Joining all of the defendants does not need to affect the burden of proof placed on the plaintiff to show causation and damages for each of the defendants separately, although it is true that where the court has all the defendants present it might be more willing to shift the burden, as some of the cases to be discussed illustrate. In any event, the procedural problems of joinder of parties, the nature of the verdict that should be rendered, and the impact of contribution and release of joint tortfeasors should present no different questions merely because the cases arise out of the use of atomic energy. While many issues in these areas are difficult and uncertain, there seem to be no problems peculiar to the atomic energy situations.\textsuperscript{757}

(2) Cumulative or Concurrent \textit{Causation Only}—The negligence of each is a necessary link in the causal chain, or the negligence of each is sufficient to cause the total injury suffered and which actually caused injury cannot be determined.

The first problem to be considered arises when several defendants have released radioactive material under such circumstances that each may be held liable for the total injury since the radioactivity released

\textsuperscript{756} See study of fall-out reported in N.Y. Times, July 5, 1958, p. 5, col. 1. The AEC reported that only one person in the region of the 1957 Nevada tests received anything approaching the 3.9 roentgen aggregate set as the safety limit.

\textsuperscript{757} Harper & James 695-97, 709; Prosser 233-51; 41 A.L.R. 1223 (1926); 47
by each was sufficient by itself to cause the harm without the contribution of the other defendants. This is a situation that could arise when two or more reactor operations or the use of isotopes by two or more persons result in radioactive material being deposited on plaintiff's property where the plaintiff himself is exposed and the exposure from each source is simultaneous either because the discharges were simultaneous or by the time the plaintiff is exposed the two sources are merged. This could easily happen from a discharge of radioactive materials into the air or a stream or into disposal grounds. In this kind of case the courts and the legal commentators agree that the full amount of damages can be charged to one or to all of the wrongdoing defendants.

The analysis of this type of case usually starts with the Massachusetts case, *Coley v. Hauenner*, where the two defendants simultaneously rode their motorcycles past a horse, frightening it and causing injury to the rider. Many other examples can be given, such as the case of A stabbing C and B hitting C with a rock simultaneously, either blow being sufficient to kill C and he later dies; or the case of two fires being started independently, converging and destroying the plaintiff's house. Similar situations have arisen in connection with automobile accidents as is exemplified by a recent Kentucky case, *Byee v. Shanks*. The two defendants negligently raced their cars down the highway. The plaintiff was injured when they crashed into each other, the plaintiff being a passenger in one of the cars but personally free from contributory negligence. Approving an earlier leading Minnesota case the Kentucky court said:

... [W]here two or more persons are unlawfully and negligently racing automobiles on a public highway in concert, all are liable in damages to a guest in one of the racing cars who was injured thereby, when the guest protests to the driver, has no control over the driver, and was not engaged in a joint enterprise with the driver. The Minnesota opinion reflects sound legal and humanitarian principles which are applicable to the factual situation of the case at bar.

The "but for" rule often does not explain holding both defendants liable under these circumstances (though it would in the racing car case) and these situations have given rise to the "substantial factor" rule.

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759 760 Prosser 221.
It always seems to be assumed, of course, that if the force that actually caused the injury can be identified and separated from a similar force created by another negligent defendant, only the defendant whose force actually caused the injury will be held liable. As an illustrative example, suppose A and B each sell a rope to a person, bent on hanging himself, under such circumstances that they are negligent in so doing.\footnote{Carpenter, “Workable Rules for Determining Proximate Cause,” 20 Cal. L. Rev. 229, 396 (1932); Prosser 221. See also Haley v. Calef, 28 R.I. 332, 67 Atl. 323 (1907).} If the person hangs himself with the rope of either A or B, the other is not liable. On the other hand, if the two pieces of rope were tied together, both A and B would be liable for the death. Used as an analogy and applied to the radiation situation, we could assume, as an example, that two radioactive cobalt 60 sources used in the same area were negligently shielded so that either could have injured the plaintiff, but it can be proved that he was exposed only to one. On the reasoning usually applied, there would be liability resting on only one defendant. So too, if the person irradiated is exposed to both sources of cobalt 60 and receives damaging radiation from each, there would seem to be no question about holding the owners of both sources equally and totally liable for the total damage.

The much more difficult question is one that arises when it is impossible to tell whether A’s piece of rope or B’s was used, but it is clear that only one was used. This raises questions to be discussed later in connection with the unknown wrongdoer.

Generally it is assumed that if the injury resulting from the contributions of both defendants is a single injury, it is an indivisible one and there can be no apportionment. In such situations it is clear that each made a substantial contribution to the ultimate injury even though the injury itself may not be divisible. Is there any reason, however, why the recovery for the single injury could not be divided between the wrongdoers in proportion to the amount of radiation contributed by each if this can be proved? One answer may be that each defendant who substantially contributes toward the final result should as a matter of good social policy be fully liable to the deceased or injured party, assuming the contribution of the other party was reasonably foreseeable. Then there could be some kind of contribution between joint tortfeasors along the lines of the apportionment suggested.

On the other hand, perhaps the radiation case is one in which we should not treat the harm as indivisible even though it is the total and ultimate harm of death, but should treat it like certain other cases of
subsequent, as distinguished from concurrent, negligent action, *e.g.*, the case in which one driver negligently injures the pedestrian who then is injured further by another driver, or the case in which a driver negligently injures a person and then a doctor negligently increases the damages. In these cases the second person is held liable only for the contribution he makes in terms of additional damage, if this can be separated. In the radiation case where there is a cumulative effect, if it can be proved that a certain number of units of exposure caused a certain injury and the radiation emitted by two different sources was in a ratio of \(1:3\), the damages caused by the total radiation could be divided between the two defendants in a \(1:3\) ratio, although the injury itself is not separate and could not be attributed to one or the other exposure. This would be feasible and would seem to be good policy.

A closely related question is that which arises when there is a difference in time between the forces negligently set in motion by the different defendants. When each of the defendants' actions makes a significant contribution to the final result, the general rule seems to be to impose liability on each of them as being concurrent causes of injury. There are many examples of this kind of liability, the most numerous of which are the automobile cases in which action of two or more negligent defendants, perhaps somewhat separated in time, occurs to create the final injury to the plaintiff. In these cases the imposition of liability on all defendants jointly and without apportionment generally is approved by legal writers. The question most likely to give difficulty in this situation is that of determining whether it took the contribution of all the defendants to cause the final injury. This often resolves itself into a proximate cause question of whether or not to hold the particular defendant liable for his contribution. In such cases, of course, the question of "the comparison and determination of alleged plural or concurrent causes falls within the province of the jury. . . . Where there is a factual dispute as to the events and circumstances which caused the injuries, proximate cause is a jury question."  

A typical example of this kind of relationship in a radiation case

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762 Harper & James 1124 and cases cited.
would be that of a supplier negligently assembling a fuel core and the reactor operator also being negligent in not finding the defect, all resulting in a discharge of radioactive material following this combined negligence of the two parties. Under these circumstances it would seem perfectly clear that the law would hold each party, the supplier and the operator, individually liable for the total amount of damage caused to others.

While there are some cases to the contrary, it seems almost equally clear that where the concurrent causes are the result of the negligence of one party but not of the other (as when one source is derived from nature or from an innocent person), the negligent party is liable in full for the jointly caused injury. A good example of this is the case of Smith v. Bonner, in which the plaintiff was killed while driving along the highway where he was hit by a tree which was blown over from the defendant's property, partly because of the unprecedented violence of the storm and partly because the defendant was negligent in not providing adequate support around the roots of the tree when he filled in an old cesspool.

There are many situations involving radiation sources which could be controlled by this general rule. An example might be the occurrence of an unprecedented earthquake combining with the negligent construction of a reactor to release radioactive material and cause injury to third parties. Even though the earthquake was unprecedented so long as the material would not have been released except for the negligence of the operator, the cases would seem to indicate that the operator will be held liable for the total resultant injury. Similar situations could arise from the discharge of radioactive material into streams, the disposal of radioactive material, or the transportation of such material where an unprecedented natural cause combines with the negligence of the owner to cause injury.

There is one other closely related situation which well might occur in the radiation injury cases in connection with which a somewhat different problem in apportionment arises. Illustrations include the case in which a boy falls from a bridge trestle under circumstances in which death is almost certain, yet on the way down he is electrocuted by defendant's wires which are negligently uninsulated; or the case in which the plaintiff is killed by the defendant's negligence, yet he has a reduced life expectancy because of some previous accident or some existing

785 Harper & James 706, n. 80.
786 63 Mont. 571, 208 Pac. 603 (1922).
disease; or the case in which a house is destroyed which already is al­
most sure to be destroyed by another fire, or by the pounding sea; or
where the defendant blocks the plaintiff's barge in a canal where there
already is a landslide which also blocks the way. Under such circum­
cstances there is a question of what is the value of the thing destroyed
by the defendant at the time he destroyed it. These problems seem to
have been seriously discussed first by Chief Justice Peaslee of New
Hampshire. Prosser's analysis, by which he would reduce the value
of the thing injured by the defendant's action where the other danger
is so imminent that a reasonable man would take it into account, seems
much sounder than the suggestion of Harper and James that the
wrongdoer be held completely liable. Even if we admit that the "ob­
jective of tort law is compensating accident victims" and that this is
the proper one to be stressed, there still remains the question of whether
the defendant in the case, society as a whole, or the plaintiff (or his
own insurance carrier) should bear the loss.

(3) Cumulative or Concurrent Contribution to Amount of Injury—The extent of plaintiff's injury results
from the accumulation of injurious impact from
several sources, usually there being no causal con­
nection between the sources but there being a con­
tribution by each to the total single compensable
injury

The multiple causation problems that are most nearly analogous to
the situations likely to arise in connection with radiation damage, and
matters that will give the most difficulty, particularly as to proof, are
those arising from injuries resulting to the plaintiff as a consequence not
of any one defendant's contribution, but from the contribution of several,
but no contribution is enough to allow imposition of liability even though
each was negligent in allowing the force to be set in motion. The sug­
gested problem is one in which each of the defendants, if treated sepa­
rately, would be considered as having committed no tort, even though

767 Peaslee, "Multiple Causation and Damage," 47 Harv. L. Rev. 1127 (1934). See
also Carpenter, "Concurrent Causation," 83 U. of Pa. L. Rev. 941 (1935); Prosser
231; Harper & James 1122, n. 5.
768 Prosser 231-32; Harper & James 1123. One need not accept the full implications
of Prosser's suggestion that if A kills B right after C has poisoned B so he will die
shortly, then the rule of reducing damages charged to A does not apply. What if A
acts only negligently or under rules of absolute liability? Maybe it would be better
simply to hold C liable even if someone got to B first so long as C's action was reason­
ably certain to cause death soon.
each breached his duty to use due care in handling some force that affects the plaintiff at least slightly. In analyzing this problem it is most important that one always keep in mind a general rule concerning the proof of causation that the plaintiff must present. The considerations involved in proving causation and damages in radiation cases are discussed later, but the generally accepted statement of the degree of proof required of the plaintiff is set forth by Prosser as follows:

He must introduce evidence which affords a reasonable basis for the conclusion that it is more likely than not that the conduct of the defendant was a substantial factor in the result. A mere possibility of such causation is not enough; and when the matter remains one of pure speculation or conjecture, or where the probabilities are at best evenly balanced, it becomes the duty of the court to direct a verdict for the defendant.  

The author points out that ordinary experience must be used to determine whether under the circumstances a given action could produce a particular result, and that circumstantial evidence may be used to infer the causal connection. This “more probable than not” test results in real difficulty in cases of injuries suffered only because of contributions of several persons. The corollary of the “more probable than not” test is that “Where the facts proven show that there are several possible causes of an injury, for one or more of which the defendant was not responsible, and it is just as reasonable and probable that the injury was the result of one cause as the other, plaintiff cannot have a recovery since he has failed to prove that the negligence of the defendant caused the injury.” What is probable or not in many cases is a question on which reasonable men may well differ. Problems of this type inevitably will arise from the use of radiation sources, if for no other reason than because the effects of radiation are cumulative. Difficulty of proof also will arise in this area because of the inability of human beings to sense the presence of radiation and because radiation in some instances will emanate from certain sources for great lengths of time through many transformations in form and over long distances.

Another very closely related problem is that which arises when it is known that a particular kind of action or energy has caused injury but it is not easy to determine which of several possible defendants or potential defendants are responsible for setting the force in motion. Here

769 Infra discussion beginning just after note 1060.
770 Prosser 222. [Emphasis added.]
again the nature of radiation and radioactive sources is such as to make this kind of problem particularly acute in cases that seem inevitable as we make increasing use of atomic energy.

(a) Liability for Another’s Negligence Assessed Because of a Legally Imposed Status Relationship

If one assumes that cause-in-fact can be proved (an assumption that is difficult to support in radiation cases as will be indicated later), and further assumes that the defendants who have set the force in motion can be identified, there are some cases about which the answer seems quite clear and all the writers agree. In general they fall into three categories.

(i) Concert of Action

When the parties act “in concert,” all of the defendants so acting clearly will be held liable for all the injury. The clearest example of this type of joint liability arises out of situations where several persons are acting together in a manner that may be in violation of both a criminal statute and also the tort rules of due care. These are cases where there is a known and intentional common pursuit of a common end, whether or not it be in the form of a formal joint enterprise, such as one of three deputy sheriffs firing the gun that injured the plaintiff. The court held that:

It is immaterial which one of the three officers fired the shot that produced the wound. They were all engaged upon a common enterprise or adventure which contemplated the halting of the buggy and its occupants. They were present, encouraging, aiding, and abetting this enterprise, and they were all equally responsible with whichever one of them actually fired the shot that produced the wound.

Similar concert of action, and therefore total liability on the part of each defendant, has been imposed in cases where innocent bystanders have been injured as the result of fights engaged in by defendants. The Tennessee court in one of these cases said:

The rule is well settled that where two or more persons engage in an unlawful act and one of them commits a serious,  


114 Mangino v. Todd, 19 Ala. App. 486, 491, 98 So. 323 (1923). See Moore v. Foster, 182 Miss. 15, 180 So. 73 (1938) for an almost identical situation.
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civil injury upon a person not engaged therein, all are equally liable for damages to the injured party. 775

Again, in a case of several defendants taking action, which together constitute a nuisance, such as polluting a stream, with full knowledge on the part of at least two of the defendants of the independent acts of others, courts have held that there was concert of action as to those who acted with knowledge:

Where all have knowledge of the independent acts that create the result and continue the independent acts with knowledge, this ipso facto creates a concert of action and makes a common design or purpose. Any other position, from the facts and circumstances of the case, would make plaintiffs practically remediless, although there is a nuisance which all jointly concurred in and contributed to, that is alleged made the plaintiff's land valueless, and but for such joinder the injury would not have occurred. 776

Other cases which may stretch the concert of action concept too far, are those in which persons hunting together are held jointly and fully liable for the injuries caused when plaintiff is hit by the bullet negligently fired by one of them. Several such cases speak in terms of concert of action, but it would seem that this is a concert of action for a different purpose. The common goal was not that of injuring the plaintiff or capturing him. Where officers assault a potential prisoner, or several persons participate in a fight likely to injure bystanders, there is a real concert of action case. 777 A detailed consideration of the wrongly labeled concert cases involving one of several negligent parties causing unintended injury is found later in this chapter. 778

Except where there is an actual joint enterprise of some kind, the application of these concert of action cases to atomic energy situations will not be called for with any frequency. This type of case arises much more often where there is an intentional tort, or at least an intentional

776 Moses v. Town of Morganton, 192 N.C. 102, 106, 133 S.E. 421 (1926). The same rationale seems to have been the basis for liability in City of Skiatook v. Carroll, 163 Okla. 149, 21 P.2d 498 (1933), and Comar Oil Co. v. Sipe, 133 Okla. 222, 271 Pac. 1010 (1928), although they can be treated as concurrent nuisance cases, discussed infra in text at note 784 ff.
777 Benson v. Ross, 143 Mich. 452, 106 N.W. 1120 (1906); Oliver v. Miles, 144 Miss. 852, 110 So. 666 (1926); Kuhn v. Bader, 89 Ohio App. 203, 101 N.E.2d 322 (1951). See also Reyher v. Mayne, 90 Colo. 586, 10 P.2d 1109 (1932). Similar ideas have been applied in cases where dogs of several owners caused damage. See e.g., Stephens v. Schadler, 182 Ky. 833, 207 S.W. 704 (1919); Arneil v. Paterson, [1931] A. C. 560.
778 Infra note 881 ff.
wrongful act of some kind, a situation not very likely to happen in the atomic energy area.

(ii) Vicarious Liability

Much more important in atomic energy cases is the type of liability that is imposed under the vicarious liability doctrines. In the light of the possibility of saying that radioactive material creates an "unusual" hazard, this concept is particularly important to the atomic energy entrepreneur. Under the cases discussed previously, it is clear that there are any number of situations in which the owner or user of radioactive material will be held vicariously liable for the actions of independent contractors, although a very good case can be made for not imposing it in cases involving independent contractors engaged in transportation and disposal operations.

An equally clear case of each defendant being held liable for the whole damage (at least so far as the plaintiff is concerned), is that in which the law imposes vicarious liability on one party for the acts of another. A typical example is the liability of a master for the acts of his servant carried out pursuant to the employment, or the liability of a principal for the acts of his agent carried out within the scope of the agency. A similar result has been reached in a case involving the person in charge of a city dump. He did nothing to prevent other defendants from causing a nuisance to the injury of the plaintiff through their use of the dump and the kind of material they were allowed to deposit there. In an action against the city and the other persons involved, the court held the city liable even though it in no way approved the action of the other defendants.

(iii) Common Duty

Another category of cases in which all defendants are held equally liable for the whole damage arises when a common duty imposed by law upon two or more persons is not carried out, and someone is injured. This rule often is applied if both the landlord and a tenant are responsible for proper maintenance of a building or two persons are responsible for the proper maintenance of a party-wall. Both are held liable when the wall falls whether because of the negligence of one or

779 Supra discussion at note 207 ff.
the other, or both. This type of case is not so likely to arise in the atomic energy area but one possibility might be if two corporations jointly form a third corporation to carry out research in atomic energy problems. If the third company is held liable on the basis of negligence or absolute liability for injuries caused to others, it is possible that the courts would pierce the corporate veil and hold both of the parent corporations liable. Again, a common duty may be found if two industrial concerns using radioactive isotopes have a common storage vault for such materials as cannot be discharged into the sewage system, and through the fault of one or the other the storage vault leaks and causes damage to a third party. In many ways this kind of activity is really a case of joint-enterprise.

(b) Cumulative Contributions from Several Negligent Sources Legally Unrelated Except Each Contributes to the Total Single Injury

The cases which will cause real difficulty, however, are those in which the injury results from the contributions of several persons, each of whom is negligent and no one of whom contributes enough to cause the whole injury, and common duty or vicarious liability rules just discussed are not applicable.

In analyzing these cases several distinctions must be kept in mind. The first is between those cases in which it is possible to make at least some rough apportionment of the relative contribution of the individual parties, and those cases in which it is practically impossible to do so. Another distinction is between those cases in which all of the contributing parties are negligent, where no one of the contributing parties is negligent, where some but not all of them are negligent, and the case where the negligent actions of one or more defendants combine with forces occurring naturally, the combination causing the damage. Likewise important is the distinction between the case where it is clear that cause-in-fact has been proved as to all of the persons joined in the action and those cases where it is perfectly clear that all of the defendants did not participate and the real question is which one caused the harm, it being possible that any one of them might have but only one of them did do so.

Another consideration of importance in analyzing the cases in this area is that joinder of all potential defendants for purposes of trial does not lead necessarily to the imposition of joint liability on all defendants for all of the damages with total liability imposed on all. In
attempting to determine what the liability may be for the cases that are bound to arise in connection with the use of radiation sources, it seems wise to analyze carefully the most nearly analogous cases. In analyzing the cases the distinctions and considerations suggested above should be kept in mind.

(i) Cases to Be Distinguished

In addition to the distinctions between cases which involve cumulative or concurrent contribution to the amount of injury, all of which are here discussed, it is important to distinguish certain groups of cases entirely. The kind of case of concern here should be sharply distinguished from that involving the independent but concurring acts of two or more defendants which create a situation causing injury to the plaintiff, but where the injury itself comes at the end of a chain of events rather than resulting from an accumulation of injuries inflicted by the defendants quite independently of each other.

The case of *Ristan v. Frantzén*⁷⁸⁸ exemplifies the distinction that should be kept in mind. In this case the first defendant negligently struck the plaintiff’s car and, while causing no serious injury to it or the occupants, put the car in such a position on the highway that the second defendant negligently ran into the car, causing very serious injury to its occupants. The first defendant was liable for the whole damage because his negligence put the plaintiffs in such a position that foreseemably they would be seriously hurt by somebody else, such as the second defendant. Because there was no recoverable injury from the first blow by the first defendant, however, the second defendant also is liable for the total damages inflicted because his negligent act caused the total recoverable damages, even though the injury would not have occurred if it had not been for the negligence of the first defendant. These are concurrent contributors but each is clearly liable for the total damage independently of whether or not the other person was guilty of negligence. The case differs from the cumulative contribution cases in which there is an accumulation of negligent actions of all defendants each contributing to the total. It would be closer if the plaintiff were hurt seriously from the first collision, then were also hurt seriously from the second collision, and died as a consequence of the combined injuries, although neither one alone would have been sufficient to kill him. It is the cumulative contribution to the amount of injury type of situation with which we are concerned here, where the injurious impacts of sev-

⁷⁸⁸ *Supra* note 764. The cases set out in Harper & James 706, n. 80 do not.
eral defendants, each negligent, combine to cause the total injury. In considering the decisions that have been made in this area it is important to keep in mind the several distinctions suggested above.

(ii) Cumulative or Concurrent Nuisance Cases Involving Negligence

By far the greatest number of cases bearing on the cumulative contribution to the amount of injury question have arisen in the area of nuisance, usually arising out of the actions of two or more defendants resulting in pollution of streams or air, (sometimes by causing noise), or the flooding of another's property. These cases are of especial significance to the atomic energy entrepreneur in relation to his potential liability problems. The leading cases in those jurisdictions which have faced the problems deserve careful study.

Roughly the cases can be divided into two categories: (1) Cases in which the courts have held that each defendant, though negligent, is liable for only his own acts and may not be held liable without independent proof that more probably than not his actions caused a specific part of the damages. In most cases, this means that it is improper to join several defendants in one action, although as was pointed out previously, joinder is not necessarily to be precluded merely because ultimately the plaintiff will have to prove that more probably than not the defendants individually contributed a specific proportion of the damages. (2) Cases in which joinder has been permitted and joint liability for damages has been assessed, or the court has ordered a shifting of the burden of proof so that each defendant is forced to show the extent of his own contribution to the total damages to preclude being held liable for the whole. The cases involve claims for damages, not for injunctive relief. This point has not always been made clear in analyzing the problem.

Defendants Held Individually Liable Only. In two early cases the California court adopted the view that unity of action is present when an injury results from combined acts, no one of which itself would cause any damage. Under these circumstances the California court held the defendants to have acted jointly and to be jointly liable for the damages. In one case 784 tailings from several mining operations in the canyon above plaintiff's land were discharged by the defendants into the waterway and polluted the water that passed the plaintiff's land. In the other case 785 the defendants each diverted some water from a stream so as to deprive plaintiff of water to which he was entitled.

784 Hill v. Smith, 32 Cal. 166 (1867).
785 Hillman v. Newington, 57 Cal. 56 (1880).
In a later case, *Miller v. Highland Ditch Co.*, however, the California Supreme Court changed its position and held that an action could not be maintained jointly against defendants if each had acted separately, and that it did not become a joint tort merely because the consequences united with consequences caused by other defendants. In this case water from the ditches of the several defendants, each operating independently, combined and injured the plaintiff’s land. A similar result was reached in a later case by the California Appeals Court where cement dust from the defendant’s operations united with that from another cement company and caused injury to the trees and orange crops of the plaintiff. The court stated that each tortfeasor could be held liable only for such proportion of the total damages as resulted from the dust from his own plant. Recognizing the difficulty of apportioning the damages, however, the court stated that the trier of facts could estimate such damages with a “liberal hand.” The problem of joinder of parties did not arise because only one defendant was involved in this particular action. It seems not unlikely that if the plaintiff had tried to join both tortfeasors, a motion for a misjoinder would have been sustained.

The *Colorado* court seems to have adopted the same view in *Ryan Gulch Reservoir Co. v. Swartz*. While the court did not make it clear that the damage would not have occurred without the water from both dams which broke as the result of a very heavy rain and caused the damage to the plaintiff’s land below the dam, the court takes a position which seems to be quite consistent with that of the later California opinion. The court said:

We, are, therefore, asked, if we hold on this review that the defendants cannot be held jointly liable, to affirm this judgment as to the lower reservoir owner and then let the two defendants hereafter settle this between themselves, which one, if either, is wholly liable, or what proportion each shall pay of the judgment thus entered by us against the one defendant. We do not think this should be done, even if we had the power to do it. The difficulty that the plaintiff will necessarily encounter, if he brings a separate action against either defendant, in showing what his contribution was to the single injury, is no reason why this court in a joint action against them, where the evidence does not show a joint liability, should hold

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786 78 Cal. 430, 25 Pac. 550 (1898).
788 77 Colo. 60, 234 Pac. 1059 (1925).
either defendant liable for the entire injury to which he is only one separate contributor, nor is it any reason why we should permit a joint action to be maintained against both when there was no concurrence, either in time or place, of their distinct and separate acts. There is always difficulty upon the part of a jury in estimating the amount of damages in such cases, but this has never been understood to be a reason for a court arbitrarily to say that defendants, whose wholly distinct and separate acts have caused a single injury, may be joined in one action for the benefit of the plaintiff and to save him the labor of showing in a separate action against either tort-feasor what damage was occasioned by him. 789

In Connecticut there is one case involving stream pollution by several upper riparian owners which contains dictum to the effect that each defendant in a joint tortfeasor situation is responsible only for his own wrongs. 790

Again, in Florida a case involved two separate mining companies as defendants. The waste from their separate plants united to pollute the stream, making it unusable for the plaintiff's purposes in operating his cattle farm. A trial court charge to the jury that defendants could be held joint tortfeasors was reversed on appeal on the ground that to be joint tortfeasors there must be a concert of action which cannot be found merely from the fact that consequences of separate acts unite to form one injury. 791

A case arose in Georgia in which it was alleged that the airplanes of several companies in using the runways of the city airport for landing and taking off were causing such a nuisance to the plaintiff that he was seriously damaged. The court said that "Since the petition does not allege a concert of action in operating on the runway so as to injure the plaintiff and does not allege a conspiracy to so operate it, and does not allege any fact which would make each defendant liable for the acts of the others, the action against the defendants jointly will not lie." 792 Three years later the Supreme Court of Georgia cited this case with approval in denying the plaintiff a joint cause of action against several defendants whose action together brought about the ponding of waters on the plaintiff's lot, causing her damage. 793 The court did go ahead to

789 Id. at 69-70.
say, however, than an injunction action against a continuing tort could be brought against all of the defendants and held that,

The court, having jurisdiction for the purpose of giving injunctive relief, could under the well-established law of this State retain it as to damages in order to do complete justice between the parties. Code §37-105. The court, upon proper determination of the damages caused by each of the defendants, could render judgment against them for the proportionate parts of the damage done. 794

It is held, apparently, that it is possible to join the defendants in equity, although the court does not indicate whether or not it is possible to shift the burden of proving what each defendant contributed.

A case arising in Idaho 795 involved a situation in which water from the canal of the defendant combined with water from other sources to flow on the plaintiff's land and ruin his hay. The courts held that each independent tortfeasor is liable for that proportion of the injury which he contributed. The court suggested that "exact and definite measurements" of the contribution of each defendant was not essential but "some evidence in that respect is essential." 796 In this case the suit was against only one defendant, there having been no attempt to join all of them, but the court did state that recovery could be obtained against each independent tortfeasor severally.

A similar result was reached by the Iowa court in Bowman v. Humphrey, 797 which involved the pollution of a waterway by the defendant's creamery to the alleged detriment of the plaintiff. Defendant attempted to show that its own pollution was negligible and that somebody else upstream was causing the pollution by dumping dead animals into the water. The trial court instructed the jury that the defendant was liable for the whole damage. The supreme court reversed on the ground that when a defendant has acted separately and without the knowledge of another's activity, only the pollution that could be proved to be the direct and proximate result of his own action can be used to assess damages. The fact that the proof problem would be difficult did not affect the rule in Iowa.

In neither Idaho nor Iowa do the cases actually hold that if all of the

794 Id. at 208.
796 Id. at 791.
797 124 Iowa 744, 100 N.W. 854 (1904). An earlier case involving smoke, soot, and gas also held the injuries must be separated; Harley v. Merrill Brick Co., 83 Iowa 73, 79, 48 N.W. 1000 (1891). See also Tackaberry v. Sioux City Service Co., 154 Iowa 358, 132 N.W. 945 (1912).
defendants were joined in one action the burden of proof would still be on the plaintiff to show the separate contribution of each separate defendant but the two opinions suggest that this would be the rule.

In an early *Kentucky* case, the plaintiff sued for damages to his land alleged to have been caused by the defendant's ditches and culverts which turned surface waters onto the plaintiff's property. The defendant argued that the county contributed to the injury, but the trial court refused to admit this evidence on the ground that it was not sufficient to establish a defense. This ruling was affirmed on appeal, the court taking the position that even if the county wrongfully contributed to the final injury, the two wrongdoers were joint tortfeasors, subject to suit jointly or separately. The court said that the action was to recover damages for the injury, not for the failure of the separate defendants to act with due care. In a later opinion, however, the Kentucky Supreme Court held that tortfeasors acting independently were not jointly liable and could not be joined in one action. The suit was for damages against several oil companies which had permitted crude oil and other harmful liquids to be put in such a position on the bank of the creek that the rains carried it into the stream and onto plaintiff's land.

Joint action was not permitted in a *Minnesota* case involving the waste matter from a canning company and a city operated septic tank combining in a stream and causing a nuisance with damage to the plaintiff's farm which was downstream. The court did not even consider the possibility of joining the parties to try common issues, but separated them for trial of the damage question.

The *Mississippi* court was faced with the problem in *Masonite Corp. v. Burnham*. In that case the defendant company had emptied its refuse matter into the waters of a creek into which the city also emptied its sewage. The polluted water damaged the plaintiff. The court, citing many of the cases which we feel should be distinguished, held that the trial court should have instructed the jury that the appellant "would only be liable for its contribution to the pollution of the stream and the damages resulting therefrom, and not for the independent acts of others

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799 Watson v. Pyramid Oil Co., 198 Ky. 135, 248 S.W. 227 (1923). The same idea was applied in a case involving joint fraud, Evola Realty Co. v. Westfield, 251 S.W.2d 298, 301 (Ky. 1952).
800 Johnson v. City of Fairmont, 188 Minn. 451, 247 N.W. 572 (1933), following dicta in Sloggy v. Dilworth, 38 Minn. 179, 36 N.W. 451 (1888).
801 164 Miss. 840, 146 So. 292 (1933).
802 See discussion supra at note 782.
contributing to such pollution and the damages resulting therefrom."  

The only case directly in point in Missouri is a decision by a Missouri appellate court in a case where the injuries complained of were caused by the depositing through sewer pipes into a waterway of large quantities of manure, soot, garbage, decayed animals, etc., by individual defendants who had received permission to do so from the city. The court denied a joint action on the ground that they were liable only in separate actions for the particular injuries caused by each defendant separately. The court reasoned that "Were the rule otherwise a person, who illegally throws some putrid matter into a highway, might be held legally responsible for the injuries caused by pestilence that depopulates a city, simply because others, by similar illegal acts added to his own, created the nuisance which bred the pestilence." In dictum in a recent case involving a situation where the real issue was which of two possible sources of the injurious force was the one which actually set it in motion, the court used some language which might indicate a contrary view.

The Supreme Court in Montana has had two occasions to rule on the problem. In the earlier case the court refused to impose liability for the entire damages on one of several companies where refuse from several mining and smelting plants, including defendant's, had polluted a waterway which had deposited the refuse on plaintiff's land. In a later case several defendants individually had diverted water in such a way as to prevent the plaintiff from using the water for irrigation purposes. The court held in each case that there could be no joint liability and that a joint action could not be brought, whether or not damages were apportioned among all defendants. In another case a federal court sitting in Montana refused to allow damages against any of the defendants in a suit to enjoin multiple defendants, even though an injunction action was proper and a restraining order would be issued against all of the defendants.

803 Supra note 801 at 854.
804 Schoening v. Claus, 363 Mo. 119, 124, 249 S.W.2d 361 (1952), mentioned infra at note 880. Since it arose in a hunting accident situation it is very doubtful that it would be carried over into the nuisance type of case, however. The court did say, "[I]f the two Claus brothers acting together negligently injured plaintiff, then each would be liable. The evidence did not justify such an instruction. If some shot fired from each gun struck plaintiff, then each would be liable. However, if plaintiff's injuries were the result of the shot fired by Elmer, Erwin would not be liable."
806 Howell v. Bent, 48 Mont. 268, 137 Pac. 49 (1913).
A *Nevada* court in an early decision\(^{809}\) also held that there was a misjoinder of parties when the defendants independently through their separate ditches wrongfully sent waste water flowing into the drain ditch of the plaintiff, although an injunction would have been permissible.

The plaintiff in a *New York* case sought damages for injury to her property caused by the defendant and other hotel owners through the disposal of sewage into a stream. The language of the New York Court of Appeals has been quoted often by courts in other jurisdictions.

The right of action arises from the discharge into the stream, and the nuisance is only a consequence of the act. The liability commences with the act of the defendant upon his own premises, and this act was separate and independent of and without regard to the act of others. The defendant’s act, being several when it was committed, cannot be made joint because of the consequences which followed in connection with others who had done the same or a similar act. It is true, that it is difficult to separate the injury; but that furnishes no reason why one tortfeasor should be liable for the act of others who have no association and do not act in concert with him. If the law was otherwise, the one who did the least might be made liable for the damages of others far exceeding the amount for which he really was chargeable, without any means to enforce contribution or to adjust the amount among the different parties. So also proof of an act committed by one person would entitle the plaintiff to recover for all the damages sustained by the acts of others, who severally and independently may have contributed to the injury. Such a rule cannot be upheld upon any sound principle of law. The fact that it is difficult to separate the injury done by each one from the others furnishes no reason for holding that one tortfeasor should be liable for the acts of others with whom he is not acting in concert.\(^{810}\)

The court did not even consider the possibility of shifting the burden of proof to the defendant to show his contributed share. Neither did it consider the advantages of a joint cause of action uniting all of the defendants in one proceeding, and either trying the common questions together and separating the damage question or shifting the burden of proof to the defendant on damages. The case was decided at a time when liberal rules of joinder were not generally accepted.

A lower court in New York in another case cited the Court of Ap-

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\(^{809}\) Blaisdell v. Stephens, 14 Nev. 17 (1879).

peals' opinion as justification for allowing an injunction against multiple defendants whose individual small contributions to the pollution of the stream together caused damage to the plaintiff.\textsuperscript{811}

Since only the defendant railroad was sued in the action, the \textit{North Dakota} case of \textit{Boulger v. Northern Pac. Ry.}\textsuperscript{812} is not really authority for the proposition that several defendants cannot be joined in one action. The court held, however, that the defendant railroad could be held liable only for the damages caused by its own embankment, and not for the additional damages caused by other sources which together with the defendant's contribution caused waters to flood plaintiff's property.

The same rule was applied by the \textit{Ohio} court in a case in which the lower court had held the city liable for all of the damages caused by the pollution of a stream which the city alleged was also partly caused by other riparian owners. The Ohio Supreme Court, reversing the trial court, held that the recovery must be limited to the injuries occasioned solely by the acts of the city, regardless of how difficult it would be to determine the part of the damages so occasioned.\textsuperscript{813}

The early \textit{Pennsylvania} case of \textit{Little Schuylkill Navigation Co. v. Richard's Adm'r.}\textsuperscript{814} is certainly one of the leading cases for this point of view. It often is cited by courts in other jurisdictions. In this case the plaintiff's dam gradually was filled with coal-dirt discharged from the coal mining operations of the several defendants. The instruction of the trial court that each was liable for the whole damage was held erroneous. As in the New York case, the Pennsylvania court held that the deposit of the coal-dirt in the dam's basin was only the cause of the injury but that the tort itself which gives rise to the cause of action was the act of throwing the coal-dirt into the stream. Since each act was wholly separate and independent of the acts of other defendants the torts were several when committed. Nevertheless, the court said that, because of the difficulty of proof, the jury should be permitted to measure the injury caused by each with a "liberal hand."\textsuperscript{816} The joinder of several defendants who acted independently is possible in Pennsylvania, however, in an equity injunction action, but the court says nothing about whether this means each defendant would be liable for all, or

\textsuperscript{811} Warren v. Parkhurst, 46 Misc. 466, 92 N.Y.S. 725 (1904).
\textsuperscript{812} 41 N.D. 316, 171 N.W. 632 (1918).
\textsuperscript{813} City of Mansfield v. Brister, 76 Ohio St. 270, 81 N.E. 631 (1907).
\textsuperscript{814} 57 Pa. 142 (1868).
\textsuperscript{815} \textit{Id.} at 147; approved in Gallagher v. Kemmerer, 144 Pa. 509, 22 Atl. 970 (1891).
merely that damages can be apportioned among the defendants in such a suit.\textsuperscript{816}

A somewhat different kind of concurrent nuisance arose in a Tennessee case decided in 1903. The defendants were separate and independent corporations engaged in the mining and smelting of copper. The operations of each caused the emission of noxious, foul, and poisonous smoke and gases, which drifted onto the plaintiff's premises. The defendant's demurrer for misjoinder was sustained, and the ruling was affirmed by the Supreme Court, the court holding that the plaintiff must proceed in separate actions for the damages caused by each wrongdoer separately, since otherwise one who contributed only a slight amount to the injury would be held liable for the damages of all. The court was not unaware of the difficulty of proof but at least made some attempt to indicate to the trial court how this might be handled and how to apportion the damages.

That a plaintiff may be embarrassed in proving the wrong done him by one person is no reason why he should recover his damages from another, who did not cause them, merely because he did the plaintiff a similar injury. [The court suggested that, to measure the damages of each, proof could be made of the extent and capacity of the plants, tonnage of ore, time each has been in operation, proximity from plaintiff's land, condition of the air currents, together with other facts and circumstances to show the amount contributed by each.\textsuperscript{817}]

While we are not now called upon to pass upon this question, we think that, where defendants are guilty of wrongs necessitating the action, juries should not be held to too great nicety and accuracy of judgment in ascertaining the damages to be assessed against each of the tortfeasors; and this court would be slow to interfere with verdicts supposed to be excessive.\textsuperscript{818}

The court, however, did insist on separate actions.

Only one of several who independently contributed to plaintiff's injury was sued by the plaintiff in the Virginia case of Pulaski Coal Co. v. Gibboney Sand Bar Co.\textsuperscript{819} The deposit of slack, slate and mine refuse by several companies acting independently caused injury to plaintiff's

\begin{itemize}
\item \textsuperscript{818} Gray v. Phila. & Reading Coal & Iron Co., 286 Pa. 111, 132 Atl. 820 (1926), discussed infra at note 834.
\item \textsuperscript{817} Swain v. Tennessee Copper Co., 111 Tenn. 430, 442, 78 S.W. 93 (1903).
\item \textsuperscript{818} Id. at 455. In accord, Madison v. Copper Co., 113 Tenn. 331, 83 S.W. 658 (1904). Injunction suit distinguished in Ladew v. Tennessee Copper Co., 179 F. 245, 255 (C.C.S.D. Tenn. 1910).
\item \textsuperscript{819} 110 Va. 444, 66 S.E. 73 (1909).
\end{itemize}
sand bar when the refuse was washed downstream. The court held that each must be held separately for a proportionate injury caused by his own negligence. The damages contributed by the one being sued had to be proved by the plaintiff, the court said.

Another case that was decided in Virginia in 1946 presents a variation of the problem not found in any of the cases discussed so far. The plaintiff sued the defendant for the pollution of the plaintiff's well by water and minerals running from the defendant's mine. The defense was that the plaintiff by his own activities had contributed substantially to the pollution. The plaintiff introduced no evidence as to how much of a contribution was made by the defendant, and the court held that this, therefore, called for dismissal of the action, since the damage done by the defendant must be proved by the plaintiff. 820

In the first case arising in West Virginia, 821 the court held that the one defendant against whom the action was brought was liable for the entire damage even though several coal mines had contributed by depositing refuse in the stream running by plaintiff's land. The court reasoned that otherwise the plaintiff would be denied relief because he would not be able to prove the proportion of the share of each tortfeasor's act to the total injury. Yet later, in Farley v. Crystal Coal & Coke Co., 822 the court expressly overruled the previous decision, and held that there was no joint liability if there was no concert of action, even though the contributions of the six coal mining companies had united to pollute the river and cause damage to the plaintiff's farm.

In a case decided by the United States Court of Appeals (Ninth Circuit) arising in Arizona, the court stated that the damages caused by separate smelting companies to the plaintiff's adjoining farm land should be measured separately, and that each should be liable only for whatever damage was done by its own smelter. 823 In this case the lower court had consolidated two cases against two separate defendants and apparently they were tried by one jury, but separate verdicts were given. The defendant who appealed had not introduced any evidence but had objected to the verdict for the plaintiff. The court stated that the evidence was convincing to the effect that the smoke and fumes from the two smelters intermingled and caused the damages, and then proceeded to say "how could plaintiffs, farmers, be reasonably expected to say with anything like precision what the contents of the smoke

820 Panther Coal Co. v. Looney, 185 Va. 758, 40 S.E.2d 298 (1946).
822 85 W.Va. 595, 102 S.E. 265 (1920).
823 United Verde Copper Co. v. Jordan, 14 F.2d 299, 302 (9th Cir. 1926).
were, or what proportion of damage was done by smoke from one smelter as distinguished from the other?” The court then stated that the theory of the plaintiffs was one of separate damages and apparently assumed that the jury’s verdict against this one defendant was based upon a separation of the damages caused by the two companies, in spite of the apparent lack of evidence to separate the damages.

Injunction Against Concurrent Nuisance. While almost all jurisdictions, as indicated above, deny any kind of joint recovery in a damage action at law where the nuisance is the result of contributions of independent persons acting without concert, nevertheless, in a proper case it is the rule in every jurisdiction that an action in equity to enjoin the continuance of the nuisance is permissible and in this proceeding all of the contributors can be made parties. An injunction against nuisance is an equitable action, and to avoid multifarious suits the equity court will allow the joinder of all parties and enjoin each of them from making further contributions to the nuisance. The cases supporting this proposition are legion, many of them in the very jurisdictions which deny joint recovery by way of damage award.

Equitable Relief by Way of Damage Award. There are a few cases in which courts, after joinder of multiple defendants for purposes of an injunction, have allowed an award of damages in the same equitable action, even in jurisdictions where a joinder of parties defendant in a law action for damages would not be permissible. Typical of these is Vaughn v. Burnette, decided by the Georgia Supreme Court in 1954. The court held that an injunction against all of the independent concurrent defendants could be had, and—

The court, having jurisdiction for the purpose of giving injunctive relief, could under the well-established law of this

824 Ibid.
825 Miller v. Highland Ditch Co., (Calif.) supra note 786; People v. City of Los Angeles, 83 Cal. App.2d 627, 189 P.2d 489 (1948); City of Atlanta v. Cherry, (Ga.) supra note 792; Lockwood Co. v. Lawrence, 77 Me. 297 (1885) (paper companies polluting water); Woodyear v. Schaefer, 57 Md. 1 (1881) (pollution of water by slaughterhouses, soap company and brewery causing sickening odor affecting flour mill operations); Jessup & Moore Paper Co. v. Zeitler, 180 Mo. 395, 24 A.2d 788 (1942) (paper companies polluting water); Johnson v. City of Fairmont, supra note 800; State v. Dearing, 244 Mo. 25, 148 S.W. 618 (1912) (mining refuse discharged into stream); Blaisdell v. Stephens, supra note 809; Warren v. Parkhurst, supra note 811, approved 186 N.Y. 45, 78 N.E. 579 (1906); City of Mansfield v. Brister, supra note 813; Madison v. Copper Co., supra note 818. See cases (including English) collected 45 A.L.R.2d 1285 (1956) and 4 Restatement, Torts §882, comment b. In Morgan v. City of Danbury, 67 Conn. 484, 35 Atl. 499 (1896) an injunction was permitted against the same defendant for two separate nuisances, filling up pond and polluting air and water.

826 Supra note 793.
State retain it as to damages in order to do complete justice between the parties. Code §37-105. The court, upon proper determination of the damages caused by each of the defendants, could render judgment against them for their proportionate parts of the damage.\textsuperscript{827}

The court in no way indicates that there would be any shifting of the burden of proof to the multiple defendants or that there would be an imposition of joint liability on each of them for the total damage.

The \textit{Nebraska} court faced a similar problem in \textit{Brchan v. Crete Mills}, decided in 1952.\textsuperscript{828} Here it was charged that the separate dams and dikes of two defendants, acting independently in the construction of the structures, together caused the river to back up in such a way as to create a nuisance, flooding plaintiffs' lands. In addition to an injunction against the maintenance of the dams and dikes, the plaintiffs asked for money damages caused by three previous floods. After the court decided that this was a proper case for joining the parties to enjoin the continuance of the nuisance, the court said, concerning the right to recover damages:

Some cases hold to the proposition that the collection of damages was not an actionable matter, and that an adequate remedy at law exists for the collection of damages. They further held that the defendant was entitled to a jury trial on the question of damages.\textsuperscript{829}

It appears from the foregoing-cited Nebraska cases that this jurisdiction has given approval to the proposition in a suit to enjoin a nuisance, damages suffered by the plaintiff on account of such nuisance may be included in the equitable action. This being an action in equity, the main relief sought is the abatement of the nuisance. The only damages that could be recovered would be the damages occurring as the result of the nuisance, if such be proven. This is based on the following rule: "It is a well-settled principle of equity jurisprudence that, where a court of equity has obtained jurisdiction of a cause for any purpose, it will retain it for all, and will proceed to a final determination of the case, adjudicate all matters in issue, and thus avoid unnecessary litigation."\textsuperscript{830}

Since the question arose on a demurrer by the defendant, the court did not answer the question of how the damages should be apportioned, if they were to be apportioned, or if the two defendants were to be held jointly liable for the total damage.

\textsuperscript{827} \textit{Id.} at 208. [Emphasis added.]
\textsuperscript{828} 155 Neb. 505, 52 N.W.2d 333 (1952).
\textsuperscript{829} \textit{Id.} at 515.
\textsuperscript{830} \textit{Id.} at 516.
To like effect, the lower court in *New York*, in *Warren v. Parkhurst*,881 in considering the objection of the defendant that money damages could not be awarded in a suit to enjoin a nuisance, said:

All the defendants may be enjoined, and, if the question of damages is urged, a reference may be had to determine what damage has been caused by each defendant. This power of a court of equity to grant exact justice and proper relief for or against each defendant relieves such an action of any possible hardship.882

The Court of Appeals in New York upheld the decision of the lower court, apparently even as to the right to award damages, although the language is not clear on this point. The court said that the complaint stated a cause of action and was not objectionable “on the ground of multifariousness. Whether it would be good if the plaintiff sought only to recover damages at law, it is not necessary now to decide.”883

There is no indication in either New York opinion as to whether it would be possible to assess joint liability against all of the defendants for the total damage, but one gets the impression from reading the cases that the damages would be separated.

The same problem arose in *Pennsylvania* in the case of *Gray v. Phila. & Reading Coal & Iron Co.*, the court saying:

Assuming that each and all of the present defendants could claim a jury trial on the question of damages (a matter which the chancellor will have little difficulty in deciding when called upon to do so), [?], and that they prefer to face the antagonistic sympathy of a jury, rather than the judgment of a court not so influenced, still no difficulty would result; for, in the interest of the public generally, the issues thus raised can be combined for the purposes of trial on this point, so long as it can be done without injustice to the defendants; and, so far as we now see, all such issues could be wisely tried together.

Moreover, the convenience of the remedy in chancery is not the only basis of equitable relief in the present case. Equity is the special forum for obtaining an injunction, which may be granted to prevent actual or threatened trespasses or nuisances of a continuing and permanent character . . . and, when once the jurisdiction has thus attached, equity will itself proceed to round out the whole circle of controversy, by deciding every other contention connected with the subject-matter of the suit,

881 *Supra* note 811.
882 *Id.* at 728.
883 *Supra* note 825 at 49.
including the amount of damages to which plaintiff is entitled because of injuries theretofore sustained . . . 834

The decision of the Wisconsin court in Mitchell Realty Co. v. West Allis, 835 has been cited frequently. The corporate defendants' operations discharged chemicals and vegetable ingredients from their industrial operations into the stream and contributed to its pollution, to the injury of the plaintiff. The action was brought against the city and seven corporate defendants for injuries caused to the plaintiff's property by the discharge of sewage through the city sewage system and thence to a stream running through the plaintiff's land. The lower court allowed damages to the plaintiff in its suit against the city, the other individual defendants having been separated from the action against the city. Separate actions had been begun against each of them. The lower court also went on the assumption that the total amount of damages resulting from the pollution could be charged to the city, which then could obtain reimbursement from the other defendants. The Supreme Court said:

It is our view, therefore, that the action as originally begun was maintainable, and that the order of the lower court in striking out the allegations as to damages with respect to the private corporations charged was erroneous. Had the action proceeded, the plaintiffs could have obtained their equitable remedy for the abatement of the nuisance, and, upon the determination of the court of the proportionate share of the damage caused by each of the defendants, were entitled to judgment for such amounts, thus disposing of the entire litigation in one action. To accomplish such a result is one of the principal functions of a court of equity. 836

The court went on to hold, however, that the whole damage could not be assessed against one defendant but would have to be apportioned among the wrongdoers.

Cases Permitting Joinder and Joint Liability. In a few cases courts have imposed total liability upon each of the defendants whose actions contributed in some part to the total injury which caused the plaintiff's damage. An action was brought in Indiana to recover damages for injuries resulting from the pollution of waterways from paper factories of several defendants. The defendants were held jointly liable and the court drew a rather unusual distinction. The court held that if the acts had amounted only to a private nuisance the defendants would be

834 Supra note 816 at 16.
835 184 Wis. 352, 199 N.W. 390 (1924).
836 Id. at 370.
liable individually only for the consequences of their own acts, but that, since a public right had been violated, each must answer for the wrongs of the others jointly or severally, as the plaintiff elects.\textsuperscript{837} No other case has been found in which the court drew a line between public and private nuisances for purposes of finding joint liability for damage. The distinction between these two kinds of nuisance would seem to have nothing to do with the question of whether persons, not acting in concert with each other but whose separate actions concurred and caused a total injury, should be held jointly liable.

In \textit{Arnold v. C. Hoffman & Son Milling Co.},\textsuperscript{888} the Kansas court held that the defendants, one of whom had constructed a bridge and the other a dam, which together caused an overflow of water on the plaintiff's land, could not object by demurrer to being sued jointly and severally under the alleged facts. The defendants would be jointly liable if it were found that their acts operated jointly and contemporaneously to produce the overflow. A similar result was reached in a later case involving injury to the plaintiff's land caused by pollution of a creek by the city which discharged sewage and an oil company which discharged refuse into the creek.\textsuperscript{889}

The opinion in a recent \textit{North Carolina} case gave the same kind of answer when one defendant was sued for damages to land from the depositing of silt from mining operations in a stream flowing through the plaintiff's property. The defendant filed a cross claim against additional defendants seeking to enforce its right of contribution, in the event it was found liable. The court stated:

If the independent wrongful acts of two or more persons unite in producing a single indivisible injury, the parties are joint tortfeasors within the meaning of the law, and the injured party may sue only one or all of the tortfeasors, as he may elect . . .

When the aggrieved party elects to sue only one, or less than all of the tortfeasors, the original defendant or defendants may have the others made additional defendants (under the applicable statute) for the purpose of enforcing contributions . . .\textsuperscript{840}

\textsuperscript{837} West Muncie Strawboard Co. v. Slack, 164 Ind. 21, 72 N.E. 879 (1904).
\textsuperscript{888} 86 Kan. 12, 119 Pac. 373 (1911).
\textsuperscript{889} McDaniel v. City of Cherryvale, 91 Kan. 40, 136 Pac. 899 (1913). See also Mosby v. Manhattan Oil Co., 52 F.2d 364 (8th Cir. 1931), cert. den. 284 U.S. 677, 52 S.Ct. 131 (1931).
Three cases have arisen in Oklahoma and the court has held each time that each of several persons acting independently, whose actions combined to produce a single injury, would be held jointly liable for the total damages. In one case livestock water was polluted by several defendants who permitted oil and salt water to run into creeks on plaintiff's land. In a later case a city was sued for its operation of a septic tank and disposal plant which caused obnoxious odors and deposited refuse on the plaintiff's land. The city claimed that others, including slaughterhouses and a cotton gin, contributed to the injuries, but the court held the city liable for the total amount on the ground that this defense was immaterial. In a later case a federal court held the defendant oil companies jointly liable for the damage to the plaintiff's property arising out of the separate drilling operations of the companies. In reaching its decision in this last case, the court considered it to be an application of the rationale used in an earlier case in which crude oil that had flowed into a creek from several defendants' operations and ignited had then burned the plaintiff's barn. These cases can perhaps be distinguished along lines suggested later on the ground that possibly the oil from any one of the defendants would have been sufficient to have ignited and caused the total injury. If so this would not be a case of each of the defendants making a small contribution to the extent of the injury, but rather they happened to be concurrent causes of one single indivisible injury, the burning of the barn.

A fairly recent Texas case, Landers v. East Texas Salt Water Disposal Co., contains as strong an expression as any for holding each of the contributors of injurious material liable for the whole. The court stated that requiring the plaintiff to assume the burden of proving the contribution of each separate wrongdoer with sufficient certainty under existing rules of damages would deny the plaintiff an effective remedy under prior rulings in Texas. The court then said:

In other words, our courts seem to have embraced the philosophy, inherent in this class of decisions, that it is better that the injured party lose all of his damages than that any of several wrongdoers should pay more of the damages than he individually and separately caused. If such has been the law, from the standpoint of justice it should not have been; if it is

844 Northup v. Eakes, 72 Okla. 66, 178 Pac. 266 (1918), the distinction that should be made is discussed in the text infra at note 858.
845 151 Tex. 251, 248 S.W.2d 731 (1952).
the law now, it will not be hereafter. The case of Sun Oil Company v. Robicheaux is overruled. Where the tortious acts of two or more wrongdoers join to produce an indivisible injury, that is, an injury which from its nature cannot be apportioned with reasonable certainty to the individual wrongdoers, all of the wrongdoers will be held jointly and severally liable for the entire damages and the injured party may proceed to judgment against any one separately or against all in one suit. If fewer than the whole number of wrongdoers are joined as defendants to plaintiff's suit, those joined may by proper cross action under the governing rules bring in those omitted. To permit the joinder as defendants of such wrongdoers without at the same time imposing joint liability upon them would not relieve the inequities of the situation nor cure the ills of the plaintiff. Simple procedural joinder of the defendants would put the plaintiff in no better position to produce the required proof of the portion of the injury attributable to each of the defendants. In most such cases, under the decisions heretofore cited, he would still be the victim of an instructed verdict. It would be of no comfort or advantage to the plaintiff that the instructed verdict relieved all of the defendants of liability in one suit and at one time rather than in separate suits and one at a time.\(^846\)

A rather odd result was reached in a very early Vermont case.\(^847\) Here two separate dams caused water to overflow on the plaintiff's land but one of the defendants removed his dam immediately upon hearing of the injury to the plaintiff's land. The jury found this defendant not guilty and the other guilty. The one found guilty appealed on the ground that there was a misjoinder in the trespass action. The court said the joinder was proper on the theory that if the plaintiff had brought an action against either one separately, the defendant would have argued that his dam caused no injury at all. The court concluded that it is possible to join both defendants and permit the jury to decide where the blame should be placed. The case, therefore, really is not a holding that there can be joint liability. In a much later case,\(^848\) however, the Vermont court held defendants jointly and severally liable where the dam of one and the piers of the other together raised the water level and caused it to flow onto the highway.

A case arose in Washington involving the pollution of a river by sewage of a city and waste from the defendant's slaughterhouse.\(^849\) The

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\(^846\) Id. at 256.
\(^847\) Wright v. Cooper, 1 Tyler 425 (Vt. 1802).
\(^848\) Town of Sharon v. Anahama Realty Corp., 97 Vt. 336, 123 Atl. 192 (1924).
\(^849\) Snavely v. City of Goldendale, 10 Wash.2d 453, 117 P.2d 221 (1941).
court did not allow imposition of joint liability because it felt it was unjust to hold one responsible for the entire injurious effects of acts committed by all, but it did allow joinder of parties in one suit to determine more accurately the rights and duties of all. It held that there was no misjoinder. This seems to reverse an earlier Washington decision in which one defendant was held liable for the whole injury in a concurrent causation situation. 850

The United States Court of Appeals for the Eighth Circuit in a case arising in Louisana adopted the joint liability for the total injury view. Louisiana follows this rule. If, therefore, on a new trial, plaintiffs can introduce evidence sufficient to show that the defendants, or any of them, were negligent and, though acting separately, their negligence combined to produce the pollution damage, plaintiff may recover for the whole damage against one or all of those contributing. 851

The recent decision by the English House of Lords in Bonnington Castings, Ltd. v. Wardlaw 852 indicates that the English rule in this kind of case is analyzed in simple terms of "material contribution," the only requirement being that the part contributed by each defendant being sued make a material contribution. If it does, then total liability is imposed upon each. At least it was so held in the case of an occupational disease, silicosis. This analysis does not seem to be dependent upon the fact that the case involved the breach of a statutory duty or liability to an employee, since the question is one of causation.

Results in Cumulative Contribution Radiation Cases Under Existing Doctrines. The results which courts would reach under existing rules in several of the multiple defendants situations have been indicated already, including, (1) when the negligence of each of two or more defendants has furnished a link in the chain of causation resulting in a single injurious incident, (2) when two or more independent sources negligently operated have exposed the plaintiff and each contribution was sufficient to cause the total injury but which actually caused the injury cannot be determined, and (3) when several sources each make a cumulative contribution to the amount of injury but total liability may be imposed upon one or more of the defendants because of legally imposed responsibility for the acts of another such as in concert of action, vicarious liability, and common duty situations.

850 Johnson v. Irvine Lumber Co., 75 Wash. 539, 135 Pac. 217 (1913), where defendant's log jam and the acts of others combined to cause injury.
851 Phillips Petroleum Co. v. Hardee, 189 F.2d 205, 212 (5th Cir. 1951).
In addition, the results which courts will reach under existing rules in other situations will be discussed in the next two subsections. *Negligent Unknown Wrongdoer* deals with those situations in which less than all of the potential defendants are responsible for the injury (in the sense that some simply could not have made any contribution), but it is impossible or at least extremely difficult for the plaintiff to identify the responsible party or parties. *Cumulative Effect from Non-Negligent Source* is concerned with cases in which the manner of operation, including the amount of radiation, is in compliance with the standard of conduct required of the reasonable man under the circumstances.

The cumulative or concurrent nuisance cases possibly give us answers to the radiation situations in which several legally unrelated defendants each has been negligent and *each has made the total injury greater* than it would have been without his contribution. Whether the sources of radiation be reactors, industrial and research isotopes, or waste products being disposed of, two types of cumulative contribution cases may arise: (1) when each negligently releases radiation but the amount is below the threshold level which causes observable injury so that without the contribution of others no tort liability would have been imposed; and (2) when each negligently releases sufficient radiation to cause recoverable injury to the plaintiff without the contribution of the others but the injury caused by each is now combined in one total injury. Many of the nuisance cases appear to involve the latter situation, but the facts of others would seem to be similar to those in the first group. Unfortunately the courts have not been concerned with such a distinction so the facts are not stated in a manner that would reveal which is involved. Under existing rules evolved from the nuisance cases this could cause a difference in result which would seem unjustifiable.

The clear majority of jurisdictions in the United States holds that there can be no joint liability in the cumulative-contribution-to-amount-of-injury case; and many of these do not allow even a joinder of defendants in the same cause of action, nor do they permit a shifting to the defendants of the burden of proving proportionate contribution. In such states the injured plaintiff must sue each one separately and prove the amount of damage caused by each. To the extent that the contribution of any one of the defendants is not sufficient to cause *any* recoverable harm this would seem to lead to a result denying recovery at least for this amount of the injury. In many cases, particularly of radiation exposure, this could mean no recovery at all. A good example would be genetic damage since the increase in incidence of mutations
apparently is directly proportional to the amount received. Using the more probable than not test, if the increase in chances of a mutation is allocated to each defendant, the contribution of no one defendant is likely to be sufficient to make the chances of mutation more than fifty per cent. Therefore, recovery could be had from no defendant. Theoretically, when each source contributed enough to cause recoverable injury, plaintiff can get full compensation if he can find and recover from all of the defendants. This would seem to be the case with such radiation injuries as shortened life span in which there apparently is a linear and cumulative effect from all radiation. In some jurisdictions joinder may be permitted and the jury allowed to apportion the damages with a liberal hand so far as proof of relative contribution is concerned.

In those eight jurisdictions which not only have allowed joinder of all defendants but also have imposed joint liability on all defendants for the total damages, the plaintiff will not only avoid the very difficult problem of proving how much each defendant contributed but also will get a windfall in two senses. Joint liability as imposed by the courts in these jurisdictions means that each defendant is liable not only for his own contribution, but also in a real sense is a surety for all other defendants in the event they cannot be found or are unable to contribute their share of the damages. In addition, the effect of joint liability could be to make the defendant or defendants who were negligent and successfully sued by the plaintiff liable not only for their own contributions but also for any contribution made by any other source of radiation which contributed to the total injury, including natural background radiation and that from non-negligent sources, such as those used in medical treatment. It can be argued that imposing total liability in such situations is like the “thin-skull” cases, or those in which the first negligent person who injures the plaintiff is liable for the negligence of a doctor who treats plaintiff for his initial injuries, or even some of the concurrent causation cases in which it took both a dam built by one defendant and a railroad embankment built by another to cause plaintiff’s land to be overflowed. Even if this explanation be accepted, it should not be used to justify the imposition of suretyship liability upon one collectible defendant when it is clear that each defendant caused some separable part of the total injury.

Surely better solutions can be worked out and the responsibility for doing so rests primarily with lawyers. We make the following suggestions as a start toward better solutions.

853 E.g., California. See case cited supra note 787.
Cumulative or Concurrent Causation and Cumulative or Concurrent Contribution to Amount of Injury Distinguished. The importance of distinguishing between the two types of cases is so great that restatement of the distinction is justified. It would seem better social policy to apply different recovery rules in each type, or at least not to carry over into the cumulative contribution cases the doctrine of total liability that has been applied in cumulative causation cases, as a few courts have done.

The cases pertinent to this subsection (5 b (3) (b) (ii)) all involve situations in which the forces set in motion by more than one source (human or otherwise) not only combine to injure the plaintiff but also each force itself makes some contribution toward increasing the damages; they are not just an essential causative link in creating the accident which caused plaintiff's injury.

An example of a case in which there clearly is cumulative or concurrent causation but not cumulative contribution to the amount of the damages is McKay & Roche v. Southern Bell Tel. Co. In this case the injury to the plaintiff's horse and property resulted when a telephone wire negligently maintained by one defendant, fell across a trolley wire, negligently maintained by another defendant, thereby becoming charged with electricity and causing injury when it fell to the ground. Here it took the concurrent forces of two wrongdoers to cause the final injury, but the injury itself was no different in extent or kind because there were two wrongdoers. Other examples of this type of case are the car collision cases in which both drivers are negligent and an innocent third party is hurt, referred to in section 5 b (2).

Neither are the true cumulative contribution cases considered in this subsection (5 b (3) (b) (ii)) quite like those where two causes, equally capable of causing the total injury, happen concurrently and in fact cause one injury, such as in the two motorcycles case or the two fires case, hitherto mentioned in section 5b(2) and similar situations. While the facts are not always clear, some of the concurrent nuisance cases may really be cumulative or concurrent causation situations rather than cumulative contribution ones. They should be distinguished, there-

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855 111 Ala. 337, 19 So. 695 (1896). Daggett v. Keshner, 149 N.Y.S.2d 422 (1950), seems to be of this category, though the facts are very fuzzy. See also Roush v. Johnson, supra note 763.
856 Supra notes 763-64.
857 Supra note 758.
858 Supra note 844.
fore, even if the courts do not do so, from the case in which there is true cumulative contribution to the amount of injury.\footnote{859}  

A few of the cumulative contribution situations analyzed in section 5 b (3) (b) (ii) perhaps do fall just in between the cumulative causation cases and those in which it is the injury itself to which each of several defendants contributes, not to the causation of the situation or accident from which the plaintiff is hurt. In a few of the cases where the plaintiff’s land has been flooded because of obstructions placed there by two or more defendants and where it took the effect of both obstructions to cause the flooding, we have cumulative forces that could be said to be either uniting in causation or in contribution to the damages resulting.\footnote{860} In many of these cases the facts do not make it clear whether it took both or several obstructions to cause any damage, or only that each of the obstructions made some contribution to the total damages. If the latter is the case then they should be treated as cases in which there is a cumulative contribution to the damage only, while if the former is the case, they should be treated as cases of cumulative causation.

The Correct (?) Solutions. While the view denying imposition of joint liability clearly is the weight of authority even today, many authorities have condemned the result. Some of them go all the way in support of the rationale of the Texas court in the \textit{Landers} case.\footnote{861} Wigmore would adopt the following rule:

\begin{quote}
\textit{Wherever two or more persons by culpable acts, whether concerted or not, cause a single general harm, not obviously assignable in parts to the respective wrongdoers, the injured party may recover from each for the whole.} In short, wherever there is any doubt at all as to how much each caused, take the burden of proof off the innocent sufferer; make any one of them pay for the whole, and then let them do their own figuring among themselves as to what is the share of blame for each.\footnote{862}
\end{quote}

Such reasoning would seem to go too far and is not necessary to protect the innocent plaintiff.

\footnote{859} Supra note 843.  
\footnote{861} Supra note 845.  
A much more desirable result would seem to be a simple shifting of the burden of proof from the plaintiff, once he has shown damages and that each of the defendants contributed toward that damage, requiring each defendant to assume the obligation of showing his contributive share by producing proof to limit his liability to something less than the whole damage. As Prosser points out, the difficulty of proof necessary to make a proper apportionment probably has been overstated. The difficulties may have been caused by lack of imagination or diligence of counsel in defending the accused. Actually a combination of solutions might prove to be best. In any event it seems clear that a joinder of all possible defendants is eminently desirable, and under liberal joinder rules now in effect in many jurisdictions this will be possible.

It has been suggested that if there is no proof of apportionment the damages be divided equally between the persons who contributed to the damage. When all of the defendants can be brought together in one suit, the shifting of the burden of proof to the defendants seems entirely satisfactory, allowing each to limit his liability, with the over-all requirement that the total damages should be fully compensated by the contributions of all defendants when added together. On the other hand, if it is not possible to join all of the defendants in one cause of action even under liberal joinder rules (e.g., if the action is brought in a state court and one or more of the defendants is out of the jurisdiction, as well may be the case where radioactive substances are involved), then one gets into difficulty unless the arbitrary rule of complete joint liability is accepted, or, alternatively, the arbitrary rule of equal liability is used. Yet complete joint liability is unjustified if there really is no concert of action either by reason of relationship or because of knowledge of the existence of the other contributing factor. While the defendant may be a wrongdoer legally, this does not necessarily mean that he is to be punished rather than merely forced to compensate for his

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863 This seems to be essentially the suggestion of Prosser 229. And see the suggestions in Carpenter, “Workable Rules for Determining Proximate Cause,” 20 Cal. L. Rev. 396, 406 (1932); Jackson, “Joint Torts and Several Liability,” 17 Tex. L. Rev. 399 (1939).


865 See Prosser, “Joint Torts and Several Liability,” supra note 864 at 443 and Prosser 236-37.

866 Prosser 229, n. 88.
own wrongdoing. The law is trying to distribute losses so as to reach a fair result. The Harper and James general philosophy, i.e., when in doubt always compensate the innocent injured party, does not necessarily always produce real justice. There would seem to be no justification for holding any single defendant who happens to be sued by the plaintiff, but whose contribution is only a minor one although an ascertainable part of the whole, liable for all of the damages, and then in addition place on him the burden of assuring reimbursement from the other defendants. Assuming that there is some way of apportioning, which will be the case in most situations, and especially in radiation cases, then there seems to be no reason to shift the burden of finding the other wrongdoer to the one who happens to be served with process, just to compensate the plaintiff. If our theory is to be one of social insurance which will assure recovery to the damaged party in every case, then we ought to impose a general social insurance scheme. We should not pick out a party to bear the social insurance policy losses merely because he happens by coincidence to damage the plaintiff in the same or similar manner as one or more other persons, where the consequence of the wrongdoing is to add to the total injury, part of which was contributed by others. The coincidence is no justification for imposing the total liability of compensating the injured party on one person who happens to be available for suit. Not only are the cases which go “whole hog” to joint liability illogical, but also, strangely enough, unjust.

In determining to which cases real joint liability for total damages should be applied, it seems fairer and more realistic to distinguish between the cumulative causation and cumulative contribution cases, rather than between divisible and indivisible damages situations.\textsuperscript{867} It is one thing to say that it is impossible to measure the separate contribution made by each of several causal links in the chain leading to a single injury. It is quite another to say that every person who contributes something to the total amount of injury should be held liable for the total damages. Even in cases of cumulative causation in which joint liability is imposed, the effect of the trend allowing contribution between joint tortfeasors is to permit apportionment.

At least as to radiation cases (and others too, probably) involving cumulative contribution to injury and not to causation it is best to make each defendant liable only for the part he contributed, otherwise every negligent user becomes a potential insurer for the wrongs of all users of radiation who cause the plaintiff some radiation harm. In addition,\textsuperscript{867} \textit{Id.} at 226-31. Harper & James 695, 699, 706-09.
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the negligent user who discharges only a small amount also would become liable for all injuries caused by non-negligent sources such as background and medical therapy sources, if his contribution added something to the total injury. This would include all other users and sources everywhere, often over a long period of time (at least the statute of limitations period), so long as the plaintiff was exposed to their radiation source before or after exposure to the particular defendant’s source. Surely the defendant at least should be permitted to prove how much he did not contribute and avoid becoming a surety for injury caused by all other radiation sources who cannot be joined in the same action or are not liable at all.

The cumulative nature of radiation effects makes existing rules inadequate. This points up sharply the need for a wholly new scheme for solving the radiation damage problem, perhaps along the lines suggested later.

(iii). Other Concurrent Contribution Cases Involving Negligence

Defamation. When two or more persons utter the identical slander against the same plaintiff, absent any conspiracy, the courts practically unanimously hold that there can be no joint liability. If no distinction is to be drawn between physical injuries and injuries to a person’s reputation, these cases are additional authority against imposing joint liability. Moreover, if anything, the problem of separating the damages in such cases would seem to be even more difficult than in the case of physical injuries, such as those resulting from the accumulation of refuse or the cumulative effect of doses of radiation from separate sources which concurrently contribute to a total injury. Nevertheless, it would seem that the trend, though a minority as yet, toward joinder of multiple defendants, and possibly to a shifting of the burden of proof, or even to imposition of joint liability on all defendants in physical injury cases, undoubtedly will be even more persuasive in radiation cases than in defamation cases. Thus it may be that the nuisance cases will lead to a liberalization of the defamation rule.

Mental Disturbance. The facts in Industrial Finance Service Co. v. Riley, decided by a Texas appellate court, illustrate the variety of situ-

868 In a recent A.L.R. annotation over fifty cases are listed which apparently hold that there can be no joint liability; there are only three cases, one being a slander of title case, in which there is language indicating the possibility of joint liability. 26 A.L.R.2d 1031 (1952).
ations in which concurrent contribution can arise in mental disturbance situations. Plaintiffs, husband and wife, in financial difficulty, borrowed from seventeen different loan companies. When they failed to make payments, the companies and their collection agencies sought to make collections. Their efforts were found to be unreasonable and to be made with malice and disregard for the health and welfare of the plaintiffs. There would seem to be no question that the constant calling day and night and the visiting at places of employment to demand payment caused mental shock and psychosomatic symptoms. Although there was no showing of any concert of action between the several companies as to their collection efforts, the court said, citing the *Landers* case \(^{870}\) as authority:

> As we have already stated, under the evidence in this case it was impossible to ascertain the amount of damages caused by any one loan company separately from the entire damage caused by all the loan companies considered as joint tort-feasors. It was therefore proper for appellees to prove their entire damages, which entire damages they were entitled to recover from any one or more of the joint tort-feasors.\(^{871}\)

Because of the cumulative nature of radiation effects, the apportionment problem in radiation cases may not always be as difficult as was the proof problem in this case, but it is not hard to predict that in Texas, at least, the courts are very likely to impose joint liability on all defendants who are cumulative or concurrent contributors in a radiation injury situation.

Defamation and mental disturbance cases present situations in which the argument of indivisible harm is most clearly applicable. To judge and apportion human emotional reactions, whether as a target of a slanderous remark, or as a victim of mental torture, would seem to be much more difficult than to judge the cumulative effect of doses of radiation, even though it probably is true that the final injury results from a combination of all forces brought to bear on the situation. The contribution of an individual user in the radiation case, however, would seem to be more nearly mathematically apportionable. The relative contributions of radiation are even more measurable than the contributions of concurrent contributors in many of the more conventional pollution cases, whether of the air or water.

*Workmen’s Compensation Analogies.* Probably the situations most

\(^{870}\) Supra note 845.

\(^{871}\) Industrial Finance Service Co. v. Riley, *supra* note 869 at 504.
nearly analogous to our radiation problem have occurred in the workmen's compensation area, particularly in cases involving occupational diseases such as silicosis. While negligence rules are not imposed in this type of situation, at least where the occupational disease is covered by the workmen's compensation scheme, the question of proving causation is still present. These cases should not be ignored in analyzing the radiation cases.

Where the statute does not provide otherwise, some jurisdictions adopt the rule that the employee, at his option, may recover an award for the entire disability against any one or more of the successive employers or insurance carriers. While it is necessary to show that each employment under which claim is made against the employer contributed to the disability, it is not necessary to show that it is the sole cause of disability. Typically the employers held liable in these jurisdictions have a right to get an apportioned recovery from other contributors in a separate action which in no way delays the employee's compensation.872

872 Colonial Ins. Co. v. Industrial Accident Commission, 29 Cal.2d 79, 172 P.2d 884 (1946) (applicant contracted silicosis while with employer who was covered during the period of employment by various insurance carriers; held, an award for the entire disability may be made against one insurer for a period when it was not acting as such); Niedzwiecki v. Pequonnock Foundry, 133 Conn. 78, 48 A.2d 369 (1946) (death due to silicosis and both employers held liable); White v. Taylor, 5 So.2d 337 (La. App. 1941) (deceased hurt his back when a wheelbarrow of brick fell on him and two days later, when working for a subcontractor, attempted to lift heavy objects and suffered back pains; held, the combination of the two accidents totally disabled the employee and the two insurers can be held jointly liable); Marsolek v. Miller Waste Mills, 244 Minn. 55, 69 N.W.2d 617 (1955) (while in three different employments, employee sustained injuries from accidents, each of which was superimposed on the preceding one; held, full compensation may be had from the last employer, who has a right to have the court apportion the award among the previous employers); Dickerson v. Essex County, 2 App. Div.2d 516, 157 N.Y.S.2d 94 (1956) (while in employ of county, deceased fell and injured his leg; because of weakened condition he fell again and re-injured it; in subsequent employment he again fell, was injured and died; held, the chain reaction all proximately resulted from the first accident, therefore the first employer is liable, but the current employer is also liable for injuries sustained in the course of the employment; as between the employers, the apportionment of the award is for the Board to decide); Esmond Mills, Inc. v. American Woolen Co., 76 R.I. 214, 68 A.2d 920 (1949) (employee contracted dermatitis under one employer and then became totally disabled while working for another; held, for the employee's benefit, the act permits him speedy recovery and allows him to collect the total compensation from the one for whom he was working when he became disabled, and such employer could then have the right to ask for apportionment from the former employers); Gosselin v. Parker Brass Foundry, 119 A.2d 189 (R.I. 1955) (deceased contracted silicosis prior to working for respondent but died of it during such employment; held, nothing in the act requires the employee to prove the disease was contracted while working for the last employer; it is sufficient to establish a causal connection between the employee's disability from the disease and his employment in work of the same...
In other states, usually by virtue of a statutory provision, recovery is granted in full against the last employer in whose employment some contribution was made to the disease or injury.\(^{873}\) It is clear that cases in general follow the rule of imposing complete liability on either the most available employer defendant, or upon one or all of them at the choice of the employee.

Whether the analogy of the workmen’s compensation cases can be carried over into the public liability situation is highly questionable, nature as that in which the disease was contracted; court cites the Esmond Mills case, \textit{supra}, approvingly). In these cases, it should be noted that the question of contribution among employers or carriers did not really concern the injured employee. In any event, he was allowed to recover the entire amount to which he was entitled from at least one of his employers. Other states, usually by virtue of a statutory provision, grant recovery in full against the last employer, under whose employment contribution to the disease or injury was made.

\(^{873}\) Travelers Ins. Co. v. Cardillo, 225 F.2d 137 (2d Cir. 1955), \textit{cert. den.}, 350 U.S. 913, 76 S.Ct. 196 (1955) (occupational disease complained of was loss of hearing; employee had several employers and employers had several insurance carriers during the course of the contracting and aggravation of the disease; held, under the Longshoremen’s and Harbor Workers’ Act, for its proper and speedy administration, it was the intent that the employer during the last employment in which the employee was exposed should be liable for the full amount of the award; by the same token, the last carrier who insured the liable employer during the employee’s employment should bear responsibility for the discharge of the duties and responsibilities of the liable employer); Mundy v. McLean, 72 So.2d 275 (Fla. 1954) (plasterer developed dermatitis while working for appellant; he left this job and took another one with no ill effects; then he left and worked for a third employer when his condition became worse and he was cautioned not to return to his trade; held, suit against the original employer will not lie by virtue of the act’s provision which says that the employer in whose employment the employee was last exposed to the disease shall alone be liable without right of contribution from any prior employer); Central Foundry Co. v. Industrial Comm., 374 Ill. 300, 29 N.E.2d 511 (1940) (the case itself is not applicable to the present discussion but it mentions the Illinois statute, Ill. Rev. Stat. 1939 c. 48, §172.25, which provides that liability be fixed, in cases of silicosis or asbestosis, on the last employer in whose employment the employee was last exposed during a period of sixty days or more after the effective date of the act; and exposure of less than sixty days shall not be deemed a last exposure); Walsh v. Kotler, 43 N.J. Super. 139, 127 A.2d 908 (1956) (a roofer worked forty years as such and for the past ten years for respondent; in the last two years his hands began contracting and it was diagnosed as Dupuytrens Contracture; respondent claimed his employment did not contribute to the disease since once it begins it will progress of its own accord; held, the last employer is liable regardless of when the disease is contracted, as long as the last employment exposed the employee; as to this causal question, the burden is on the employer to show that his employment added nothing to the severity of the disease or its acceleration); Stewart v. Duncan, 239 N.C. 640, 80 S.E.2d 764 (1954) (employee, a coal miner all his life, contracted silicosis at an undetermined date and became disabled while in employ of appellant; held, G. S. 97-57 is applicable and provides that the employer in whose employment the employee was last injuriously exposed to the hazards of the disease, and the insurance carrier at that time, shall be liable; the exposure is deemed injurious if
since the workmen's compensation approach really is a social insurance program which as yet has not been adopted in the area of public liability generally. The principles are readily applicable only where there are statutory provisions and administrative procedures by which the liability award can be determined. Without statutory assistance, it would be unrealistic to try to carry these theories into the usual tort liability cases. From the standpoint of radiation injuries in workmen's compensation situations themselves, assuming that radiation injuries are covered, there would seem to be nothing unusual or unique about such injuries that would call for any different rule than that applied in other cases.\textsuperscript{874}

(c) Alternative Liability—Specific wrongdoer who caused injury unknown although an identifiable group which includes the wrongdoer can be found

Atomic energy cases not infrequently should present courts with a type of problem often described as one involving alternative liability, or as we prefer, one involving an unknown-wrongdoer. The term unknown-wrongdoer is used because, while it can be determined that one or more of a limited and identifiable group of defendants set in motion the force that irradiated the plaintiff, it also is clear that only one or at least less than all of the group were responsible for the radiation which actually did harm the plaintiff. In this sense the wrongdoer is unknown and unless the plaintiff can prove which one or ones "more probably than not"\textsuperscript{875} caused his injuries, he will not recover under the

the employee was exposed for as much as thirty working days within seven consecutive calendar months, in cases of silicosis and asbestosis; the plain language of the statute dispels any possibility of contribution among successive employers or carriers); Karoly v. Jeddo-Highland Coal Co., 166 Pa. Super. 571, 73 A.2d 214 (1950) (employee had silicosis; held, the employee's last exposure fixes liability on the employer and carrier at that time); Leva v. Caron Granite Co., 124 A.2d 534 (R.I. 1956) (stonecutter worked for previous employer, who was not covered by workmen's compensation, for thirteen years, after which he worked on a temporary basis for respondent for about seven weeks; he became disabled from silicosis though it was clear he did not contract it while with respondent; held, all the act requires is that the disease was due to the nature of the employment, regardless of when it was contracted; therefore the last employer is liable); Pocahontas Fuel Co. v. Godbey, 192 Va. 845, 66 S.E.2d 859 (1951) (coal miner disabled from silicosis; Va. Code 1950 §65-47, states that the employer in whose employment he was last injuriously exposed and the carrier at that time is liable, without a right of contribution from any prior employer or carrier).

\textsuperscript{874} \textit{Infra} Part II on workmen's compensation.

\textsuperscript{875} \textit{Supra} note 770. See discussion of \textit{res ipsa loquitur}, \textit{infra} text at notes 1173 ff.
traditional rules of tort liability which require him to prove by the preponderance of evidence that a specific and identifiable defendant or defendants caused his injury. It is assumed that the plaintiff can prove that each of the defendants owed a duty not to irradiate him and that one or more of them, but less than all, is liable to the plaintiff for the injury suffered if the specific cause can be shown. The plaintiff, however, may not be able to pinpoint which of the group actually caused the harm. The only issue is that of causation, not duty, breach, or damages.

As already suggested, under traditional rules the plaintiff loses because he has not proved causation. The result, at least in some cases, certainly is not fair to the plaintiff and there is a very small group of recent cases which may be indicative of a new approach to the problem. As yet they do not represent the majority view and perhaps are not even indicative of a trend. The impact of these cases, however, if applied to radiation situations is so startling, and so unjust in many cases if traditional tort liability rules are applied, that they must be noted. It should be emphasized that this causation question is presented regardless of whether rules of negligence, perhaps supplemented by the doctrine of res ipsa loquitur, or those of absolute liability are applied.

While it has not always been done, again it is important to distinguish certain types of cases already discussed above, which are not directly analogous, but rather involve problems of multiple causation, contribution to damage, vicarious liability, and equal concurrent

876 Also to be distinguished from the true unknown-wrongdoer cases are those in which the concurrent negligence of two different defendants each contributes to cause the injury of the plaintiff, the injury resulting from a single impact. Saisa v. Lilja, 76 F.2d 380 (1st Cir. 1935) (two racing cars, and jury found both caused injury though only one hit pedestrian); Brown v. Thayer, 212 Mass. 392, 99 N.E. 237 (1912) (clear contribution of racing car drivers).

877 Micelli v. Hirsch, 83 N.E.2d 240 (Ohio App. 1948), is a good example of an often miscited case. There the decedent was struck by a car driven by one defendant and was run over by the car of another defendant. Joinder of the two defendants was allowed since the court considered the injury indivisible. There was no question but that each was negligent and, more important, that each did damage to the decedent. The only question was one of dividing the damages and the joint liability imposed upon each is similar to the results of stream pollution cases or car collision cases in which the negligence of each of two different persons concurs so as to inflict one injury upon the plaintiff, and the courts make the concurrent defendants separate the amount each contributed to the total damages. This is not a case of an unknown wrongdoer, but rather a case of unknown extent of damages. Actually, some of the hog, dog, and cattle cases really fit into this category, since it is known whose animals participated in the damage but it is not known just which animals did how much of the damage. Anderson v. Halverson, 126 Iowa 125, 101 N.W. 781 (1904) (had to prove separate damages, however); Worcester County v. Ashworth, 160 Mass. 186, 35 N.E. 773 (1893) (interpreting statute); S. S. Nohre v. Wright, 98 Minn. 477, 108 N.W. 865.
causation. Once these groups are distinguished, as they should be, the number of cases dealing with the question of the true unknown-wrongdoer, as here defined, is small indeed. Because in some of these distinguishable cases the rule of liability has developed because of the difficult proof problems, there is some tendency to use them as authority in the unknown-wrongdoer situation. This is not good analysis and analysis and

Miller v. Prough, 203 Mo. App. 413, 221 S.W. 159 (1920) (to plaintiff’s advantage to claim separate liability); Kerr v. O’Connor, 63 Pa. 341 (1869) (statute interpreted as imposing liability for all damages on all dog owners); Nelson v. Nugent, 106 Wis. 477, 82 N.W. 287 (1900) (same); Remele v. Donahue, 54 Vt. 555 (1882) (same); McAdams v. Sutton, 24 Ohio St. 333 (1873) (same); Stine v. McShane, 55 N.D. 745, 214 N.W. 906 (1927) (no joint liability and joint statute not effective yet); Hill v. Chappel Bros. of Montana, Inc., 93 Mont. 92, 18 P.2d 1106 (1932) (horses, and jury allowed to estimate as best they could); Wood v. Snider, 187 N.Y. 28, 36, 79 N.E. 858 (1907) (liability on basis of ratio of each defendant's cattle); Pacific Livestock Co. v. Murray, 45 Ore. 103, 76 Pac. 1079 (1904) (separate liability but defendant offered to show others contributed); King v. Ruth, 136 Miss. 377, 101 So. 500 (1924) (separate damages between hogs).

Also to be distinguished from the true unknown-wrongdoer situation are those cases involving application of the rules of vicarious liability, whether it be in terms of master-servant, [Raber v. Tumin, 36 Cal.2d 654, 660, 226 P.2d 574 (1951)] or some concept of concert of action, artificial though this is in some of the cases, [Reyher v. Mayne, supra note 777—hunting group and particular defendant known but all liable; Ushirohira v. Stuckey, 52 Cal. App. 526, 199 Pac. 339 (1921)—joint maintenance of herd of cattle; Stephens v. Schadler, supra note 777—one defendant harbored both his own and others’ dogs but the court did emphasize proof problem in imposing joint liability; Kuhn v. Bader, supra note 777—gun injury from one of hunting group; Oliver v. Miles, supra note 777; Benson v. Ross, supra note 777; and see cases set out supra note 877; Queen v. Salmon, 6 Q.B.D. 79 (1880)—criminal liability for all in target practice activity; State v. Newberg, 129 Ore. 564, 278 Pac. 568 (1929)—criminal liability for both hunters in group shooting regardless of whose shot killed]; or liability of landowner or primary contractor for accidents occurring during construction work on the premises, [see cases discussed supra in text at notes 220-291. Liability may not be imposed, of course; Wolf v. American Tract Society, 164 N.Y. 30, 58 N.E. 31 (1900)—brick fell where nineteen independent contractors were using 250 men]; or liability of a manufacturer for products sold without the application of the res ipsa loquitur doctrine, [see infra Chapter V on product liability and discussion of res ipsa loquitur in text following note 122; see e.g., Escola v. Coca Cola Bottling Co., 24 Cal.2d 453, 150 P.2d 436 (1944); Burr v. Sherwin Williams Co., 42 Cal.2d 682, 268 P.2d 1041 (1954); Gordon v. Aztec Brewing Co., 33 Cal.2d 514, 203 P.2d 522 (1949); Loch v. Confair, 372 Pa. 212, 93 A.2d 451 (1953); Nichols v. Todd, 174 Kan. 513, 258 P.2d 317 (1953)] or some kind of special relationship in the nature of joint enterprise such as may be the explanation of some injury-to-surgical-patient cases [Prosser, “Res Ipsa Loquitur in California,” 37 Cal. L. Rev. 183, 223 (1949), suggests this analysis for the famous case of Ybarra v. Spangard, 25 Cal.2d 486, 154 P.2d 687 (1944); see also Oldis v. La Societe Francaise, 130 Cal. App.2d 461, 279 P.2d 184 (1944); Cavero v. Franklin General Benevolent Society, 36 Cal.2d 301, 223 P.2d 471 (1950); Meyer v. St. Paul-Mercury Indemnity Co., 61 So.2d 901 (La. App. 1952)—finding no negligence, however; Duprey v. Shane, 39 Cal.2d 781, 249 P.2d 8 (1952)].

In the same general category to be distinguished are the cases in which two
makes for poor justice so long as the existing system of tort recovery is used. At least the distinctions should be recognized, even if it should be concluded that they are distinctions without a difference in some cases.

This particular causation difficulty could occur with considerable frequency in atomic energy cases. One example, already mentioned at the beginning of the discussion of multiple causes, would be if some person downwind from two reactors which could discharge identical radioactive material were injured by radiation which could only have come from one or the other of the reactors, but he has no way of proving from which reactor it came. A similar legal problem could arise if there were a limited number of industrial users of isotopes discharging radioactive material into some central place such as the sewage system. If a sewage plant employee is injured or if there is injury to the sewage plant itself because of the presence of excessive amounts of radioactive material resulting from an accidental discharge from one of the users, how can it be determined which of the potential defendants is to be held liable, assuming it is clear that only one discharged the excessive amount? It also is possible that both users of radioactive material were negligent in that they breached the standard of conduct required under the circumstances or else discharged radioactive material under circumstances calling for absolute liability but it is impossible to determine from whose plant the particular material which injured the plaintiff came. This could happen if plaintiff could not pinpoint the exact time of his exposure but he could show that it was from one or the other of the defendants' materials or operations. Should traditional rules be applied and the plaintiff denied recovery? Should the burden of proof

forces, equally capable of doing the total damage, act so nearly simultaneous that it is impossible to tell whether one or the other or both caused the injury. Corey v. Havener, supra note 758. See also Hanrahan v. Cochran, 12 App. Div. 91, 42 N.Y.S. 1031 (1896) (same except sleighs instead of motorcycles); and probably concurrent causation or at least concurrent contribution to total injury in Finnegan v. Royal Realty Co., 35 Cal.2d 409, 218 P.2d 17 (1950).

Anderson v. Halverson, supra note 877, applied this rule in a dog-killing-sheep case. Stine v. McShane, supra note 877 (same). Cf. language of court in Stephens v. Schadler, supra note 777 at 837. Common law concept applied in Schoening v. Claus, supra note 805 (hunting accident); Haley v. Calef, supra note 761 (two towns responsible for bridge and injured plaintiff could join but must show which town responsible for part of bridge where hurt); Louisville Gas & Electric Co. v. Nall, 178 Ky. 33, 198 S.W. 745 (1917) (not known whether plumber or gas company employees left hole in closet uncovered); Casey Pure Milk Co. v. Booth Fisheries Co., 124 Minn. 117, 144 N.W. 450 (1913) (not known which two companies responsible for goods lost); Hartzell v. Bank of Murray, 211 Ky. 263, 277 S.W. 270 (1925) (not known whether bank or bank cashier liable for loss of note—but why not master-servant lia-
be shifted to each defendant to prove his innocence? Or, are we to im-
pose joint liability for the total injuries upon each defendant, even
though it is clear that only one caused the plaintiff harm?

In answering this question two general categories of cases can be
identified, each involving what we have termed unknown-wrongdoers.
First, there are cases in which it can be shown that each of the defend­
ants was negligent in that he owed a duty to the plaintiff and did not
live up to the standard of conduct expected of the reasonably prudent
man under the circumstances, but there is only one injury and only the
force placed in motion by one defendant could have caused the injury.
Second, there are cases such that clearly only one, or at least less than
all of the possible defendants were negligent in the sense that they
breached the standard of conduct required, but the plaintiff can not
prove which defendant set the force in motion.

(i) All Potential Defendants Negligent

Many cases establish and support the general common law rule
denying recovery where all of the multiple defendants clearly are negli­
gent but which one caused the injury is unknown, even though the re­
sult is that the plaintiff's injuries will be uncompensated. There are
a few cases pointing in the other direction, however. It might be argued
that some of the hogs, dogs, and cattle cases really are examples of
liability imposed upon a person whose responsibility for the injury has
not been proved. This would not seem to be a correct analysis, except
for the very unlikely case. It is possible that a particular defendant's
hog, dog, or steer, while part of a damage-feasant group actually did

881 See cases cited supra note 880.
882 Supra note 877.
none itself, but this is a most unlikely situation, and practically all of the cases find or assume that each of the animals caused some damage. The only real difficulty is in determining the amount that each did. Therefore, this is not a case of unknown-wrongdoers in our sense. A truly analogous situation would arise if several dogs, owned by different persons, were negligently allowed to run free, and less than all of them attacked a flock of sheep, it being perfectly clear that one or more of the dogs (but which is not known) did not participate. If we held all of the dog owners liable for all of the damages under these circumstances we would have a real unknown-wrongdoing dog case.

Cases that come much closer are those involving hunting accidents in which one or more of the group are negligent in using the weapons, but the injury obviously comes from only one gun. In all such cases, the courts, except for a recent California decision, have found concert of action among the hunting party as a reason for imposing joint liability. This really is an application of vicarious liability rules. If the situation instead of involving two members of the same hunting party, involved two hunters acting without knowledge of the existence of the other, this would present the true case of the unknown-wrongdoer, to which the usual rule of vicarious liability for concert of action could not be applied.

The California court in *Summers v. Tice* faced up to the proof problem without relying on the concept of concert of action in a case in which two hunters in the same party negligently discharged their guns in such a manner that a pellet from one of them put out the plaintiff's eye. The trial court, after assuming both defendants were negligent, and finding that there was no way to determine from which of the guns the shot came, imposed joint liability, reasoning as follows:

> When we consider the relative position of the parties and the results that would flow if plaintiff was required to pin the injury on one of the defendants only, a requirement that the burden of proof on that subject be shifted to defendants becomes manifest. They are both wrongdoers—both negligent toward plaintiff. They brought about a situation where the negligence of one of them injured the plaintiff, hence it should rest with them each to absolve himself if he can. The injured party has been placed by defendants in the unfair position of pointing to which defendant caused the harm. If one can escape the other may also and plaintiff is remediless. Ordinarily defendants are in a far better position to offer evi-

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883 *Supra* note 777 and note 878.
884 33 Cal. 2d 80, 199 P.2d 1 (1948).
dence to determine which one caused the injury. This reason-
ing has recently found favor in this court. In a quite analo-
gous situation this court held a patient injured while uncon-
scious on an operating table in a hospital could hold all or any
of the persons who had any connection with the operation
even though he could not select the particular acts by the par-
ticular person which led to his disability (Ybarra v. Span-
gard, 25 Cal. 2d 486 [154 P. 2d 687, 162 ALR 1258].)
There the court was considering whether the patient could
avail himself of res ipsa loquitur, rather than where the bur-
den of proof lay, yet the effect of the decision is that plaintiff
has made out a case when he has produced evidence which
gives rise to an inference of negligence which was the proxi-
mate cause of the injury. It is up to the defendants to explain
the cause of the injury. 885

Prosser feels that the result is "a very desirable solution where negli-
gence on the part of both is clear and it is only the alternative causation
which is in doubt." 886 It certainly is not "more probable than not" that both
caused the injury; in fact it is one hundred per cent certain that
this is not the case. On the other hand it is equally probable (rather
than more probable) that either did it. Therefore, the violation of
the usual rule is only in terms of a fraction of a per cent. Harper and
James also approve the result. 887

A remarkable sequel to Summers v. Tice arose in Canada in 1957. 888
Here again an innocent third party was struck by a single rifle bullet
fired by one of a group of boys, all of whom were under fourteen years
of age. The defendants were two merchants, each of whom had sold
the boys a box of cartridges, and the court held that each of them was
negligent in making the sale to boys of this age. The damaging bullet
was the very last cartridge fired when the boys came back to town after
having used all the other cartridges from both boxes out in the country.
The court held both defendants to have been at fault and liable for the
total damages. It rejected the argument that only the seller of the last
cartridge could be held liable because this placed on the plaintiff "the
burden of identifying the one who sold the shell that was last fired; a
burden which needless to say, was not discharged." 889 This case makes

885 Id. at 86-87.
886 Prosser 231.
887 Harper & James 1115. The result does spread the loss rather than leave the plain-
tiff uncompensated.
889 Id. at 422.
it clear that concert of action is not required, a possible alternative explanation for the result in *Summers v. Tice*. The Canadian case is even more remarkable because of the causation reasoning used by the court. Instead of adopting the rationale of *Summers v. Tice*, shifting the burden of proof to the defendants each to exculpate himself if he could prove his force did not do any harm, the Canadian court worked out a theory whereby it concluded that each was not only negligent in selling the shells, but also was a cause-in-fact of the injurious last shot. The argument of the court is remarkable enough to set out in full.

The sale of the cartridges must be regarded as one act, for though two separate sales were made it took both to put the boys in the position to do the damage. Had one box only been sold then, on the facts as they came to pass, the accident could not have happened since all of the cartridges in the one box would have been fired outside of the village. But—again on the facts as we know them—since two boxes were sold it became possible for the boys to exhaust their interest in the country and yet have cartridges in their possession when they returned to the village. In consequence it required both sales to make the accident possible and for this reason the relationship for cause and effect is established.\(^890\)

One wonders if the court would apply this reasoning if it could have been proved whose bullet caused the injury. If so this reasoning is not too far removed from the argument that the driver of a car who breaks the speed limit and gets to his destination in time for lightning to strike his guest as he steps from the car is liable for the death of the guest because, "but for" his breaking the speed law, the guest would not have been where the lightning struck. In fairness, however, the Canadian case is not quite the same because the injury that did occur was the very thing which could have been anticipated by a careful person and the foreseeability of which made the selling of the shells negligent. Nevertheless, this kind of "but for" reasoning cannot be recommended for other cases.

Undoubtedly radiation cases will arise to which this reasoning could be applied. Two manufacturers of an industrial device utilizing radiation might furnish identical items to the same user and someone is found to have been injuriously irradiated from this type of source because the devices were made negligently. The evidence of exposure might be such that it is clear the person received radiation from only one source but

\(^890\) *Id.* at 423. This is like saying that the man who loaned them the car negligently is liable because without it they could not have been where plaintiff was.
it is impossible to tell now which source was responsible because records were not kept of when the various sources were used at particular places in the plant or operations of the user.

The validity of the *Summers v. Tice* solution of shifting the burden of proof to multiple defendants should be tested by altering the facts slightly. What if, instead of two negligent persons, there were three or ten? Here the probabilities are not even equal; for each wrongdoer there is either a one-in-three or one-in-ten chance that he is responsible for the injury. At what point does the probability become *de minimus*?

In a sense, this criticism can be made of the holding in another California case, *Ybarra v. Spangard,* in which an unconscious surgical patient apparently was negligently injured by some one of the number of persons who handled him while he was unconscious, but it was rather clear that less than all of them were directly responsible.

To impose joint liability on all who have been negligent and who possibly have caused the plaintiff's injury actually goes beyond even absolute liability concepts. While negligence need not be shown if an activity is ultra-hazardous, the causal connection with the defendant's action must. In effect the reasoning of the California and Canadian cases turns the fault doctrine around. Instead of holding defendants liable only if fault can be shown, it is making any person who has breached the required standard of conduct responsible for any injury which his action might just possibly have caused unless he can prove absence of causal connection. While Harper and James object to the use of the traditional fault doctrine to excuse liability, there is no indication that they also would do away with proof of causation. It is true, however, that the reasoning of these few cases compensates the plaintiff more often and spreads the risk.

If the reasoning of the Canadian court is accepted at face value, the result would be to impose liability on all negligent persons for all harm that results not only from their own negligence but also from that of all persons similarly situated who have been negligent. If liability is to be imposed simply for increasing the risk that somebody will be injured by negligently setting some harmful force in motion, traditional tort liability procedures should be abandoned. Our system of total liability or none in each individual case as to each defendant will not work fairly if such reasoning is used.

If the *Summers v. Tice* reasoning is to be used in radiation injury

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891 *Supra* note 878. Discussed *infra* in text at notes 1180 ff.
cases, a different system of compensating plaintiffs and assessing liability on defendants should be adopted, one developed on a much more statistically accurate basis. Use should be made of some kind of insurance fund to which all persons who might be negligent or who have been negligent in dealing with harmful radioactive material should contribute in accordance with the increase in the risk of harm caused by a particular defendant. Injured parties who could not identify the specific source of their injury would then sue this fund. Perhaps something like the unsatisfied judgment fund schemes for covering injuries from automobile accidents in hit-and-run cases can be used, or perhaps all radiation injuries could be compensated under a fund similar to that suggested below for future injuries, or other fund schemes suggested by others.

Such a plan would provide a more scientifically accurate basis for spreading the risks than would the rationale of Summers v. Tice when it is carried over into the situation in which there are more than two defendants, even though all have been negligent in some manner in releasing radiation that may possibly have hurt the plaintiff. Certainly the reasoning of the Canadian court as to causation should not be used. If we are to impose monetary responsibility for all negligence, even though actual damages have not been proved, it would seem preferable to make some kind of administrative evaluation of the potential loss that might be created by each mistake and force a contribution to some fund from which injured plaintiffs could recover. Traditional rules are unsatisfactory in the multiple defendants case because plaintiffs remain uncompensated when they would recover except for failure to prove which defendant was the cause. Nevertheless, using the reasoning of these few recent cases also leads to unrealistic results.

Courts also should avoid too broad application of the justification suggested for the Ybarra type case (unconscious patient injured by one of several defendants), that the actions constituted something of a joint enterprise of all participating persons. If liability is imposed on all, each one is forced to take the utmost precautions to see that no injury is inflicted upon the patient during the time he is unconscious. Caution also should be used in applying the theory that joint liability is

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894 A “contingent injury fund” is discussed infra in text following note 1123.
895 Summer Institute, Workshops on Legal Problems of Atomic Energy, U. of Mich. Law School (1956), position of minority at 36. Switzerland and West Germany have fund plans under consideration.
justified as a method of forcing people who probably know what happened to inform on each other. These justifications should not be applied under existing tort rules in situations in which there are several wrongdoers who are acting quite independently of each other and have no control over their co-defendants or, perhaps better, their co-potential defendants; they have no power of selection or rejection and no way of taking extra precautions to protect themselves against the results of the negligence of another.

(ii) Only One Defendant Negligent

If the law is to be accommodated to the plaintiff's difficulty in proving causation in unknown-wrongdoer cases, then the ultimate development would be the result reached by an appellate court in California recently, in Litzmann v. Humboldt County. This is the case in which the plaintiff's small boy was seriously injured when he ignited an aerial bomb which he found lying in the fairgrounds. The court held that the plaintiff had a right to jury instruction to the effect that if he proved that one or the other of two defendants was negligent in dropping the aerial bomb, then he was not required to prove which defendant had been negligent. The appellate court held that this was a correct instruction.

This is exactly the kind of situation which may arise in the atomic energy area. For example, there could be three, five, or ten reactors so located that the radioactive material which caused the plaintiff's injuries could have come from any one of them. If circumstantial evidence clearly supports an inference of negligent emission, perhaps via res ipsa loquitur, then a parallel case is presented, and the plaintiff, by analogy to Litzmann, would not be obliged to prove which of the reactor operators was the guilty party.

While this is not quite the same thing as absolute liability because it assumes that one of the parties was negligent, nevertheless, so far as the innocent accused are concerned it is worse. Even strict liability is dependent on proof of causal connection. Currently our theory of negligence liability is aimed at allocating the losses that occur on a basis of culpability and not upon a doctrine of "compensate every plaintiff who can show an injury." Accordingly, the use of the plaintiff's difficulty as an excuse for placing the burden of proof on a potential defendant

896 273 P.2d 82 (Cal. App. 1954). The case was settled while an appeal was pending before the California Supreme Court, Note, 28 So. Cal. L. Rev. 429 (1955).
897 See discussion of res ipsa loquitur, infra at notes 1146 ff.
to free himself from liability is to make the incidence of loss from negligent injuries depend upon the laws of chance in a peculiarly unscientific and unjust manner.

In practical effect it means that whether or not one is to be charged with a loss depends on the purely fortuitous circumstance of whether somebody else engaged in a similar activity happens to have caused injury. This is going even further than absolute liability because in absolute liability cases it is essential that cause-in-fact be proved. The principle is really no different than saying that one whose dog was running loose at the time that some person was bitten by a dog, assuming that it was at night and the dog could not be identified, is to be held liable for some or all of the loss if it was at all possible that his dog was in the vicinity at the time. It would be the same as holding, in the case involving the theater patron whose eye was put out by a spit ball projected by some member of the audience,\(^{898}\) that the plaintiff could hold each spitball-shooter-carrying member of the audience liable unless he could prove that he did not do it. This negative usually can be established only by finding the one who did do it, a task as difficult for the innocent defendants as it is for the plaintiff. Or perhaps liability could be limited to those who sat within spit ball range of the plaintiff.

A similar case could be one holding two contractors liable for a falling brick which injured the plaintiff even though their only relationship was that they happened to be working on different but adjoining buildings at the same time.\(^{899}\) If we are to spread tort risks on a broader basis than is now the case where proof of cause-in-fact is usually insisted upon, this objective should be accomplished by some kind of more scientifically justifiable scheme.

This should be true even if absolute liability rules are adopted for some aspects of atomic energy operations. Some writers at least\(^{900}\) would not approve of the solution which renders all liable even though some, or all but one, are innocent. Surely making two or four or nine innocent parties stand the loss caused by one wrong-doing party would carry the compensation principle too far, at least as applied to the radiation injury cases. The Litzmann rationale, particularly if it were carried beyond the case of two well-identified potential wrongdoers, is com-

\(^{898}\) Pfeifer v. Standard Gateway Theater, 262 Wis. 229, 55 N.W.2d 29 (1952).

\(^{899}\) This is also similar to Wolf v. American Tract Society, supra note 878, (a brick fell where 19 independent contractors were working) if a brick fell from between two adjoining buildings.

\(^{900}\) Prosser 231; Seavey, supra note 880 at 648. Harper & James 1116, do not take a position on this kind of case.
pletely unjustified and unrealistic. When one takes into account the great time and space intervals that can intervene between a discharge of radioactive material and its reaching a place of rest where injury is inflicted, almost any user of radioactive material in the county, at least of the kind found to have caused the injury, might possibly have been responsible. Surely joint liability should not be imposed under our present tort system. To do so truly would be to impose absolute liability on atomic energy operations with a vengeance and without the requirement that has always been applied in the past, *i.e.*, that cause-in-fact must be shown. For whatever comfort it is to potential defendants, most of the courts do not approve the *Litzmann* rationale, although most of the cases were decided prior to *Litzmann*.

(iii) Effect of Common Insurance Carrier

One fact which will almost inevitably be present in many atomic energy cases might justify application of the *Tice, Ybarra*, and even the *Litzmann* solutions. If in this type of unknown-wrongdoer case every one of the potential wrongdoers were insured by the same insurance carrier against the kind of loss which occurred, then a good case could be made for recovery, at least to the extent that there was identical coverage up to the limit of the lowest policy. If the insurance company covered all of the defendants, it would be perfectly clear that if any one of them were found liable the insurance company should pay. To decide in such circumstances that recovery will be allowed where there is an insurance policy, while it would not be allowed against the same defendant if there were none, violates our traditional rules concerning the liability of insurance companies when policies are written on an indemnity basis only. The result, however, does seem to make good sense, by compensating innocent plaintiffs without imposing liability on someone who should not be required to pay.

This suggestion has peculiar applicability to the area of radiation injuries, at least to the extent that the user of radiation is licensed by the federal government and is required to furnish financial protection which ordinarily will be in the form of an insurance policy taken out from one of two carriers of such insurance. One of them is relatively so much smaller than the other that it is very likely in many situations one insurance carrier will have insured all potential defendants,

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901 See cases set out *supra* note 880, some of which involve only one wrongdoer.
902 See insurance discussion *infra* beginning at note 1265.
903 See discussion *infra* at notes 1347-48.
at least in the reactor field. In the event of a major reactor disaster in which the damages run over sixty million dollars, and clearly in the case of an accident involving a much smaller total, where the government's responsibility to take over liability will come in at a much lower figure, there is then absolute identity of the insurance carrier in effect, though not technically, since the federal government's liability is only that of an indemnitee, not as an insurer. The same result should be reached because the government actually is indemnifying all of the potential wrongdoers above the limits of financial protection set by the AEC. Insurance companies surely will try to find a way out of the dilemma created by this suggestion, but until they do the solution is attractive.

In such states as Louisiana and Wisconsin in which the insurance carrier can be sued directly there would seem to be no difficulty in holding that even the *Litzmann* reasoning applies if all of the multiple defendants are covered by the same insurance company. In other states a court might change the common law rule and hold that recovery will be allowed if the court finds that one carrier covers the liability of all defendants, but deny recovery otherwise. If an insurance policy is more than an indemnification agreement and imposes direct responsibility on the carrier if the defendant does not pay, as is the case with much of automobile collision insurance today, is there any reason why the court should not determine this and impose liability as a matter of common law rule? This does not need to violate the usual "hope" that juries will not be allowed to know an insurance carrier is involved when they make their fact determinations. Nevertheless, enactment of a statute undoubtedly would be the better procedure for achieving this result.

(d) Cumulative Effect from Innocent Sources

In one other situation, which creates more difficulty than any other, the solution surely should not be joint liability, if liability is to be imposed at all. Except for those involving unknown wrongdoers, there was, in the cases discussed so far, concurrent contribution toward the amount of damage inflicted by persons at least some and usually all of whom were wrongdoers in the sense that they breached the standard of conduct required of the reasonably prudent man. Actually the facts in many of the cases seem to indicate that the defendants must have acted with knowledge of the existence of the contribution of other persons, and so might even be considered as acting in concert with each other. Many of the cases arising in connection with cumulative impacts of ra-
Radiation may involve situations where the contributions of the other persons to the total injury are not known. Nevertheless, where all parties breach the standard of conduct required by law, shifting the burden of proof does not seem to be too much of a burden to place upon them.

If the amount of radiation released by one or more of the concurrent causal factors is so small that the discharge can be considered innocent because there has been no breach of the required standard of conduct, the court faces a real difficulty. Prosser,\textsuperscript{904} in commenting on the situation where the contribution of two or more parties, standing alone, would not even be a breach of the standard of conduct, states that:

Where, as in the usual case, such liability must be based upon negligence or intent rather than on any ultra-hazardous activity, it would seem that there can be no tortious conduct unless the individual knows, or is at least negligent in failing to discover, that his conduct may concur with that of others to cause damage. And liability need not necessarily be entire, for there is no reason why damages may not be apportioned here, to the same extent as in any other case.\textsuperscript{905}

This situation could easily arise where radiation is the cause of the injury. Persons using a radioactive source may have complied with statutory or administrative limits for discharge of radioactive material, and may have acted as a reasonably prudent man would have in the light of present knowledge and the circumstances, and yet, through an unusual set of circumstances several discharges from such sources might cause damage or unite with radioactive material negligently released and cause damage. Should the innocent contributor be held liable for all or a part of the damage caused? Surely there is no excuse in this situation for holding him jointly liable for the whole and thereby shifting to him the burden of finding the evidence for the plaintiffs. If the Texas liability rules\textsuperscript{906} are not applied, as surely they should not be in many atomic energy activities where the quantity of radiation is at a very low level, it seems difficult to justify imposing any liability. It is even more difficult to justify complete liability such as that imposed in the case of true joint tortfeasors.

Once the concurrent contribution injury is discovered there would seem to be no real obstacle to an injunction suit to abate what very likely is a nuisance, and even compliance with official regulations might not justify the kind of taking of property that would be involved in this

\textsuperscript{904} Prosser 232.
\textsuperscript{905} Id. at 233.
\textsuperscript{906} See discussion supra note 845.
situation. As to damage recovery, this may be the very case in which social policy limitations on imposing liability should be brought to bear to relieve the "innocent wrongdoer" from liability because, by hypothesis, in this last situation, the defendant had no reason to suspect that there would be other contributions added to his minor one resulting in an injury. The question in tort case really is not always how can we compensate the innocent plaintiff but who should bear the losses that do arise out of normal activities in today's complicated, highly industrialized life. Perhaps this is the case where the plaintiff must take out insurance to protect himself rather than seek compensation from a person who has acted prudently. The situation that can arise in the radiation field, at least in some cases, would be analogous to a suit against an individual homeowner whose heating system emits into the air in a large city some unburned particles of coal, gas, or oil contributing to the pollution of the air over the whole city, or against the drivers of thousands of cars who do the same thing through the discharge of unburned particles through exhaust pipes. In this situation it would seem a little unrealistic to say that if we can prove any one car driver or any one householder contributed some small part to the total pollution he should be liable for the whole. This is utterly ridiculous, if it is not unjust. In the case where there are only a few contributors it still is unjust. Perhaps the atomic energy situation may present the very kind of case suggested in the English opinion in *Blair v. Deakin*, one person might put something into a stream which in and of itself was not dangerous but when combined with another equally innocuous substance put in the stream by another person creates a dangerous condition. Injunction in such situations would seem perfectly justified, but to impose liability for all foreseeable damages because it is now found that such chemicals when combined will create a dangerous substance comes close to absolute liability. Any imposition of liability for the injuries caused in situations where the individual's contribution is not enough in itself to be considered tortious and where he has no basis in terms of knowledge or reasonable grounds to believe that others are contributing a substance which will cause harm when combined with his is in effect to impose strict liability without admitting it. It is doubtful if damages which result from many of the situations that will arise in connection with radiation sources where the contributions of many people are very small is really any more dangerous to a city, to a country or to the world than

907 Compare psychological nuisance case and see cases there discussed, *supra* notes 628-722.

a discharge into the air of carbon dioxide, an inevitable result of our modern industrialized, technological life. Once we find the evil exists something should be done, but it would not seem that the tort system, devised to solve damage questions between individuals or small groups of individuals, is the vehicle by which such problems can be solved. Compensating the plaintiff is not the only aim of the tort system. As suggested before, the aim really is to decide who should bear the loss which seems inevitable in our kind of complicated society. There are methods other than always imposing liability on the defendant, even admitting that in a particular case the defendant's actions have caused some harm. A fire insurance type of policy (or medical insurance, or life insurance) carried by the potential victim may be the better way for some cases, particularly where the contributions are in and of themselves innocent, if we want normal growth of atomic energy, which is so important to us in the long run. In any event, as long as existing damage rules are used, there is no justification for making the innocent contributor actually jointly liable in the sense of being held responsible to the plaintiff for his total injuries to which many others contributed. Surely at most he should be held responsible only for his own contributive share.

c. Proof of Cause and Damage Generally

Criticism of the common law system of handling the losses that occur as the result of what might broadly be called accidents (as distinguished from intentional torts) has been increasing both in amount and vigor in recent years. Many respected legal scholars have advocated a sweeping examination of present tort rules, and many, of course, attack the very basic concept of fault that underlies so much of our tort law today. Many of them argue for strict liability or something approaching it in many more situations, and they urge that this be combined with some sort of shifting the burden of losses to the industrial community, or in appropriate areas by requiring insurance coverage, such as in the case of automobile accidents. While such drastic changes are not imminent, it certainly is possible that there will be a continued move in this direction and possibly even an acceleration. Whether the rule of

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absolute liability be applied across the board, or a scheme of insurance
or governmental funds is adopted supported by assessments of the
workmen's compensation type or by general taxes, the injured party
who seeks compensation still will face the same problem that he faces
under the present tort rules in the usual situation where the claim is
against a single alleged wrongdoer defendant. The plaintiff who sues
the industrial producer or operator, or the individual wrongdoer or his
insurance company, or the federal or state government fund set up to
award compensation in accident cases, will have to prove that his dis­
ability was caused by the accident. The plaintiff will have to show (1)
that he has been "injured," and (2) that his injury was "caused" by a
force for which he has a claim against an individual wrongdoer under
our present system, or against an insurance company, a fund, or some
other social group in the event our system of loss distribution should
be changed to make this possible.

Very likely our present system will continue to be the law for many
years to come, although minor changes undoubtedly will be made. Even
if it has been proved that a duty was owed to an injured party by a de­
fendant who did not meet the standard of conduct expected of a reason­
abley prudent man under the circumstances, or if the accused is to be
held to strict liability and the type of injury for which the plaintiff is
seeking compensation is recognized as compensable, the plaintiff still
must show that he received such an injury and that it was caused by the
force set in motion by the alleged wrongdoer. Whether he repre­
sents the plaintiff or the defendant, the lawyer handling radiation cases will
find some of his most difficult problems in this area of proof. Many
radiation cases will arise in which proof of cause and damages will be
relatively simple and certainly solvable in accordance with existing com­
monly recognized principles. Likewise, in the cases where the proof
problems are considerably more complex and subtle, it seems clear that
answers will be found, if only by leaving the doubtful cases to the jury.
The great majority will fall in this category. It is in the area of proof
that our present tort rules and theoretical analysis of them have been
most inadequate. The appellate opinions and the legal writers have con­
cerned themselves for the most part with the problems of substantive
law by which we determine who is liable to whom for what kind of in­
jury. The proof problems usually are buried in trial records, and even
the rules of evidence seldom get down to the level of concrete types of
proof that are available and might or should be used to prove specific
fact questions. Here again the radiation cases, which are bound to arise
in increasing numbers in the next twenty years, very likely will show,
sometimes dramatically, the inadequacy of our present analysis of the problems of proof. It is still too early in the study of the relationship between scientific technology and legal problems, and certainly it is beyond the scope of a general treatise, to answer in detail the many scientific-legal proof problems that inevitably will arise. Some lines of attack under existing rules can be indicated, however, and attention can be focused much more sharply on some of the inadequacies of existing concepts of proof, particularly as applied in tort cases.

A study of the problems that seem inevitable in radiation cases convinces one that here again is evidence of the fact that policies underlying the legal rules of proof and probability may be somewhat different from those assumed by scientists when, in their scientific activities, they are concerned with proof. The present concern of the legal profession as to the proper use and control of expert testimony is perhaps evidence of an awakening legal recognition of the problem. In any event it seems clear that lawyers must concern themselves much more with the premises and techniques of the scientists if they are to handle adequately the proof problems that are to be an inevitable part of radiation litigation. Atomic energy cases seem destined to increase the need of mutual understanding between the lawyer and certain other professions and sciences such as physicists, engineers, and biologists, to name merely the most obvious and most inclusive categories. Radiation cases bid well to force lawyers to recognize much more sharply the areas of specialty among experts and to use those who may not have a license but who nevertheless know scientific principles essential to the case. In looking at the proof problems it seems convenient to separate those involved in the doctrine of *res ipsa loquitur* and treat them as a separate group. The *res ipsa loquitur* doctrine cannot be completely separated from duty and particularly breach concepts but most commentators treat the doctrine primarily as one of proof, and this seems wise. It will aid clarity of analysis, nevertheless, if the *res ipsa loquitur* problem is treated separately.

(1) Proof of Radiation Injuries and the Law of Probabilities

As indicated previously, scientists generally agree that exposure to radiation can cause many personal injuries. In analyzing the problem of tort liability, however, the question is not what can be caused by exposure to radiation, but, rather, whether a particular injury was caused by such an exposure; or, stated otherwise, is a given exposure to radia-
tion the cause-in-fact of the injury. With few if any exceptions, present scientific knowledge indicates that there is nothing qualitatively unique about injurious radiation from the standpoint of its observable physiological and pathological effects. Numerous other forces can be causes or causal factors with respect to seemingly identical injury manifestations. Added to this problem of multiple possible causes of the same injury is the inconvenient fact that science has no very precise way of determining which was the actual medical cause—much less the legal cause. The lawyer finds himself confronted, therefore, with possibilities and probabilities. The legal result to be reached is far from certain in many, if not most, cases.

The question then becomes one of availability of acceptable evidence to prove or disprove that a particular cancer or cataract or genetic injury was caused or influenced in some harmful fashion by the negligently occasioned exposure to radiation.

In answering this question it is important to recognize that the causation-in-fact question is double-barreled. First, there is the question of whether the negligent act or omission of the defendant actually caused the plaintiff to be irradiated, and, second, assuming there was a radiation “impact” upon the body of the plaintiff or decedent, did this particular exposure in fact cause or aggravate the apparent injury. Assuming that the radiation “impact” is not in itself a compensable injury, both of these issues of causation must be resolved against the defendant before liability attaches, regardless of whether absolute liability, negligence, or workmen’s compensation rules are used. Different types of phenomena may be needed to provide the answers to “prove” these two causation questions. If those needed to show “impact” are somewhat esoteric, those bearing on the second question are almost occult. The proof must embrace a substantial portion of the fields of scientific knowledge about matter and energy.

For the most part this study is limited to biological questions of causation—from impact to injurious consequence; however, it is not possible to disregard entirely non-biological considerations or matters of social policy. One cannot avoid the feeling that in many cases, rightly or wrongly, the plaintiff’s burden of showing biological causation is made easier if the proof of causation as to impact is quite persuasive and not just barely “more probable than not.” While the burden of proof may not shift, seemingly it becomes somewhat less onerous to prove biological injury if the impact is clearly established. It is not surprising to find juries influenced in this fashion, but it is a little dis-
appointing to discover the same effect upon some of the courts. Some of the cases containing implications of this attitude are discussed below.

(a) Some General Considerations as to Proof of Biological Cause

For our purposes biological injury can be deemed to be the terminal result of a totality of causes. Some may be more immediate than others, but each is essential, qualitatively, quantitatively, and chronologically, to the result. These causes form a reticulated pattern of antecedent events and processes made up of increments of matter and of energy which culminate in an observable or predictable injury. In its broadest sense, and probably in the scientific sense as well, the determination of causation embraces this entire dynamic structure, or, to be charitable, it would if we could make it so.

One of the aims and techniques of science is to find or at least to illuminate the causal facts. The method of science is essentially one of filling in the gaps between existing observational data with a postulate or theory, and then testing the theory. The law has taken too little cognizance of this method. The scientific investigator is confronted with a biological condition which he rarely can observe either on the level at which it actually develops or as a dynamic process—limitations on aided and unaided perception being what they are. Nevertheless, through experiment and what observational situations he can contrive the investigator is gradually able to isolate various external influences and obtain more or less incomplete cross-sectional views at various stages in the pattern. As soon as a consistent, or perhaps one should say readable, pattern begins to unfold, the scientist will commence to put together these observable influences with a theory that assigns cause and effect roles to each factor. A causal theory usually consists of numerous sub-theories which seek to explain what happens between observed and partially known consecutive steps in the phenomena.

The scientist has learned to live with the frustration that comes from realizing that a given theory of causation is only one of the many possible theories to explain a particular disease or injury, and that no two situations are ever precisely the same. To each injurious result there are a number of causal routes, some occurring with greater frequency than others, but none revealing their real origins or their true nature to the casual eye, and few even to the trained one. The scientist is a humble man in his field, but, unfortunately, not enough judges and attorneys and even jurors are equally so when they enter the same field. Con-
cerned with the assigning of legal responsibility, they too often borrow from science with little understanding and apply the borrowed knowledge with only a modicum of caution. The plaintiff, having been injured, looks for one or more causal theories that include as a necessary influence an event like the impact or trauma ascribable to the negligence of the defendant. His attorney then directs his proof only to those events which justify the application of those theories rather than some other. He states, for example, that the plaintiff's health was excellent before the impact, that the impact left a pronounced bruise, and that six months later a cancer was discovered at the precise point of impact. The plaintiff obtains the services of one or more physicians who take the stand and testify to the existence of a causal theory that cancer can be caused and aggravated by a single trauma. Perhaps these experts will state that the plaintiff's injury could have been caused by the trauma, but, with becoming caution, they may be unwilling to state that in their opinion the cancer probably was caused by the impact. These physicians have been entirely honest, for, while the single trauma theory of cancer causation has little currency, today, it was looked upon with greater favor at an earlier time and still has not been explained away entirely.

At this point the defendant presents his evidence, but what evidence does he have? All of the evidence is inside the plaintiff or in his past. The defendant offers alternative theories of cancer causation, but these remain hypothetical without evidence of specific events to which they can be tied, and problematical even with such evidence. Even assuming that there were pre-impact manifestations of cancer or that other external influences impinged, the plaintiff is under no obligation to volunteer this information nor do the discovery procedures give the defendant much assistance. On cross-examination the plaintiff's experts may be made to admit that the defendant's theories of causation have wider acceptance in the medical field, but without some kind of circumstantial evidence to show that basis exists in the instant case for applying one of the alternative theories, little is going to help the defendant, short of judicial notice that the plaintiff's theory of causation is too tenuous. Thus the fact of causation has been "proved," for legal purposes at least.

On appeal from the judgment attacking the sufficiency of the evidence as inadequate to justify the jury's finding of causation, the defendant is

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\[^{910}\text{Small, "Gaffing at a Thing Called Cause: Medico-Legal Conflicts in the Concept of Causation," 31 Tex. L. Rev. 630 (1953).}\]
worse off than at the trial. On such an appeal the court will look only at the plaintiff’s evidence, and this in its best possible light. In addition, the plaintiff can cite in his brief numerous cases involving cancer caused or aggravated by a single trauma: a metastatic cancer in the tibia caused by a sidewalk fall; breast cancer caused by an exploding hot water heater; cancer caused by an automobile accident, or by an umbrella handle, or a railroad seat; an eye cancer caused by a blow with a fist; a foot cancer caused by a fall in a hole; death from jaw cancer caused by false teeth worn for three months; or cancer of the womb caused by a miscarriage two days after a railroad accident, with death four months after the accident; or a death “caused” by cancer in the sacral area induced by a fall from a streetcar twenty months earlier, where an autopsy revealed that the victim also was suffering from tuberculosis, Bright’s disease, acute and chronic cystitis, acute and chronic prostatitis with abscess formation and chronic selenitis; or dormant cancer of the larynx triggered by smog.

Thus does the law rush in where science fears to tread, “proving” cause-in-fact with one theory of causation out of many (and that theory of questionable virtue), allowing a minimum of circumstantial evidence to indicate a circumstantial theory of causation, and saying, that in the absence of affirmative proof to the contrary, the impact and the injury, plus a few facts, such as prior good health, speak for themselves on the issue of causation if the jury wants to accept them. This is virtually proof by default. Is it any wonder that “the doctor is shocked by judicial treatment of cause in tort...”? Perhaps the doctor himself is to blame in part because he has failed to realize the social purpose for using a scientific theory to prove in a court before a jury what “caused” an injury.

Juries are always suspected of assuming that a wealthy, corporate

912 Vitale v. Duerbeck, 338 Mo. 556, 92 S.W.2d 601 (1936).
914 Louisville Ry. v. Steubing’s Admr., 143 Ky. 364, 136 S.W. 634 (1911).
916 Harris v. Hindman, 130 Ore. 58, 278 Pac. 954 (1929).
917 Atlantic Coast Line R. Co. v. Thompson, 211 F. 889 (4th Cir. 1914).
919 Louisville & N. R.R. v. Kemp’s Admr., 149 Ky. 344, 149 S.W. 835 (1912).
922 Small, supra note 910 at 641.
defendant clearly has done something "wrong," and the "pathetic" plaintiff has to be taken care of by someone. In fairness, it must be recognized, however, that the laws of probabilities surely support the conclusion that many injuries go uncompensated because there are "more probable" explanations for the injury which actually was caused as hypothesized by that "tenuous" or "too speculative" theory. If the fifty-fifty chance is where the line is drawn, as many deserving plaintiffs lose as undeserving win. The most euphemistic way to state the end result is that "rough" justice is reached. Even this is true only if we accept the concept that two wrongs average out to make a right. There should be a better way, but first some examples of how the present system works.

(b) The Legal Standard Required to Prove Cause-in-Fact

As set out previously in the discussion of multiple causation cases, causation is often arrived at by applying the "but for" test or preferably the "substantial factor" test.\(^{923}\) That these formulas are helpful always in deciding concrete cases is at least questionable. Yet even assuming the validity of such tests, the underlying question still remains, did the radiation in the case under consideration amount to a "substantial factor" or, "but for" the radiation, would the injury not have occurred? In the ordinary case the plaintiff must prove that more probably than not the radiation was a substantial causal factor inducing the injury.\(^{924}\) In terms of probability, when reduced to percentages, this would seem to mean that the chances must be at least fifty per cent plus that the radiation caused the injury and that the chances of all other possible causes together actually having caused the injury are slightly less than fifty per cent.

A few cases to the contrary notwithstanding, as pointed out in the multiple causation discussion, the majority of judicial opinions have stated or implied that they are following the "more probable than not" standard.\(^{925}\) How the legal fact finding process really works perhaps never will be known. Certainly the reading of appellate court opinions cannot begin to furnish the answer, if for no other reason than that an infinitesimally small portion of the litigated cases get to the appellate courts. In addition, lawyers who try cases in the lower courts fre-

\(^{923}\) Supra notes 751-53. See also Harper & James §20.2.

\(^{924}\) Supra note 770.

\(^{925}\) Cases cited supra note 880.
quently are unable to recognize their cases as they are described in app­
ellate court opinions.

A real understanding of how the fact finding system works in the law would require a complete study; not only of how juries react, but also how trial judges and plaintiffs’ and defendants’ attorneys think in such situations. In addition, a factual study would need to be made of the kinds of evidence used in thousands of trials, and, once the evidence was collected, the necessary analysis to make sense from the material would require a statistician and an IBM machine to aid all the other experts.

Realizing these limitations, however, the lawyer must take account of the rules and concepts laid down by the appellate courts which have more or less effect on the actual trial of cases and, therefore, even the settlement of cases. Also, even though the appellate approach to the proof problem cannot be described adequately in the generalities dic­tated by the format of legal treatises, such generalizations can be helpful to the lawyer who is seeking the cases from which he must distill the approach of the appellate courts.

Certain generalizations that can be made are summarized briefly below. In addition, attached as an appendix at the end of this section are briefs of a group of representative cases which have dealt, in one way or another, with the standards of probability. The cases thus briefed support the following general propositions. When a case is mentioned in the text or footnotes of this section by name only, it can be found in its alphabetical location in the Table of Cases—Problems of Proof.

If one accepts the frequency with which a problem appears in appel­late opinions as an indication of its importance, one would have to con­clude that the instruction given by the court to the jury prior to its reaching a verdict is of key significance. Again accepting numbers as the proper criterion in determining the weight of authority, the instruc­tion to the jury in most cases is to the effect that the evidence must show that it is “reasonably certain” or “reasonably probable,” both that defendant’s negligence caused a harmful force to affect the plaintiff and that the harmful force caused the injury that has been alleged. Many cases deal specifically with the second causation question, namely, did the defendant’s force cause the biological result observed in the plaintiff? 928

928 See the Boland, Charlton, Cohenour, Menarde, Ramberg, Vaccaro, and Walker cases as throwing some light on this test, infra Table of Cases at end of this section. “Reasonably” is not always tacked on “probable.” Sometimes “certainty” (?) is re­quired, Menarde case; and see also DiFazio v. J. G. Brill Co., 133 Pa. Super. 576,
There are cases, however, in which words on their face indicating a somewhat lower standard than "reasonably certain" or "probable" have, been used by appellate courts or have been approved by such courts in reviewing the standards set by trial courts. Such words as "possible," "likely," "could," and "liable," have been used or approved by appellate courts.\textsuperscript{927}

Discussed in a number of appellate court decisions\textsuperscript{928} has been the question of the effect of other possible causes on the plaintiff's proof—the question of whether the plaintiff must produce evidence explaining away other possible causes or whether, on the contrary, the defendant has the burden of showing the probability of suggested alternative causes. If by "reasonably certain" or "probable" one means "more probably than not," then by hypothesis the other possible causes added together do not weigh as heavily as did the force set in motion by the defendant. By the same token, if an alternative cause suggested by the defendant is more likely to have been the cause than any other, then by hypothesis the plaintiff has not proven causation with reasonable certainty or probability. It therefore would seem more accurate to consider the question of other possible causes as simply a ramification of the reasonably probable rule.

\textsuperscript{927} Alley, Bearman, Boland, Cohenour, Louisville, Vaccaro, Walker, and Wood cases, see Table of Cases at end of this section. See also Bogany v. Consolidated Underwriters, 252 F.2d 764, 767 (5th Cir. 1958). See also cases cited Harper & James 1117, n. 32. See also discussion of cases infra notes 984 ff.

\textsuperscript{928} Bucher, Charlton, Cohenour, Cornbrooks, Ingersoll, Magazine, Ramberg, Vaccaro, Walker, and Wood cases, see Table of Cases at end of this section.

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Alley v. Charlotte Pipe & Foundry Co., 159 N.C. 327, 74 S.E. 885 (1912). Plaintiff was injured when a defective core for molding pipe caused molten metal to flow onto

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plaintiff and seriously burn him. The negligence charged against the employer was that it had hired an incompetent core-maker and kept him on the job notwithstanding that it knew him to be such. The jury found that the company was negligent and that plaintiff was not guilty of contributory negligence. A verdict of $6,000 damages was returned.

Defendant contended that the court should not have permitted a physician to state "that the character of the plaintiff's wound was such that a sarcoma, or eating cancer, was liable to ensue." The court said the rule was that such testimony should be confined to probable consequences, "but in this instance we do not think the physician indulged in pure speculation. . . . The word 'liable' is defined as 'exposed to a certain contingency more or less probable.' Webster's Dictionary. The word was used by the witness in the sense of probable, and was doubtless so understood by the jury." (P. 330)

As to mental anguish the court said: "We think the evidence competent also as tending to prove acute mental suffering accompanying a physical injury. The liability to cancer must necessarily have a most depressing effect upon the injured person. Like the sword of Damocles, he knows not when it will fall." (P. 331)

Ayers v. Hoage (Deputy Commissioner), 63 F.2d 364 (1933). Plaintiff (appellant) was employed by Langmead's Arm Chair Lunch in the District of Columbia from 1925 to 1931 when he was found to be suffering from tuberculosis. During employment plaintiff lived in the same house with a tubercular sister.

Plaintiff filed a claim under the Longshoremen's and Harbor Workers' Act, which was rejected by defendant on the ground that: (1) Plaintiff failed to establish either an accidental injury arising out of and in the course of employment or that he was suffering from occupational disease or infection that arose naturally out of such employment; (2) it was not shown that there was aggravation, activation, or acceleration of a pre-existing condition due to employment.

Plaintiff worked long hours and ate at irregular times. He was employed sometimes as a bus boy, short order cook, and counterman. He contracted a cold of unknown origin in January 1931. He usually worked twelve hours a day. In the middle of January a sewer trap in the lunchroom overflowed for about one week and plaintiff got his feet wet. Plaintiff testified that he contracted tuberculosis or the cold because of his employment. Expert testimony was given as follows:

(1) Dr. Walters—plaintiff's family physician. A bad cold will act as an accelerant. Many other predisposing factors will do this also: long hours, continual exposure to draughts, irregular meals. It is possible to contract the disease from dishes, silverware, etc., or from plaintiff's sister. Did not testify that plaintiff contracted tuberculosis at the lunchroom.

(2) Dr. Tewksbury—tuberculosis specialist, twenty years, 40,000 cases. Possible to carry tuberculosis bacilli and the infection for many years. Sputum test negative is not conclusive (Dr. Walters had obtained negative results in 1928). Twelve hours of work a day would not cause tuberculosis nor cause it to flare up, nor would a cold do so, nor standing in water. Could come in contact with the bacilli anywhere any time; many infected people were wandering about. It is not probable that cold lowered resistance to the spread of tuberculosis . . . though possible. Tuberculosis is not a disease peculiar to restaurant workers; very few cases seen involving restaurant workers. The percentage of cases among restaurant workers is about average; the same as clerks in the government departments; danger of coming in contact with bacilli is just as great on the outside as inside. No way of proving definitely where the individual gets the disease.

(3) Dr. Avery—In 1928 took a negative sputum test of plaintiff. Plaintiff's tonsils then badly infected (should have been removed). Sputum test is not a positive sign. Any exposure may accelerate the condition of tuberculosis; anything causing an un-
usual strain on the resistance would have a tendency to aggravate. (Dr. Avery was a general practitioner and surgeon.)

Decision: Decree dismissing plaintiff’s bill affirmed.

An injury “arises out of” the employment within the meaning of the Compensation Act when it occurs in the course of the employment and as the result of a risk involved in or incidental to the employment or to the conditions under which it is required to be performed. The mere fact that the injury is contemporaneous or coincident with the employment is not a sufficient basis for an award.

The question the court must answer is: “Was the employment a proximate cause of the disablement, or was the injured condition merely contemporaneous or coincident with the employment?” (P. 365)

It conclusively appeared that tuberculosis is not peculiar to restaurant workers, and that the disease may be contracted in any place frequented by the public. To hold that there was a causal connection between the disease and the employment would be to indulge in conjecture.

Bearman v. Prudential Ins. Co. of America, 186 F.2d 662 (10th Cir. 1951). Action on a life insurance policy which insured against loss of life resulting directly from bodily injuries and independently of all other causes. Immediately before the final illness the insured was struck on the back by an apparently unknown object. He died six weeks later. Prior to the injury he was in apparent good health.

An autopsy revealed atherosclerosis of the left coronary artery and a thrombus completely occluding that artery. Three experts testified that this was probably a long standing disease, that in their opinion there was no relation between the disease and the accident, and that there was no causal connection between the injury and the atherosclerosis, the rupture of the atheromatous abscess, the thrombosis, or the coronary occlusion. They also testified that trauma or strain may produce a coronary occlusion and that the injury might have contributed to the death. Judgment for defendant was affirmed.

Whether there was causal connection between the accident and resulting injury and the atherosclerosis, the rupture of the atheromatous abscess, the thrombosis, or the coronary occlusion presented a question for solution not within the competency of laymen, and a question with respect to which, only a medical expert with training, skill, and experience could form a considered judgment and express an intelligent opinion. Indeed, it perhaps would require a medical expert trained and experienced in a specialized field.

The great weight of authority supports the rule that medical expert testimony to be sufficient to take the case to the jury must be to the effect that the accident or injury probably caused the Insured’s death; and that testimony to the effect that a causal connection between the accident or injury and Insured’s ensuing death was possible, such as testimony that the accident or injury “might have,” or “may have,” or “could have” caused the death of Insured, is insufficient to take the case to the jury, because such testimony leaves the issue in the field of conjecture and permits the jury to speculate or guess as to the cause of death. (P. 665) (Emphasis added.)

Boland v. Vanderbilt, 140 Conn. 520, 102 A.2d 362 (1953). The plaintiff was injured in an automobile accident in which the jury found the defendant negligent. Plaintiff claimed to have sustained (1) strains, bruises, and contusions, and (2) that he suffered a cerebral thrombosis seventeen days after the accident.

Trial of the case came some two and one half years after the accident. At this time plaintiff’s left arm was almost completely paralyzed, he walked with great difficulty, he suffered constant buzzing in his head, headaches, and dizzy spells. He had to be driven about to do his work and was earning less than formerly. Judgment for plaintiff affirmed.

The defendant claimed there was no evidence to support an award for future permanent injury, pain, and suffering. The court pointed out that plaintiff was healthy before the injury and that his injuries were readily apparent. “Speaking broadly, the jury
had the opportunity to appraise his condition and the probable future consequences of it." (P. 523) The court distinguished this case from another in which the injuries were “of such a nature that the extent and probable duration of future disability by reason of it could not have been ascertained by the jury without the aid of testimony upon that element of damage [a knee injury].”

The defendant also maintained that plaintiff failed to establish any causal relation between the accident and the cerebral thrombosis. The court said “The occurrence of a post-traumatic cerebral accident or thrombosis is recognized by medical science. There is a likely connection between the plaintiff’s cerebral thrombosis and the automobile accident. . . .” (P. 525)

To be entitled to damages a plaintiff must establish a causal relation between the injury and the physical condition which he claims resulted from it. . . . This causal connection must rest upon more than surmise or conjecture. . . . A trier is not concerned with possibilities but with reasonable probabilities. . . . The causal relation between an injury and its later physical effects may be established by the direct opinion of a physician, by his deduction by the process of eliminating causes other than the traumatic agency, or by his opinion based upon a hypothetical question. . . .

The medical witness here testified, in answer to a hypothetical question, that there was a “likely connection.” The court found this to mean “[o]f such a nature or so circumstanced as to render something probable . . . appearing like truth; seeming to justify belief. . . .” (Emphasis added.) (P. 525)

_Bucher v. Wisconsin Central Ry.,_ 139 Wis. 597, 120 N.W. 518 (1909). Plaintiff was injured on September 26, 1906, while standing on the step of an engine cab, leaning out to catch a signal from a conductor. His head struck a standpipe along the right-of-way as the train moved past at ten to fifteen miles per hour. Plaintiff was examined the same day by a physician employed by defendant. There was a contusion and small swelling on the back of his head and a contusion on his right hip and right shoulder. He made no complaint about his ear, but complained of pain in his left testicle. The doctor examined and found a small chronic varicocele. Plaintiff testified that he was in sound health before the accident, that he was in bed about a week after it, that he went to work (for another employer) in November and worked until the middle of January. In February plaintiff called on Dr. Corbitt when he was suffering from an acute attack of grippe. He also complained of pain in his head, dizziness, loss of sleep, numbness in the arms, impotency, and tenderness in the upper and lower parts of his spine.

Dr. Corbitt testified that the nerve controlling erection was contained in the _sacroplaxis_, and that plaintiff was tender in that region, that the brain, spinal cord, and the penval nerves all take part in the phenomenon of erection, that he believed from an examination of the plaintiff and the injury that there was sufficient injury to either the brain or the spinal cord from the blow on the back of the head to cause permanent impotency.

Dr. Brazeau (specialist in eye, ear, nose, and throat) examined plaintiff and found him to be suffering from suppuration of the middle ear. He cautiously stated that this condition _might have_ been caused by the accident. An osteopath testified that the accident as described _could have_ caused the injuries complained of. . . . The jury found for plaintiff ($4,000).

In reversing and remanding, the court pointed to the period of apparent good health of about five months following the accident and before the attack of grippe, and that the opinions regarding impotency were given by men who saw plaintiff after the attack of grippe. The court said:

The verdict of a jury founded upon facts is entitled to great weight, and is almost conclusive upon this court if supported by any evidence. But the verdict
of a jury founded only upon the opinion of experts concerning the cause of a condition, which condition is itself established by the opinion of experts, has no such weight. (P. 606)

Opinions of medical men may be rejected as an insufficient basis for a finding of fact by a jury where the court is convinced that reasonable certainty is outside of the possibilities of the situation. (P. 607)

The court further pointed out that one physician found plaintiff to be suffering from grippe and having a suppurated ear, with some indications of varicocele and fever five months after the accident, and that this physician was of the opinion that plaintiff's sexual impotence was not due to any of these causes, but rather to the accidental injury. It was pointed out that he did not see plaintiff until five months after the accident, nor see the actual wounds or injuries, nor was there any evidence that they were described to him. The court pointed out that the physician who examined the plaintiff immediately after the accident found a chronic varicocele, and that "Dr. Allen McLane Hamilton, in his work entitled 'Legal Medicine,' expresses the opinion that varicocele except in its earlier stages finally results in the production of both impotence and sterility." (P. 609) Apparently another treatise informed the court that grippe could cause impotence.

In discussing the character of such an injury as impotence the court said:

It is very easy to exaggerate before a jury the cause, effect, or probable permanency of such a condition as impotence. The same is true with regard to nervous disorders. Both are easy to feign, hard to disprove, exaggerated by auto-suggestion, and it is comparatively easy for an expert to have an opinion tracing either to a particular physical injury instead of to a disease, a mental condition, or a general impairment of health. If loss of sexual power is to be thrown into the scale as an item for which the plaintiff is entitled to be compensated in a personal injury case, common sense informs us that in practically all cases of severe injury, pain, suffering, or sickness there must be and ordinarily is during such period of stress a suspension of the sexual functions. . . . The consequence of considering this as an additional or independent item of damages must be that every sick or injured man may assert his sexual impotence as a ground for recovery additional to pain, sickness, or suffering, and thus duplicate damages. Cases may no doubt occur of direct injury to the generative organs in which some such ground of damages would not be a matter of mere conjecture, and what is here said has no reference to such cases. (P. 609)

The court then found that Dr. Corbitt, under the circumstances detailed, and five months after the injury, had no certain or satisfactory data upon which to base his opinion that the impotency of the plaintiff, if it existed, was caused by the accident. The court discounted the testimony of the osteopaths entirely.

In concluding, the court stated:

The testimony of experts is proverbially unreliable at best, even when the experts are learned and competent, because bias is almost unavoidable on account of our mode of selecting experts, and bias requires small basis upon which to ground an opinion. But where this unreliability is accentuated by a showing that the expert has little or no data upon which to base the opinion . . . , and the subject upon which he expresses an opinion is one recognized by the approved learning of the times to be of great doubt and difficulty, or where the alleged expert demonstrates his lack of knowledge by his testimony, [as the osteopaths apparently did] such testimony will not be sufficient to support a verdict which to this court seems unjust or excessive. (Pp. 611-12)

Charlton Bros. v. Garrettson, 188 Md. 85, 51 A.2d 642 (1947). Following an operation for bilateral hernia, and about two weeks after returning to work, the plaintiff, in a collision between the streetcar of one defendant and the truck and trailer of the other, was thrown forward and struck in the region of the groin by the
frame of the seat ahead of him. Plaintiff claimed it caused "terrible pain." Following
the incident the plaintiff was in the care of Dr. Wilkerson, who performed the hernia
operation. The doctor testified that in his belief the accident produced a *recurrent
hernia.* He further testified that the only curative treatment is another operation, that
there was no "more than a fifty-fifty chance" of cure, that ten per cent of the hernias
operated on recurred without accident, but that this particular type of hernia is a *direct
hernia,* i.e., one that must be acquired, and ordinarily is due to some abdominal trauma.
(An indirect hernia is one for which all the elements necessary for it to occur are
present at birth.)

The defendant claimed reversible error in the court's charge to the jury to the effect
that it might consider whether the injuries would be permanent, and in overruling
objections to Dr. Wilkerson's testimony as to causal connection, as to the chance of
cure, and as to a "direct hernia." Apparently the doctor did not hear the testimony in
the case. Judgment for plaintiff approved.

. . . It was not necessary for him (the doctor) to hear the testimony. [Since
he had unusually extensive, firsthand acquaintance with the plaintiff's condi-
tion.] (P. 93)

The law requires proof of probable, not merely possible, facts, including
causal relations. Reasoning *post hoc, propter hoc* is a recognized logical
fallacy, a *non sequitur.* But sequence of events, plus proof of *possible*
causal relation, may amount to proof of *probable* causal relations, in the absence of
evidence of any other equally probable cause. [Italics by court.] . . . We are
not required or permitted to assume that the collision and the new hernia
were a mere coincidence and that the hernia would have recurred if there had
been no collision.

There is also evidence of permanent injury. Plaintiff is [Italics by court.]
permanently injured, unless he is cured by a formidable operation, which offers
a 50 per cent chance of cure. Before the collision his condition involved a
10 per cent risk of recurrence. His present condition, *if* [Italics by court.]
he undergoes another operation, involves a 50 per cent risk of recurrence.
*This increase in hazard is itself a permanent injury.* Expert testimony hardly
seems necessary to show that such an operation would leave plaintiff in a
permanently weaker condition. (P. 94) (Emphasis added.)

injuries as a result of an automobile accident caused by defendant. Following the
accident, the plaintiff got out of the car and walked around, and gave no indication
of injury whatsoever. He told a highway patrolman that he "was fortunate because
he had a weak back and was not even hurt." Plaintiff had been injured in a similar
accident twelve years previously. He also had been in an accident the previous year,
but claimed he had suffered no permanent injuries as a result of either event. He had
been a frequent visitor to doctors both before and after the accident, but he did not
complain to any of them of having received an injury in this accident. Examination
showed that at some time two of his vertebrae had become compressed.

This action was commenced thirteen months after the accident. The only medical
witness called by the plaintiff was one who examined him two years after the accident
for purposes of testifying. This witness testified that the accident *could* have caused
the condition in plaintiff's back. Judgment for plaintiff reversed.

Did the plaintiff establish by expert testimony that the plaintiff's injuries were
a result of the accident . . . ? The answer to this question necessitates the
consideration of two points, the first being: Did Dr. Rice testify with sufficient
definiteness that plaintiff's injuries were the result of the accident . . . ? and
second: Were the other accidents in which plaintiff was involved properly
eliminated as possible causes of his alleged injuries? We think the answer is
"No." (P. 670)

The plaintiff must show that the accident *probably did* cause the injuries.
The authorities clearly hold that medical testimony as to the possibility of a causal relation between a given accident or injury and the subsequent impaired physical condition of the person injured is not sufficient, standing alone, to establish such a relation. (P. 670)

The court also pointed out that Dr. Rice testified on cross-examination that plaintiff's injuries could have been caused at another time than the date of the accident. "We think that until the plaintiff has eliminated other possible causes of his injuries as being the sufficient cause, he should not recover." (P. 671)

Cole v. Simpson, 299 Mich. 589, 1 N.W.2d 2 (1941). Plaintiff claimed to have been injured when she was dragged by a bus from which she was alighting. No one saw the accident and there was considerable doubt whether the accident ever occurred.

The only outward evidences of injury were a few abrasions and bruises on her left leg and hand and on her face. Five months after the accident the plaintiff complained of pain in her back. Ten months after the accident X-rays disclosed that she was suffering from duodenitis and colitis, the latter in ulcerated form. Her main complaint is that the accident caused frequent, irregular, and very prolonged and painful menses.

There was medical testimony that duodenitis and ulcerated colitis, because of the advanced stage disclosed by X-rays, must have developed before the alleged accident. There was evidence that the menstrual difficulty was caused by this diseased condition; however, one of the plaintiff's medical experts, when asked whether he had any opinion based upon reasonable medical certainty whether or not the findings he had made (a considerable period after the injury) "could have been caused by a fall or being dragged," answered, "Why it was possible, yes." He further stated that the possibility was "very great," "80 per cent possible." Another medical witness for the plaintiff (the doctor who had been treating her) felt that the menstrual injury, duodenitis and ulcerated colitis were the result of a previous accident. Judgment for the plaintiff reversed on other grounds. (On subsequent discovery the defendant showed that plaintiff was a professional in personal injury actions.)

We agree that this testimony has very little probative value; that medicine is not such an exact science that the cause of disease can always be determined and it may be said that in most instances there is a possibility that any untoward condition may cause a more serious one. However, there was no error in admitting the testimony. In Hunter v. Village of Ithaca, 141 Mich. 539, we held that it was not improper to ask a witness whether an injury "could cause" a condition rather than whether such an injury would be likely to cause such result. We held that the objection went to the weight of the question rather than to its admissibility. The weight of authority sustains this ruling. (Pp. 595-6)

Comeau v. Beck, 319 Mass. 17, 64 N.E.2d 436 (1945). The plaintiff testified that she was three months pregnant at the time of the automobile collision for which the defendant was responsible. She further testified that the force of the collision threw her against the steering wheel, that she experienced pain and nausea, that she was obliged to stay in bed after the accident for a week, and that on the ninth day after the accident she suffered a miscarriage. She introduced no medical evidence on her behalf.

The defendant called as a witness a doctor, who had examined the plaintiff about six months after the accident. He testified that there was grave doubt that she had suffered a miscarriage, and that, if she did, it was not as a result of the accident. On appeal the defendant contended that the jury could not, unassisted by expert medical testimony, find that the plaintiff suffered a miscarriage or that such a miscarriage was causally related to the accident.

The court held that the plaintiff's own testimony as to her pregnancy and that she
suffered a miscarriage was sufficient evidence for the issue of the injury to go to the jury. With respect to the issue of causal connection the court stated:

The testimony of an expert that such causal connection exists, or probably exists, has been held sufficient. . . . [E]xpert testimony that merely shows "that such (causal) relation is possible, conceivable or reasonable, without more, leaves the issue trembling in the balance." But there is no rule of law that this relation must be proved only by expert testimony. . . . Expert testimony that an accident would be an adequate cause of subsequent disease has been held "sufficient, taken in connection with the plaintiff's testimony that his health was good before the accident." . . . We think, although with some hesitation, that the plaintiff's testimony with respect to the accident and the condition of her health afterwards, in conjunction with the testimony of the defendant's doctor to the effect that a miscarriage might be produced by "some injury, (or by) the striking of the abdomen," was enough to support a finding that the plaintiff's miscarriage was causally related to the accident." (Pp. 19-20)

Judgment for the plaintiff was affirmed.


The plaintiff sought damages for loss of the sight of his left eye, alleged to have resulted from the negligent operation of an electric vibrator by a barber employed by the defendant. The electric vibrator came in contact with the left side of the plaintiff's face on January 9, 1934. The plaintiff testified that there was an unpleasant jarring sensation; however, he sensed no further discomfort until the afternoon of the same day when he became aware of a dimness of vision which gradually became more pronounced. By January 15 the sight of the plaintiff's left eye was reduced to ten per cent of normal. Medical examination revealed that the retina had been torn. Prior to application of the vibrator, the left eye had been moderately nearsighted. Both before and after the injury the eye was entirely free from disease or infection.

Plaintiff's experts testified that the most common causes of a retinal detachment are trauma, jarring, or body strain. The plaintiff testified that he had undergone no unusual exertion nor sustained any blow. These experts testified that the detachment of the retina is not accompanied by pain, and that the vibration would have been a competent producing cause of the injury. Even the defendant's experts (barbers) testified that the vibrator should never be applied to the face.

The plaintiff was given judgment and the defendant prosecuted the appeal on the ground of a failure to show cause-in-fact. He supported the assertion by citing the experts' testimony to the effect that the injury might have resulted from a jolt or jarring sustained on a subway train, a taxicab, or a bus, in which vehicles the plaintiff had admitted riding on the 9th of January. The defendant offered no proof of such incidents. With respect to these contentions of the defendant, the court stated:

But the significant fact is that the record contains no proof that plaintiff had been jarred or jolted at any time and, to the contrary, the plaintiff denied such an occurrence.

It is not enough that the defendant, in an effort to break the chain of causation, should prove that plaintiff's injury _might_ [Italics by court.] have resulted from other possible causes, nor is it required of the plaintiff that he eliminate by his proof all other possible causes." . . . It is enough that he shows facts and conditions from which the negligence of the defendant and the causation of the accident by that negligence may be _reasonably_ inferred." (P. 223) (Emphasis added.)

The judgment for the plaintiff was affirmed.

_Fidelity & Casualty Co. of New York v. Industrial Accident Commission_, 84 Cal. App. 506, 258 P. 698 (1927). Proceeding in _certiorari_ to review an order of the Commission awarding compensation for the death of an employee of Balfour, Guthrie & Co. Deceased was sent by his employer from San Francisco to Valparaiso, Chile,
to attend a nitrate conference. On the return trip he stopped at Arequipa, Peru, pursuant to his employers' orders to visit company customers. There he contracted typhoid fever and died. Due to unsanitary conditions, typhoid in both Chile and Peru, while not epidemic, was prevalent and a constant source of danger. At least one of the deceased's superiors was familiar with the health conditions in both countries, and had warned deceased to this effect advising him concerning the precautions to be taken. The Commission found deceased sustained injury arising out of and in the course of employment. Judgment was for plaintiff.

This court was without power to determine weight to be given the evidence . . . or which of two opposing inferences should be drawn therefrom. Claimant was not required to show proximate cause by a preponderance of the evidence. The evidence need merely be reasonably sufficient to support the award.

The distinguishing feature between this and prior cases where an award is denied is that here at least one of the employers was aware of the greater prevalence of the disease in the places to which the deceased was sent. "... [A]nd we are unable to say that the conclusion of the Commission that the employee was subjected to an exposure in excess of the commonalty was not reasonably supported." (P. 510)

"Commonalty" means the great body of citizens, the mass of people.

... [A]n employee who contracts a contagious or infectious disease has the burden of showing affirmatively that he was subjected to an exposure in excess of that of the commonalty and in the absence of such showing his illness or death cannot be said to have been proximately caused by an injury arising out of his employment . . . the question is one of fact for the Commission, and its finding thereon if reasonably supported cannot be disturbed. (P. 508)

Furthermore, the evidence sufficiently shows that the inhabitants of these localities, while not immune from the disease, were less subject to infection therefrom than foreigners . . . (P. 510)

Harris v. Hindman, 130 Ore. 15, 278 P. 954 (1929). The defendant hit the plaintiff in the eye with his fist. The abrasion which resulted did not heal. Subsequent examination revealed the presence of a cancerous growth, for which the plaintiff sought damages.

In appealing from the judgment for the plaintiff the defendant contended that the opinions of the plaintiff's five medical experts rose no higher than inference in the scale of evidence. In affirming the judgment and disposing of the defendant's contentions, the court quoted from Chamberlayne on Evidence (§111):

"The necessity for receiving the reasoning of skilled witnesses is self-evident. . . . [T]he skilled witness, as an observer, is permitted to state facts perceived by him with the same admixture of reasoning which is allowed the ordinary percipient. The presence, on his part, of a new element, that of special knowledge, has several marked effects, in an administrative point of view. Among these, it may be noted in the first place, that the large number of data, professional reading, past observations, and the like, usually broadens the basis of the reasoning of the skilled witness to such an extent as to make his mental deduction from his observations resemble, not so much an inference, as a conclusion." (P. 18) (Emphasis added.)

Howley v. Kantor, 105 Vt. 128, 163 Atl. 628 (1932). The plaintiff was struck and injured by the defendant's automobile while she was crossing the street. It was not questioned that the evidence reasonably justified a finding by the jury that negligence of the defendant proximately caused the accident. The real issue (for our purposes) was with respect to expert testimony.

An expert testified that a growth on the plaintiff's left breast was caused by trauma. Apparently it was conceded that the accident was the cause of the growth. The expert further testified that such growths may be either simple tumors, which easily are
removed and cured, or may be malignant or cancerous growths, that to determine their character it is necessary to remove and examine them microscopically. With respect to the type of growth the witness testified that they "run about eighty per cent cancerous." No evidence or testimony was offered as to the character of the plaintiff's growth; the witness was unwilling to state whether it was a simple or a cancerous growth. The trial court left it to the jury to decide, and the jury apparently found that the growth was a cancer or could become a cancer. The defendant took exception to the failure of the trial court to charge the jury that the evidence was not sufficient to justify a finding that there was a cancerous growth and that it was not to consider such a condition as an element of damages.

In reversing and remanding a judgment for the plaintiff, the court stated:

Competent expert medical testimony was essential to lay a foundation for this claim made by the plaintiff. . . . To support such a claim, the evidence must be of such a character that the jury can find that there is a reasonable certainty or a reasonable probability that the apprehended future consequences will ensue from the original injury. Consequences which are contingent, speculative, or merely possible are not entitled to consideration in ascertaining the damages. (P. 133) (Emphasis added.)

In considering the expert testimony and establishing its legal effect, the court went on to state:

The record before us does not disclose any opinion of the medical witness as to the probable future development and result of the plaintiff's breast condition. His answer, "run about eighty per cent cancerous," does not have the effect claimed for it. The witness did not say that in his opinion the chances are eighty per cent that the growth is cancerous, but, rather, as is clearly indicated, that from his experience and the history of other cases injury to the breast producing tumor developed about eighty per cent cancerous. (P. 133)

This testimony and the inferences to be drawn from it were held to be too conjectural and speculative to furnish a basis for the assessment of future damages.

Ingersoll v. Liberty Bank of Buffalo, 278 N.Y. 1, 14 N.E.2d 828 (1938). In this case there was clear evidence that the basement stairs in a house owned and leased by the defendant were defective. The defects had been pointed out to the defendant, but they had not been remedied. The decedent, a lessee of the house, who weighed 214 pounds and was carrying a 32-pound package was discovered by the plaintiff, his wife, at the bottom of the stairs. A piece of the tread of the second stair from the bottom was broken off. Inspection showed it to have happened at an old crack. Shortly after the accident the decedent said to his wife, "Something broke, . . . Something gave away in here," (pointing to his chest). He died several months later as a result of injuries sustained in the fall. There was evidence indicating that decedent had been suffering from a heart disease at the time of the accident. Neither was the body of the decedent much bruised, nor the package he was carrying greatly damaged.

The defendant contended that the decedent fainted or lost his footing on the stair as a result of his physical condition. He claimed that this must have happened at or near the top of the stairs and that the package broke the stair as it fell.

The trial court submitted to the jury the question as to which inference should be drawn. The jury found for the plaintiff. The appellate division reversed and dismissed the complaint on the ground that plaintiff had failed to show a causal connection between the defect and the injury.

In reversing the decision of the appellate division, the court of appeals pointed out that the defendant's inference was possible but unlikely since neither the package nor
the decedent were shown to have been bruised sufficiently to warrant the inference that they had fallen from very far up the stairway. The court went on to state that

Where the facts proven show that there are several possible causes of an injury, for one or more of which the defendant was not responsible, and it is just as reasonable and probable that the injury was the result of one cause as the other, plaintiff cannot have a recovery, since he has failed to prove that the negligence of the defendant caused the injury. . . . This does not mean that the plaintiff must eliminate every other possible cause. . . . The existence of remote possibilities that factors other than the negligence of the defendant may have caused the accident, does not require a holding that plaintiff has failed to make out a *prima facie* [Italics by court.] case. It is enough that he show facts and conditions from which the negligence of the defendant and the causation of the accident by that negligence may be *reasonably inferred.* (P. 7) (Emphasis added.)

Applying this rule to the facts in issue the court further stated that

In the case at bar the natural and reasonable inference is that the plaintiff was descending the stairway with the box, when the defective tread broke under his foot and caused him to fall. There was evidence that the decedent suffered from heart disease, and the jury might have reached the conclusion that he fell because of heart attack or dizziness. The question was one for the jury and the complaint should not have been dismissed. (Pp. 8-9)

Kramer Service, Inc. v. Wilkins, 184 Miss. 483, 186 So. 625 (1938). Plaintiff was injured while opening a door in defendant's hotel when a broken piece of transom glass fell upon his head. The wound in the temple did not heal. About two years after the accident it was found that at the point where the injury occurred a skin cancer had developed. The jury awarded a $20,000 verdict.

The only two medical experts testified that there is no causal connection whatever between trauma and cancer, and went on to observe that if there were such a connection nearly every person of mature age would be suffering from cancer.

In affirming as to liability but reversing and remanding as to the amount of damages, the court stated:

And the medical testimony is conclusive on both judge and jury in this case. That testimony is undisputed that after long and anxious years of research the exact cause of cancer remains unknown—there is no dependably known origin to which it can be definitely traced or ascribed. If, then, the cause be unknown to all those who have devoted their lives to a study of the subject, it is wholly beyond the range of the common experience and observation of judges and jurors, and in such a case medical testimony when undisputed, as here, must be accepted and acted upon in the same manner as is other undisputed evidence. . . .

In all other than the exceptional cases now to be mentioned, the testimony of medical experts, or other experts, is advisory only; but we repeat that where the issue is one which lies wholly beyond the range of the experience or observation of laymen and of which they can have appreciable knowledge, courts and juries must of necessity depend upon and accept the undisputed testimony of reputable specialists, else there would be no substantial foundation upon which to rest a conclusion. (Pp. 498-9) (Emphasis added.)

Lee v. Blessing, 131 Conn. 569, 41 A.2d 337 (1945). The plaintiff was injured in an automobile accident on December 24, 1942. She sustained a bad bruise over her left breast. On February 13, 1943, a cystic mastitis was discovered at the precise point of injury. Apparently none of the medical experts were willing to state that the mastitis had been either caused or aggravated by the injury with reasonable certainty.

In affirming a judgment for the plaintiff the court stated:

Only the medical testimony is printed. It is highly technical. The jury could reasonably have found that the cause of cancer is unknown; that the prepon-
derance of medical opinion today is to the effect that cancer rarely if ever results from a single trauma; but that the exceptional circumstances surrounding this case, particularly the period that elapsed between the date of the trauma and the appearance of the cancer, and the fact that the cancer was located at the precise point of injury, justified the conclusion that there was a causal connection between the plaintiff's injury and her cancer. (P. 570)

*Louisville Ry. v. Philippina Steubing's Admr.,* 143 Ky. 364, 136 S.W. 634 (1911).

The decedent fell from defendant's streetcar by reason of the negligence of the defendant's employee. In doing so the handle of her umbrella bruised her chest. Within six months after the accident a tumor developed on her breast at the point where she had been bruised by the umbrella. This tumor further developed into cancer which caused her death. The judgment was for the plaintiff.

On appeal the defendant insisted that all the evidence as to the cancer should have been excluded from the jury, as it was not shown that this was the direct and proximate result of the injury.

In affirming the judgment for the plaintiff the court pointed to evidence showing that the decedent was a strong healthy woman before the accident and that she suffered constant pain following it. The court also adverted to testimony of physicians introduced by the plaintiff "to the effect that fifteen per cent of the cases of cancer of the breast may be traced back to a traumatic injury." While these physicians admitted that the cause of cancer was unknown, they gave it as their opinion that in a glandular structure like the breast, where the circulation is very extensive, there are what are called embryonic cells, and a bruise would start an embryonic cell to growing and developing into a growth different from the original material. These experts also testified that falling from a streetcar and having an umbrella punched into her chest, would be sufficient or probable cause for the condition in which they found the decedent, that the injury might not cause the cancer, but might bring about a condition which would cause it although a cancer otherwise would not have existed, that any chronic inflammatory condition in the breast was liable to bring about such a condition, and that a large percentage of the tumors of the breast in women at some time took on malignancy. The court held that this was sufficient evidence for the issue of causation to go to the jury.

*Magazine v. Shull,* 116 Ind. App. 79, 60 N.E.2d 611 (1945). This was a claim under workmen's compensation statutes. On March 13, 1942, the claimant, while pushing a motor block up an inclined ramp to a truck bed, experienced a sharp and severe pain in the region of his stomach. He became dizzy and cold and was compelled to rest. Later, he collapsed in his employer's office. That same day he had two rectal hemorrhages, and during the following week he had recurrent spells of nausea and pain. On March 21, he had several hemorrhages, both oral and rectal. On March 24, after being taken to the hospital, claimant awakened totally and permanently blinded by bilateral optical atrophy. Prior to this time claimant had had no trouble with his eyes; however, he apparently had an incipient stomach ulcer.

A medical expert stated, "It is known on good authority that one single hemorrhage or repeated hemorrhages may exsanguinate the retinae and thereby produce death of the retinas followed by optic atrophy. That condition is rare but there are cases reported of such a happening." (P. 84) In response to the question, "Would you say, doctor, that the result might have occurred in this case?" (Emphasis added.) the witness replied, "Yes, it just easily could have happened." This was all the medical testimony favorable to claimant. Nothing was said as to what caused the hemorrhage. Judgment for plaintiff was affirmed.

It is true that in many jurisdictions courts attach little evidentiary value to statements of medical experts which are doubtful and equivocal and hold that the evidence must establish a probability, not a mere possibility, of causal
connection between an injury and disability. In this state, however, it is settled law that the opinions of medical experts using words such as "might," "could," "likely," "possible," "may have," etc., in testifying concerning the causal connection between accident and disability, if coupled with other credible evidence of a non-medical character, is substantial evidence and sufficient to sustain an award. In our opinion the chain of events in close sequence, such as the accident itself followed by pain, dizziness, chill and hemorrhages, at frequent intervals over a period of 11 days, together with the fact that the appellee previously had had good eyesight and no hemorrhages, is sufficient, under the rule above announced, to render Dr. Alvis' testimony substantial in character and of such probative value as the Industrial Board saw fit to give it. (P. 87) (Emphasis added.)

McAllister v. United States, 207 F.2d 952 (2d Cir. 1953). Libellant, a second assistant engineer, employed by the United States on a government owned vessel, operated by the War Shipping Administration, brought an action contending that the respondent had been negligent in creating conditions conducive to the transmission of polio and that the libellant contracted polio as a result of this negligence.

The vessel arrived in Shanghai from New York on September 26, 1945, where she stayed until November 1. Notice was posted and announcements were made by the master as to the existence of a polio epidemic in the area; all members of the crew were warned to avoid contact with the Chinese and to exercise care in eating and drinking while ashore.

On November 1 the vessel went to Hong Kong, returning to Shanghai on November 11. During this second stay at Shanghai Nationalist Army trucks were loaded on board the vessel with the aid of Chinese coolies; also Chinese soldiers and mechanics were taken on board. While a deck toilet was provided for them, no provision was made to keep the Chinese from using the crew's toilet facilities. The Chinese in fact did use these facilities as well as a common drinking fountain on deck. On one occasion libellant was required to flush the deck latrine. Judgment for libellant reversed. On appeal to the Supreme Court, 348 U.S. 19, 75 S. Ct. 6 (1954), judgment was reversed, the court saying:

On evidence showing these facts, including the opinion of the experts, we think there was substantial evidence from which the District Court [no jury] could and did find that respondent was negligent in permitting these Chinese, from the infested area of Shanghai, to have the run of the ship and use of its facilities, and in furnishing the crude and exposed latrine provided on the deck of the ship, by reason whereof the petitioner contracted polio. Of course no one can say with certainty that the Chinese were the carriers of the polio virus and that they communicated it to the petitioner. But upon balance of the probabilities it seems a reasonable inference for the District Court to make from the facts proved, supported as they were by the best judgment medical experts have upon the subject today, that petitioner was contaminated by the Chinese who came aboard the ship November 11, 1945, at Shanghai. (P. 22) (Emphasis added.)

Menarde v. Philadelphia Trans. Co., 376 Pa. 497, 103 A.2d 681 (1954). Plaintiff was injured on May 16th while alighting from defendant's streetcar. That evening she noticed a discoloration on her right breast. Over the period of the next two and a half months the discoloration disappeared; however, by the end of July plaintiff detected a lump at the exact spot where there had been discoloration. Plaintiff was referred to a cancer specialist who recommended removal of the entire breast. This operation was performed. Plaintiff's regular physician testified in very unequivocal terms that in his opinion the cancer was the direct result of plaintiff's injury. This witness refused to even concede that the cancer possibly could be caused by anything else. The cancer specialist, who performed the operation, testified that the trauma sustained by plaintiff caused the cancer, although in somewhat less emphatic terms. Judgment for plaintiff affirmed.
... [T]he expert has to testify, not that the condition of claimant might have, or even probably did, come from the accident, but that in his professional opinion the result in question came from the cause alleged. A less direct expression of opinion falls below the required standard of proof and does not constitute legally competent evidence. (P. 501) (Emphasis added.)

Where, as here, a person who has enjoyed prior good health sustains an injury to a particular member and some three months thereafter a malignant nodule appears in precisely the same location as the bruise, and two doctors conclude that the cancer resulted from the trauma, causal connection between the accident and the disease is sufficiently established... (P. 503)

Since their statements [those of plaintiff's two experts] exhibit no absolute contradiction respecting the fundamental issue, it was legally competent evidence and was properly submitted to the jury. (P. 503)

Payne v. Chandler, 41 Ga. App. 385, 153 S.E. 96 (1930). In this case the court pointed out that the mere fact that one event chronologically follows another is alone insufficient to establish a causal relationship between them. In a remarkably elliptical opinion the court merely stated:

... Evidence that a woman suffered a pain in her heart and other physical ailments after having swallowed a liquid, the nature and character of which does not appear except that it was suitable for use as a hypodermic by a dentist while operating in a person's mouth and possessed a bitter and disagreeable taste, is, in the absence of evidence as to any facts tending to show a causal relation between the woman's physical condition and the swallowing of the liquid, insufficient to authorize an inference of fact that her condition was caused by the swallowing and the ill tasting effects of the liquid. (P. 386)

Ramberg v. Morgan, 209 Iowa 474, 218 N.W. 492 (1928). In this case plaintiff's intestate was struck by an automobile. He was brought by the driver of the automobile to the police station. In response to a call, the doctor, an assistant police surgeon, arrived at the station about an hour after the accident. He found decedent on the floor of a cell in an unconscious condition. The doctor examined decedent. He diagnosed the case as intoxication, stating that he found no evidence of head injury. He left decedent, still unconscious, lying on the floor of the cell, and did not see him again. Decedent remained unconscious for six hours; thirty-one hours later he was taken home in a stupor, complaining of an "awful headache." His condition became worse, and he died four days after the accident.

Autopsy revealed a fracture of the sutures of the parietal and occipital bones near the base of the skull and indicated that decedent had died as a result of anemia of the brain, or medullary edema, due to pressure of fluid inside the skull.

In bringing action against the doctor for negligence, the plaintiff did not plead that the doctor's omission caused, aggravated, or accelerated the death, but apparently alleged that in all probability the decedent's life could have been saved had defendant exercised reasonable care and skill; and that this omission was the efficient and proximate cause of the death.

All the medical experts who testified suggested but one proper course of procedure when confronted with a situation such as this. Apparently there was ample variance between such a procedure and the doctor's examination. The supreme court held that the trial court was justified in overruling defendant's motion for a directed verdict and submitting the issue of breach of the standard of care to the jury.

The principal issue on appeal was that involving cause-in-fact. The court pointed out that:

The only recognized standard in such cases is essentially within the domain of expert testimony. ... Nor is the value of expert opinion to be determined by counting noses, as in this case two physicians were called by the plaintiff, and three by the defendant, to testify on the proximate cause of death. ...

But, if plaintiff's own medical experts are in doubt, and could not, on the
hypothetical question put to them, state with any reasonable certainty that the death of decedent was aggravated or accelerated by the negligence of the defendant, how could a court or jury determine such proposition? (Pp. 481-82)

By way of establishing the general rule the court stated:

There must be causal connection between death of plaintiff’s intestate and the negligence of the defendant, as alleged. There must be something more than a showing that the evidence is consistent with plaintiff’s theory of the cause of death. The evidence must be such as to make that theory reasonably probable—not merely possible—and more probable than any other hypothesis based on such evidence. (P. 482)

The court stated that “it was necessary for the jury to find, upon proper evidence, that the death of the decedent would not have occurred on January 25, 1926 (the 4th day), but for the alleged negligence charged against the defendant.” (P. 483)

All of defendant’s experts testified that the head injury was the cause of death; plaintiff’s witnesses testified that “the cause of death . . . was problematic”; that they did not know whether anything the doctor did or failed to do, caused the death, or that decedent would have lived if he had received other treatment. One of plaintiff’s witnesses, in response to a hypothetical question containing the conditions and procedures of the doctor’s examination and asking if they “probably accelerated his (decedent’s) death, answered, “I would have to answer, in any one case, I don’t know as I could say. I would say in a series of cases that this sort of treatment would probably accelerate or possibly cause some of them to die sooner.” (P. 485) (Emphasis added.)

In discussing the testimony of the plaintiff’s expert witnesses the court stated:

It may be stated further that both of these experts, in answering the hypothetical question, stated that a person receiving a traumatic injury who lived 48 hours or more had a better chance of life, but admitted that the law of probability as applied to any particular individual in a class is “a mere guess.”

Dr. Carney testified:

“There may be ninety-nine out of a hundred who receive a certain injury that are going to die, and one may recover; but nothing in those statistics enables one to tell which one is going to be the fortunate one. I believe that this man did have a severe brain injury, and a severe brain injury causes death at times, in the face of the exercise of highest degree of skill and care.”

It is sufficient to say that a physician, called as an expert, does not make a prognosis on statistics, because no two cases are alike; and plaintiff’s experts could not say that, in any particular case, the fact that the patient lived 44 or 48 hours after the shock proved that he was not going to die. Damages may not be predicated on statistics of the character offered in the instant case. (P. 486) (Emphasis added.)

The court held that the defendant’s motion for a directed verdict on the ground that causation was not shown should have been sustained and reversed a judgment for the plaintiff.

Thompson v. New Orleans Ry. & Light Co., 145 La. 805, 83 So. 19 (1919). The plaintiff was injured by a fall from a railway car of the defendant. At the time of his death he was afflicted with both a cancer and tuberculosis. Autopsy revealed the cause of the death to be cancer. In disposing of this case in the plaintiff’s favor the court said:

Their [the medical experts] testimony is to the effect that tuberculosis was not the cause of Mr. Thompson’s death; and that the real cause of his death was a malignant tumor, or cancer, which had resulted from a trauma or blow apparently inflicted about the time of the accident to him, as before described. They say, in effect, that such a malignant tumor as Mr. Thompson had results from a blow, as a rule, and that it generally attains its full growth and does its deadly work within 12 to 18 months’ time; in just about the time between the day of the accident to Mr. Thompson and the day of his death. (P. 813)
Travelers Insurance Co. v. Donovan, 125 F. Supp. 261 (D.D.C. 1954). Action by an insurer to set aside an award under the Workmen's Compensation Act (33 U.S.C.A. 901 et seq.) made by the defendant as deputy commissioner. The claimant (to whom the award was made) was employed by the American Red Cross in Washington, D.C., and later assigned to duty in Kyoto, Japan. While at Kyoto she contracted tuberculosis.

Under the stipulated facts:

(a) Kyoto
1951—incidence of TB 1,040/100,000
1952—incidence of TB 1,090/100,000

(b) Washington, D.C.
1951—incidence of TB 221/100,000
1952—incidence of TB 216/100,000

The Act provides: "Presumptions—In any proceeding for enforcement of a claim for compensation under this chapter it shall be presumed, in the absence of substantial evidence to the contrary—(a) That the claim comes within the provision of this chapter." (33 USCA 920) Claimant did not have tuberculosis when she went to Japan. The question presented was whether it was reasonable for the defendant to reach the conclusion that the claimant's tuberculosis was contracted not only during the employment but out of the employment, because there was an aggravated risk as a result of being sent to work in an area with a comparatively high incidence rate? Judgment for claimant.

To a certain extent it must be realized that the inference drawn by the Deputy Commissioner results from the weighing of probabilities. It may well be that in an action for damages governed by the principles of the common law the causal relationship between the employment and the tuberculosis could not be deemed to have been sufficiently established. Different principles govern claims under the Workmen's Compensation Act, however. It is for the Commissioner to draw inferences from the evidence, and here the facts are stipulated and not in dispute.

The court is of the opinion that the inference drawn by the Deputy Commissioner is not so unreasonable and is not so lacking in being founded on substantial evidence as to justify any interference on the part of the court. (Pp. 62-63) (Emphasis added.)

On appeal (221 F.2d 886 (D.C. Cir. 1955)) the insurer claimed that the award was void because it was based on speculation and conjecture and was not substantiated by the facts. The court held that the sole fact of the higher incidence of tuberculosis in Kyoto than in the District of Columbia "cannot support the inference drawn by defendant that claimant sustained such an occupational disease or infection as arose naturally out of her employment." Judgment for claimant was affirmed. The employment sent the claimant to Japan. The statute created a presumption for the benefit of the claimant. Absent substantial evidence to the contrary, a disability occurring in the course of employment must be presumed to have arisen therefrom. The court of appeals admitted that it is conceivable that the incidence of the disease in both places was so minimal as to require the conclusion that the 5-fold ratio was itself de minimis. But since the insurer offered no proof to that effect, the court could derive no such conclusion from its inspection of the record. The court concluded that it was entirely reasonable to infer, under all the circumstances, that the plaintiff contracted the disease by her contacts with the population of that country, infected as it was to a higher degree than that of the District of Columbia.

Vaccaro v. Marra Bros., Inc., 130 F. Supp. 12 (D.C. E.D. Pa. 1955). Plaintiff sustained injuries as a result of defendant's negligence when he was struck under the armpit by a heavy wire cable. The injuries were alleged to consist of a wrenching and stretching of the muscles and ligaments of the shoulder and an aggravation of a pre-existing chronic inflammation inside the shoulder joint. The plaintiff also alleged
that the injury aggravated a pre-existing heart condition. The jury gave a verdict of $25,000, which the defendant claimed to be grossly excessive in that there was no sufficient showing of causal connection between the accident and the heart condition. An expert witness testified:

... "Well, I believe that this strain of the accident, and what trauma he received during the accident, most likely contributed to a myocardial infarct.

"I think it is impossible to state positively the extent to which the accident contributed towards Dr. Vaccaro's present condition. . . . I came to the conclusion that the myocardial infarct, . . . was probably or, possibly—I think possibly—was due to the emotional upset and trauma produced by the accident." Q. "... [I]sn't it true that the myocardial infarction that we are discussing now is a frequent and common complication of the hypertensive and arterial sclerotic heart condition, with added emphysema, that Dr. Vaccaro suffered from, which has no connection with the accident?" A. "That is correct." Q. "So that is the reason . . . that you use the word 'possibly' in your opinion concerning the causal connection?" A. "That is right. I wish I could use the word 'probably' for Dr. Vaccaro's benefit." (P. 13) (Emphasis added.)

The court remanded the case for a new trial, feeling the judgment to be grossly excessive.

"In order to link [the] impaired physical condition to the defendant's conduct, the plaintiff was forced to depend on expert medical testimony because scientific knowledge was required for the elucidation of the question. * * * Moreover the expert has to testify, not that the condition of claimant might have, or even probably did, come from the accident, but that in his professional opinion the result in question came from the cause alleged. A less direct expression of opinion falls below the required standard of proof and does not constitute legally competent evidence." (P. 14) (Emphasis added.)

Walker v. St. Louis Pub. Serv. Co., 362 Mo. 648, 243 S.W.2d 92 (1951). When four weeks pregnant, the plaintiff was injured in a collision, for which the defendant was responsible. For a number of years prior to the accident she had suffered rheumatic heart disease with mitral stenosis, which was permanent and progressive. The baby was delivered uneventfully and in a healthy condition.

The verdict for plaintiff was attacked on the ground that the court permitted the jury to award damages for permanent injuries when there was no substantial evidence of any permanent injury being proximately caused by the accident. Judgment for plaintiff affirmed upon remittitur of $4,000 of a $14,000 award.

An expert who examined plaintiff one year after the accident testified that where an aggravated heart disease of this type and extent is aggravated by any cause, the combination would make it worse; that he could not tell how much the accident had shortened plaintiff's life; that plaintiff would require treatment for the rest of her life; that pregnancy and childbirth throw a burden on the heart. Another expert testified that plaintiff's rheumatic heart disease, mitral stenosis and congestive heart failure were permanent and apt to shorten her life; that it was unusual for a woman of plaintiff's age (37) to have so severe a condition; that congestive heart failure does result from mitral stenosis, but many who have mitral stenosis do not have congestive heart failure; that plaintiff's early heart failure was a result of mitral stenosis but that the accident might have been the precipitating event; that where mitral stenosis exists, heart failure could and probably would result at any time; that any sudden and unexpected occurrence may precipitate congestive heart failure; that plaintiff's pregnancy possibly speeded up the development of congestive heart failure but that ordinarily where congestive heart failure occurs from pregnancy alone it does not occur until the 6th or 7th month, while the diagnosis of plaintiff's congestive condition was made in the 4th month of her pregnancy; that plaintiff's condition has become
progressively worse since before the accident; and that plaintiff's life expectancy was two years. He also said, "I feel that it [the accident] has probably speeded up the course of her development of congestive heart failure." (Emphasis added.) Prior to the accident plaintiff was able to do her housework. Since the accident she was not able to do so. The court said:

... [W]e are not overlooking the facts: that plaintiff's doctors testified that mitral stenosis would probably cause congestive heart failure independent of any aggravation suffered at the time of the accident; that one of plaintiff's doctors testified that the aggravation caused by the accident would last not more than 8 months...; that the accident might have caused congestive heart failure; that plaintiff's pregnancy possibly speeded up the development of congestive heart failure; that any shock might cause congestive heart failure; that mitral stenosis probably would result in congestive heart failure without the intervention of an accident or other shock. (P. 656)

We think there was an expert opinion sufficiently definite to constitute substantial evidence from which the jury could reasonably find that the accident hastened the development of congestive heart failure. When the entire testimony of Dr. Stubbs is considered, and when his various "might", "may", "could", "would", "possibly", and "probably" statements are analyzed with reference to the manner in which they relate to each other and to his total testimony, we believe that Dr. Stubbs did give his expert opinion that the accident... hastened, or caused sooner than would otherwise have been the case, congestive heart failure. (P. 656)

It will be noted that this statement came after the doctor had testified to the possibilities and probabilities of other causes. Dr. Stubbs conceded that whether the accident... hastened or speeded up congestive heart failure was necessarily somewhat speculative; he conceded that plaintiff's pregnancy possibly speeded up the development of congestive heart failure; he stated that the accident might have been the thing that precipitated the congestive heart failure; he conceded that mitral stenosis could or would have caused it independent of any accident or other shock; but after conceding all this, the doctor then, based upon his examination and upon the facts related to him, was of the opinion that the aggravation caused by the accident in turn brought on congestive heart failure sooner than such condition would have resulted but for the accident.... Where, as here, it may be determined from the testimony that the doctor was expressing his expert opinion as to the cause of a condition, the form of language used will not deprive the statement of its evidentiary value. (P. 657)

It is well established that before recovery may be had for permanent injuries, the permanency of the injuries must be shown with reasonable certainty and likewise that the causation of such permanent injuries must be shown with reasonable certainty; and when evidence goes only to the extent of showing that a certain condition might or could have been caused by one of two causes for only one of which defendant is liable, such is not a substantial showing of which the causes produced the condition and furnishes no basis from which a jury may reasonably find the cause. (P. 658).

Williams v. Reading Co., 175 F.2d 32 (3d Cir. 1949). The plaintiff's decedent was last seen, apparently asleep, in the car of the defendant's local train pulling out of station X, where he should have alighted. The next terminal was Y, and as the train was pulling away from it a trainman announced that Z terminal was next. It was shown that as the train left Y terminal, and when it reached Z terminal, the doors on the right side of the train were open. Before the train reached Z terminal, it made a stop at an intermediate crossing, A, to allow a train bound in the opposite direction to cross ahead of it and proceed upon a track immediately to the right of the track upon which the decedent's train was traveling. It was dark at the time that the decedent was last seen, and still dark when he was found the next morning, lying alongside the tracks at a point near the intermediate stop of the previous evening. It was stipu-
lated that the decedent had suffered a fractured skull. The defendant offered no evidence.

Under Pennsylvania law the plaintiff was entitled to a presumption of having exercised due care. Also it had been decided by the supreme court of that state that if a train, after the announcement of the next stop, stops short of or beyond that station, and no warning of the fact is given to the passengers, such omission is a negligent act on the part of the carrier.

The lower court rendered a verdict *non obstante veredicto* in favor of the defendant, saying that the evidence was too inconclusive to show causation since decedent could have left the train at either terminal Y or Z and have been walking along the tracks when struck by a train, or that voluntarily or involuntarily he might have fallen from the train while in motion, as a result of pure accident or illness. No evidence was adduced to substantiate any of these alternative theories.

In reversing and remanding with directions to enter a judgment for the plaintiff on the jury verdict, the court pointed out that the plaintiff's proof, considered in the best light, need not eliminate every possible cause other than the one on which he relies, but only such causes, if any, as fairly arise from the evidence. Moreover, the court stated that the presumption of due care remains in the case where there is no evidence offered by either side to offset it. For this reason the court felt that the jury was justified in finding that decedent did not leave the train while in motion and that he did not leave at either terminal Y or Z and walk along the tracks at night. Therefore, the court felt that the jury might find that the plaintiff's decedent left the train as a result of the clearly negligent act of the defendant, and that as a result of his having done so, he was struck and killed by the southbound train on the adjacent track.

*Wood v. Joyce Co.*, 228 App. Div. 729, 239 N. Y. Supp. 110 (1930). While in the employ of the defendant, the claimant fell from a stepladder. He continued his work as a carpenter during the rest of the day and for three weeks thereafter. Then, while at work, he suddenly became blind in his right eye. A medical examination disclosed a detached retina. The eye had been bloodshot after the accident and there had been some pain and blurring of vision. The defendant employer appealed from an award granted to the claimant.

In reversing and setting aside the award, the court pointed out that identification of the blindness with the earlier accident *must depend upon medical testimony*. While some of the experts had eliminated practically every other cause, except the accident, all of them *hesitated to express a definite opinion* that the origin of the detached retina was the accident. They merely said it was "possible." The court held that in the absence of other evidence leading to a reasonable conclusion, this was not sufficient.

(c) Kinds of Evidence Used

(i) Circumstantial

Because so many factors ordinarily enter into the determination of the causes of a particular physical ailment, it is not surprising that use of circumstantial evidence is so prominent in cases involving personal injuries. While it is impossible to catalogue the kinds of circumstantial evidence that have been accepted as helping to prove causation, there are some that stand out, particularly those dealing with the development of cancer after a trauma. Apparently good health prior to impact not only is properly admitted to show causation but it seems to be fairly
persuasive.\textsuperscript{929} On the other hand, lack of prior good health does not seem to show lack of causation.\textsuperscript{930} Another type of circumstantial evidence of considerable effectiveness in many cases is the near coincidence of the time of impact and the appearance of physical symptoms in the plaintiff's case, and in medical experience generally in such cases.\textsuperscript{931} The coincidence of the injury manifesting itself at the exact point of impact of the force set in motion by the defendant also has been given considerable weight in several cases.\textsuperscript{932}

(ii) Expert Testimony

As indicated previously, in discussing the malpractice cases involving radiation injuries,\textsuperscript{933} the language in the opinions is not consistent as to whether in areas involving scientific information it is necessary for the plaintiff to produce expert witnesses if he is to recover. It seems a fair generalization, however, that there are many cases in which the evidence so obviously points to causation from the force put in motion by the defendant that even a lay jury can rationally conclude without expert testimony that causation has been proved. But, once the evidence gets into the doubtful area, where it is of a technical or scientific nature, a plaintiff would be foolhardy to pass up the privilege of using expert witnesses. Certainly in radiation cases many questions of causation will necessarily involve evidence which only specially trained people can give and interpret. Cases dealing with biological causation in personal injury situations seem to bear this out.\textsuperscript{934} Even in those jurisdictions in which cases are found saying that expert testimony is not necessary it is perfectly clear in general that it is admissible.\textsuperscript{935} Whether the testimony

\textsuperscript{929} See the Comeau, Cornbrooks, and Menarde cases, \textit{supra} Table of Cases at end of previous section.

\textsuperscript{930} See the Thompson, Ingersoll, Magazine, Vaccaro, and Walker cases, \textit{supra} Table of Cases at end of previous section. Chronological coincidence rejected in suit for damage to sheep from A-bomb test; Bulloch v. United States, 145 F. Supp. 824 (D.C. Utah, 1956).

\textsuperscript{931} See the Charlton, Cornbrooks, Lee, Louisville, McAllister, Menarde, Payne, Thompson, Walker, and Wood cases, \textit{supra} Table of Cases at end of previous section.

\textsuperscript{932} See the Charlton, Lee, Louisville, Menarde cases, \textit{supra} Table of Cases at end of previous section.

\textsuperscript{933} \textit{Supra} discussion at notes 186 ff.

\textsuperscript{934} See the Bearman, Comeau, Harris, Kramer, Vaccaro, and Wood cases, \textit{supra} Table of Cases at end of previous section. See also Bennett v. Los Angeles Tumor Institute, 102 Cal. App.2d 293, 227 P.2d 473 (1951); Goodwin v. Misticos, 207 Miss. 361, 42 So.2d 397 (1949).

\textsuperscript{935} See the Cole and Menarde cases, \textit{supra} Table of Cases at end of previous section. See also Stanley Co. v. Hercules Powder Co., 16 N.J. 295, 304, 108 A.2d 616 (1954). \textit{Cf.} Bucher case, \textit{supra} Table of Cases at end of previous section, opinion at 611-12: "The testimony of experts . . . which to this court seems unjust or excessive."
given in the particular case by the expert witnesses is sufficient to support the claims of the plaintiff or defendant is a question that ordinarily is left to the jury, although occasionally an appellate court will rule that the evidence was too speculative and tenuous to justify the jury's finding.988

(iii) The Use of Statistics, Scientific Treatises, and Other Scientific Data

There are many cases in which the use of statistics, treatises, and scientific data, which for the most part come clearly within the definition of hearsay evidence, has nevertheless been permitted. In such cases it frequently has happened that the validity of such evidence either has not been argued or the question has been ignored by the appellate court.987 There is considerable disagreement among the courts, however, as to whether it is proper to use such testimony. It is inevitable that the use of such material, with or without the use of experts to explain it, will become so important in radiation cases that its availability under the legal rules of hearsay and the limitations on the use of such material cannot be ignored.

The principal objection to the use of medical treatises and statistics to prove the likelihood of future injury is that it violates the hearsay rule. Where the fact to be proved with reasonable certainty is the future manifestation of an injurious impact, and statistical evidence is introduced to show that under similar circumstances the condition ultimately has occurred in a certain number of cases out of the total number of cases investigated, the defendant can argue that the evidence is hearsay, except in the rare instance in which the witness giving the testimony personally has investigated all of the cases. The argument is that the witness is unable to testify from personal knowledge as to both the accuracy of the statistics generally and as to the accuracy of the diagnosis of the individual cases specifically. Furthermore, it can be argued that the use of such evidence deprives the opposing party of his right and opportunity to cross-examine so as to test the validity of such statistics.

Wigmore, in addition to the above stated argument against the admission of learned treatises on medicine as evidence, has pointed out several other arguments which have been asserted from time to time with some

988 See the Bearman, Bucher, Comeau, and Kramer cases, supra Table of Cases at end of previous section.
987 See the Boland, Bucher, Harris, Louisville, and Ramberg cases, supra Table of Cases at end of previous section.
success: (1) That “science is shifting,” that experiment and discovery continually are altering scientific theories and rendering them obsolete, that there is no general agreement among scientists, and that testimony characterized by such instability and uncertainty is untrustworthy; (2) that there is danger of confusing the jury by reading technical passages to them without explanatory comment; (3) that passages may be used unfairly by quoting them out of context; and (4) that the truths of medicine are to be sought chiefly in the personal experience of physicians. Wigmore’s answer to these four objections is summary to the point of being contemptuous. Both the danger of confusing the jury and quoting out of context can be remedied easily by the use of expert witnesses and the alertness of opposite counsel. The fourth objection is simply ridiculous, for it does not conform to the facts of the twentieth century. As to the first of the four objections, if the proponent is entirely consistent he would have to insist that the witness stand be denied to all scientific experts except the most up-to-date researchers, and even such opinions would be suspect since they might become obsolete tomorrow. In addition, science seldom refutes itself and the fact that it is an evolutionary discipline, constantly improving its methods of observation and the abstractions drawn from them, does not mean that it is “uncertain.” If this is uncertainty, then the law itself is chaos.

In any event, such evidence generally is admissible, as it should be.

Wigmore, Evidence §1690 (3d ed. 1940).

Id. at §665b, where the author says: “The data of every science are enormous in scope and variety. No one professional man can know from personal observation more than a minute fraction of the data which he must every day treat as working truths. Hence a reliance on the reported data of fellow-scientists, learned by perusing their reports in books and journals. The law must and does accept this kind of knowledge from scientific men. On the one hand, a mere layman, who comes to court and alleges a fact which he has learned only by reading a medical or a mathematical book, cannot be heard. But, on the other hand, to reject a professional physician or mathematician because the fact or some facts to which he testifies are known to him only upon the authority of others would be to ignore the accepted methods of professional work and to insist on finical and impossible standards.

“Yet it is not easy to express in usable form that element of professional competency which distinguishes the latter case from the former. In general, the considerations which define the latter are (a) a professional experience, giving the witness a knowledge of the trustworthy authorities and the proper source of information, (b) an extent of personal observation in the general subject, enabling him to estimate the general plausibility, or probability of soundness, of the views expressed, (c) the impossibility of obtaining information on the particular technical detail except through reported data in part or entirely. The true solution must be to trust the discretion of the trial judge, exercised in the light of the nature of the subject and of the witness’ equipments. The decisions show in general a liberal attitude in receiving technical testimony based on professional reading.”
Courts frequently have accepted such evidence indirectly through an expert's testimony; for example, when the expert witness admitted that his knowledge that formaldehyde in milk was injurious was acquired, not from experiments, but wholly from reading, study, and conversations with other physicians, when two physicians in a criminal case admitted they derived their knowledge on the subject of poisons solely from medical books, when a professor of geology based his testimony on "what I have read and the information I gathered from discussions with numerous geologists, and from my own observations," when a professor of science (mathematics and philosophy) used U. S. Coast and Geodetic Survey Maps in his calculations, when a professor of

In a subsequent passage Wigmore goes on to say, in §687: "To deny the competency of a physician who does not know his facts from personal observation alone is to reject medical testimony almost in its entirety. To allow any physician to testify who claims to know solely by personal experience is to appropriate the witness-stand to impostors. Medical science is a mass of transmitted and collated data from numerous quarters; the generalizations which are the result of one man's personal observation exclusively are the least acceptable of all. The law must recognize the methods of medical science. It cannot stultify itself by establishing, for judicial inquiries, a rule never considered necessary by the medical profession itself. It is enough for a physician, testifying as to medical fact, that he is by training and occupation a physician; whether his source of information for that particular fact is in part or entirety the hearsay of his fellow-practitioners and investigators, is immaterial."

Isenhour v. State, 157 Ind. 517, 62 N.E. 40 (1901), where the court said, at 528: "Courts have never undertaken to set up a standard of scientific knowledge by which competency of a witness may be determined, and have not gone to the extent of holding that a scientific witness can only testify from facts learned by him from personal demonstration. The general rule, in such cases, in this State at least, seems to be that where a witness exhibits such a degree of knowledge, gained from experiments, observation, standard books, or other reliable source, as to make it appear that his opinion is of some value, he is entitled to testify, leaving to the trial court, in the exercise of a sound discretion, the right to say when such knowledge is shown, and to the jury the right to say what the opinion is worth;..."

Boswell v. State, 114 Ga. 40, 39 S.E. 897 (1901), where the court makes the following distinction, at 43: "Books of science and art are not admissible in evidence to prove the opinions of experts therein expressed.... But, notwithstanding the inadmissibility of the books, the opinions contained therein may come to the jury through the mouth of an expert witness."


Pennsylvania Threshermen & Farmers' Mutual Casualty Ins. Co. v. Messenger, 181 Md. 295, 29 A.2d 653 (1943). The court said, at 298-99: "It is a familiar rule of evidence that a witness, in order to qualify as an expert, should have such special knowledge of the subject on which he is to testify that he can give the jury assistance in solving a problem for which their equipment of average knowledge is inadequate. ... It is not a ground for excluding the testimony of an expert that he bases his statements in whole or in part upon what he has read, provided that his reading can be assumed to constitute part of his general knowledge adequate to enable him to form a reasonable opinion of his own. ... The knowledge of an expert in any science or art would be extremely limited if it extended no further than inferences from happenings
mechanical and aeronautical engineering admitted that his calculations of the train's speed were based on experiments on similar train brakes and coefficients of friction, wind, and grade resistance to be found in handbooks on the subject, and when a medical expert, who had made a blood test on the defendant and qualified as an expert in matters of blood tests and intoxication, in testifying as to a drunkometer test, stated this his conclusions were "accepted by physiologists." There is a striking similarity between cases involving the use of statistics to relate the alcoholic content of the blood to nervous response and cases involving future probability of injury from known dosages of radiation. The similarity becomes even closer when, as in the *Toms* case, statistics are offered which correlate the intake of liquor with the blood alcoholic content, which, in turn, is correlated with the degree of intoxication. Assuming, for example, that similar statistics could be obtained that correlate radiation dosage with the extent of ionization in the cell, and this latter figure to such pathological effects as leukemia or cancer, there does not appear to be any reason why they would not be just as acceptable to prove the ultimate fact as are the statistics in the drunkometer cases. The one is no more hearsay than the other. The "necessity" for admitting such evidence is just as great in the irradiation cases as in the intoxication cases, and there is no greater "circumstantial probability of trustworthiness" in the latter than in the former. It is even doubtful if individual variation is any greater in the one than the other, and in the *Toms* case the court said:

... [T]he competency of such evidence is not at all impaired because some persons yield more readily than other[s] to the deleterious effects of intoxicants. That fact may lessen the weight of the expert testimony with the jury, but it cannot be employed to exclude it. within his own experience. His testimony is admitted because it is based on his special knowledge derived not only from his own experience, but also from the experiments and reasoning of others, communicated by personal association or through books or other sources. ... His testimony was admissible, even though no maps or other records of the Geodetic Survey were produced at the trial."

*Los Angeles & Salt Lake R.R. v. Umbaugh*, 61 Nev. 214, 123 P.2d 224 (1942), where the court said, at 223: "His technical knowledge in respect to the subject was reasonably calculated to enable him to give a considered appraisal to the values established by other recognized experts by actual experiments in answering the questions propounded. 'The judgment of a skilled witness testifying as an expert may be based, in part at least, upon the results of experiments made by himself or others.'"


*Supra* note 945.

947 *Id.* at 819-20.
Actually in a number of cases discussed subsequently in the section on future injuries, the physician's prognosis of future injury was based largely upon the histories of similar injuries. In the *Alberti* case, the court allowed testimony of a physician as to the resulting life expectancy of the injured plaintiff, when the physician stated that he could only estimate the probable length of this period from histories of similar cases. In the *Cordiner* case, both the physician and the court referred to similar cases as being the basis of a prognosis as to future injury. The physician testifying in the *Riggs* case referred to the experience of the profession when he said, "It is very frequent that we even find epilepsy, traumatic epilepsy, as we call it, following a severe brain injury." The expert in the *Coover* case testified that "our medical literature is full of cases of cancer—carcinoma, that have developed upon a senile skin following an X-ray burn." Some of the cases dealing with the meaning of reasonable certainty, discussed below, include references to statistics known to a professional group.

On the other hand, the problem of direct admission of scientific source material as evidence (e.g., statistics) presents greater difficulty than does its indirect admission through an expert's testimony. In discussing the subject of "learned treatises" as an exception to the hearsay rule, Wigmore has stated that they have obtained complete recognition on common law principles in only two jurisdictions—Alabama and Iowa. Initial statutory efforts to admit such evidence in some seven or eight states met with hostile judicial attitudes, but the recent and more carefully drafted enactments of Massachusetts, Nevada, and Pennsylvania appear to preclude too much judicial obstruction. Wigmore feels that, in the discretion of the court, published scientific opinions of recognized authorities should be admissible. As he points out:

> It has long been unquestioned that standard *tables of mortality* (used in computing annuities, life-insurance sums, dower, and damages for loss of life), and *almanacs* are admissible in evidence. The occasional controversy has arisen, not over the present principle, but over the question how far the probability of life-expectation in the average should be taken by the jury to measure the probability for a particular decedent.

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948 *Infra* discussion beginning at note 981.
949 *Infra* note 995.
950 *Infra* note 1015.
951 *Infra* note 1020.
952 *Supra* note 452.
953 Wigmore, Evidence §1693 (3d ed. 1940).
954 *Ibid*.
955 *Id.* at §§1691-92.
It is doubtful whether a general rule in favor of standard tables of scientific calculations of all sorts can be regarded as established; but rulings tending in that direction are found. These almanacs and mortality tables have been explained to be admissible because they are founded on “certain and constant data” and deal with the “exact sciences.” But the notion that every collection of figures savors of the exact sciences is sufficiently discredited at the present day. In fact, some of these particular tables have been among the least trustworthy of scientific efforts. . . . The simple fact is that the admission of a certain class of statistics was demanded by custom and practical convenience, and the judicial mind relented. Thus, a system of mere probabilities and working averages is not found wanting in qualities entitling it to be placed before the jury; while the substance of other collections of data, possessing at least equal inductive value, made with equal or greater thoroughness, sifted, arranged, and stated by trained observers, is by the same discriminating authority relegated to the limbo of hearsay and other judicial abominations. The error has lain, not in looking too leniently upon mortality tables, but in a misconception of the true qualities of other scientific work.956

As an early Iowa court put it:

... [A]n appeal to medical authorities has been disallowed by some of the courts in this country; though physicians, when testifying, are permitted to refer to medical authors, and to quote their opinions from memory. Being permitted to refer to and quote authors, we can see no good reason why they may not read the views and opinions of distinguished authors. The opinions of an author, as contained in his works, we regard as better evidence than the mere statement of his opinions by a witness, who testifies as to his recollection of them from former reading. Is not the latter secondary to the former? On the whole, we think it the safest rule to admit standard medical books as evidence of the author’s opinions upon questions of medical skill or practice, involved in a trial.957

Perhaps in the ordinary situation, it does not make too much difference whether or not the contents of “learned treatises” on science are directly admissible as evidence, so long as the courts either let a qualified expert testify as to their substance or allow him to express opinions based on principles and probabilities that are necessarily hearsay knowledge. In general, the expert should be adequate to this task,

956 Id. at §1698.
957 Bowman v. Woods, 1 G. Greene 441, 445 (Iowa 1848).
especially when he has been forewarned by counsel as to the course of questioning. Accurate and exhaustive scientific statistics, however, do not lend themselves to this sort of treatment. No expert can be expected to memorize the statistics of life expectancy or a table of logarithms, or coefficients of friction, to mention only a few, and the courts, where the admission of such evidence is "demanded by custom and practical convenience," have relented. Perhaps the real reason behind this judicial inertia is not really an objection to hearsay evidence, but because of a judicial reluctance to clutter up the trial with a lot of material that the court feels can be more expeditiously presented as oral testimony. As soon as there is something positive to be gained by the direct admission of medical and scientific statistics generally rather than by having an expert paraphrase them, the courts perhaps will disregard the hearsay prohibition. That point will be reached when it becomes apparent that the statistics themselves are too complex to quote or paraphrase from memory, and, what is more important, when it becomes apparent that what a physician takes as being probable from the statistics and how the law uses "probable" may be quite different.

(d) Use of Statistics in Personal Injury Cases

Assuming the admissibility of properly authenticated scientific data of a statistical nature, what use has actually been made in litigated cases of such material? It is admissible in most jurisdictions, as indicated above, at least where such information is presented as the personal knowledge of an expert witness. It might have been expected, therefore, that there would be a considerable body of legal literature analyzing the probative value of such material to prove causation and extent of injury, or at least that there would be a considerable number of cases illustrating the use of such material. Yet a search of the digests, annotations, and periodical indexes proves singularly unrewarding, and a reading of those cases in which statistical evidence surely should have been used does not prove to be much more helpful. In personal injury cases and in the face of a clear attack on its probative value, generally the only time in which statistical data is used as such is in connection with the measurement of average life span to determine the length of continued pain and suffering or to measure the future earnings of a disabled plaintiff. Many of the cases discussed or cited above in the study of shortened life span either expressly approved the use of such material or by clear implication accepted the validity of statistical proof.

958 Supra discussion at notes 482 ff.
Some of the cases even recognized clearly the need to relate all such statistical data to the particular fact situation rather than blindly accept the statistical average. There are a few cases in which the court clearly was aware of the statistical character of the evidence, but, in most instances, the significance of this type of evidence or an appreciation of the value and the danger in its use has escaped recognition. Venturing a statistical guess where no statistics are available, it is probable that in many, if not most, cases where legal as well as scientific conclusions are drawn, there is an underlying statistical basis used, albeit unknowingly, because so many of our conclusions really are based upon probabilities. The difficulty is that our probability assumptions are arrived at most unscientifically.

A postulation of general legal rules is based, in a very fundamental way, on the use of a statistical type of data. Unfortunately, the law is in the habit of making such assumptions as to the validity of generalities by induction from groups of particulars assumed to be understood correctly, instead of doing so only after testing them for statistical validity. Whether or not lawyers recognize it, most of our legal observations and generalizations, as is true of observations and generalizations for other purposes, in reality are probable only, not certain. A doctor, for example, is seldom if ever able to observe the course of a certain physical phenomenon in a particular individual in its cellular, molecular, or, in connection with radiation injuries, in the atomic or sub-atomic level at which nuclear energy operates; his understanding of the basic particulars of the condition is far from complete, and yet a prognosis in terms of probability, though not in terms of certainty, can be made by the doctor and is used by him, successfully in most cases, in taking medical action. In making such decisions, however, he must compare his observation and analysis of the various phenomena in the particular patient and reach his prediction on the basis of what his science teaches him has happened or is true in other similar situations. Most of his techniques of observation, experimentation, and isolation of factors in any complex phenomenon are essentially macroscopic, or, at best, microscopic. By comparing observations of enough similar situations, the doctor and the scientist as well make their evaluations and decide on courses of action on the basis of probabilities. The law must, or at least should, do likewise, because human affairs cannot wait for certainty. Lawyers should recognize, however, that the probabilities implicit and fundamental in the affairs of men are, or at least should be, based upon an empirical foundation of statistics. Unfortunately the law
has tended to ignore the fact that its Aristotelian, two-valued concept of either right or wrong really is based on probability and, therefore, upon a little articulated and less understood statistical foundation.

If the above thesis is correct, as we believe it to be, probably most of our cases involving personal injuries make use, although unknowingly, of statistical types of evidence. Usually the character of the evidence underlying the basic assumptions is obscured by the fact that it is the opinion of a living, speaking witness, or by "everyone knows" assumptions on the part of the jury or the judge without any reasonable testing of the statistical validity of the assumptions made. In just a very few cases it is perfectly clear that statistical data in the raw form, with little or no help from an expert's statement to the effect that he is expressing his own personal opinion, has been used to justify proof of injury and causation. Most of the cases cited in the last section dealing with the use of circumstantial evidence, particularly those in which similarity of lapse of time between the impact and injury in the particular case and in similar cases was used as proof of causation, actually were using probabilities based on observation of similar situations, but the courts seem quite unaware of the fact that such conclusions were based on statistical probabilities. In those cases in which the statements from medical texts and treatises have been admitted, again use is being made of statistically supported conclusions or statements.

The most flagrant examples of drawing legally significant conclusions on the basis of assumed knowledge are the res ipsa loquitur cases. The assumptions in these cases usually are made without any attempt to test the validity of the statistical foundations supporting the probabilities on which the use of res ipsa loquitur is justified. There are, of course, many other examples where a statistical type of evidence is used, such as in the determination of market value of listed stocks and bonds, or in cases where valuation is established by evidence which really is the composite of opinions of a large number of people or of numerous transactions. Our concern is rather with the use of statistical evidence to prove causation, the extent of injury, or the biological processes involved. Only a handful of cases have been found in this area which face squarely the issue of the validity of such statistical data.

959 Supra note 931.
960 Supra note 937. See also Bowman v. Woods, supra note 957.
961 Infra notes 1146 ff. See also Malone, "Ruminations on Cause-In-Fact," 9 Stan. L. Rev. 60, 61-64 (1956).
962 Wigmore, Evidence §1704 (3d ed. 1940); an early example is Sisson v. Cleveland & Toledo R.R., 14 Mich. 489, 497 (1866) (newspaper market reports permitted).
One other type of case which often involves the use of material based on statistical information and the conclusions to be derived therefrom, is that in which standards formulated by national groups or by administrative or statutory rules are used to prove either negligence or lack of negligence. A clear example of this use involving what basically is a conclusion as to probabilities grounded on a foundation of statistics, is Rakowski v. Raybestos-Manhattan, Inc. In the construction and operation of X-ray fluoroscopic machines the setting up of safe limits for exposure of operators unquestionably is based on much clinical data from which statistical judgments are formed, even though the court actually does not look at the question of how the code standards are established. Such evidence was used in this case to show a lack of negligence rather than to prove causation of physical injury from irradiation.

Again, Western Assur. Co. of Toronto v. J. H. Mohlman Co. is a case in which the court accepted what clearly was a conclusion based upon empirical data from which the crushing strengths of different kinds of timber were reached inductively. The question in the case turned upon whether the building fell because of weakened timbers and before the fire or whether it fell as a result of the fire and so was covered by the insurance policy. The court permitted the introduction of reports from the United States Department of Agriculture, prepared by the Chief of the Division of Forestry, showing the results of two thousand tests of the crushing strength of timber. The report was stated to be by a recognized authority in the engineering profession. Also a table was introduced from an engineering treatise giving the crushing strength of timber. Similar tables from a third volume also were presented. The court said, in overruling objections to the use of this material:

Under the rule contended for, that valuable information would be available for the use of a court of justice so long as the men who made the tests and prepared the tabulations were living and producible, but after their death or disappearance the information they had gathered would be lost to the court, although available for every one else in the community, and relied upon by engineers and builders whenever a new structure is in process of erection. Upon the precise point here presented the diligence of counsel has not succeeded in discovering

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863 Supra discussion at notes 77 ff.
864 Supra note 175.
865 83 F. 811 (2d Cir. 1897).
a single authority. We feel, therefore, no hesitancy in so modifying the general rule as to hold that, where the scientific work containing them is concededly recognized as a standard authority by the profession, statistics of mechanical experiments and tabulations of the results thereof may be read in evidence by an expert witness in support of his professional opinion, when such statistics and tabulations are generally relied upon by experts in the particular field of the mechanic arts with which such statistics and tabulations are concerned. 966

The evidence apparently had been inserted to support the proposition in the complaint that the fire rather than failure of timbers had caused the fall, and the circuit court upheld judgment for the plaintiff.

A considerably more hostile view was expressed by the Alabama court in Franklin v. State. 967 The case was a prosecution for bastardy and the jury had found the defendant to be the father. The use of statistical tables was put in issue by the defendant's objections to the trial court's refusal to allow counsel for defendant to use tables in cross-examining a physician who had been a state witness. The nature of the tables was not described other than they came from a volume on "clinical obstetrics." The court said:

Relevant extracts from medical treatises are not in themselves self-proving but are admissible when recognised and approved by the medical profession as standard. . . . The volume in question was not shown to be a standard work or recognized authority on the subject at issue, and in the rejection by the court of the table there was no error. 968

While the court denied the use of such material because it was not a recognized work, it rather clearly assumed that tables from authoritative works would be permitted. It is not possible from this opinion to tell whether the tables were to be used as proof or disproof of causation.

The only cases found dealing directly with cause-in-fact of biological injury supported solely by evidence of probability based clearly and squarely on statistical data involve workmen's compensation situations. If these cases should be followed in ordinary tort situations (and on the cause-in-fact issue there should be no difference between workmen's compensation and ordinary torts), a whole new area of proof will be opened up applicable in the radiation cases as more scientific evidence is collected from experiments as to the causal relationship, in terms of probability, between amount of exposure and incidence of injury.

966 Id. at 821-22.
968 Id. at 308.
In 1933 the Court of Appeals for the District of Columbia in *Ayers v. Hoage* \(^969\) decided a case arising under the Harbor Workers' Compensation Act. The plaintiff claimed that he incurred tuberculosis "arising out of" his employment in a restaurant. The deputy commissioner denied recovery and the court sustained him. While there was no reference to statistical data as such, the court leaned very heavily on the testimony of two doctors, one of whom was an expert in tuberculosis cases, to the effect that tuberculosis could spread in many ways and "that he had not found that tuberculosis was a disease peculiarly common to restaurant workers or to people waiting on tables; on the contrary, he had had only a few cases of people engaged in restaurant work. . . that there is no way of proving definitely where an individual contracts tuberculosis." \(^970\)

The court made no reference to a decision by a California appellate court six years earlier. The California case, *Fidelity & Casualty Co. of New York v. Industrial Accident Commission,* \(^971\) was for compensation under the Workmen's Compensation Act for the death of claimant's husband from typhoid fever while on a trip to Chile. On his return by way of Peru, he took sick and died. When they sent the employee into the area, the employers were aware of the unsanitary conditions and the resultant greater incidence of typhoid in both of these countries. In reviewing the compensation awards, the appellate court concluded that it could not say the commission's award was "not reasonably supported." \(^972\) The court held that the commission reasonably could conclude from the evidence that the risk of contracting the disease was enough greater in these other countries that the disease was "proximately caused by the employment." Here the court very clearly was supporting a conclusion that exposure to an increased incidence situation as a result of employment can be used to meet the causation requirement of "arising out of the employment."

Of perhaps greater significance for our purpose is the case of *McAlister v. United States,* \(^973\) decided in 1953. Under the Admiralty Act recovery could be had only on proof of negligence. In overruling the $80,000 award of the lower court for the injuries resulting from poliomyelitis, the court of appeals assumed that negligence had been shown in not keeping the Chinese laborers more adequately segregated from

\(^969\) 63 F.2d 364 (D.C. Cir. 1933).
\(^970\) Id. at 365.
\(^971\) 84 Cal. App. 506, 258 Pac. 698 (1927).
\(^972\) Id. at 510.
\(^973\) 207 F.2d 952 (2d Cir. 1953).
the crew's facilities in the light of the known epidemic of polio among the Chinese workers. Nevertheless, the court reversed, saying:

... [T]he proof here that the libellant contracted polio from the Chinese is far from satisfactory. The incubation period of poliomyelitis is not certain, as the libellant's medical witness admitted. Estimates, as shown by the record, range from a few days to 30 or 35 days. Thus the libellant might have become infected while on shore leave in Shanghai before November 1. Moreover, he might have become infected by flies or by members of the crew who were carriers of the disease. Under these circumstances to hold the respondent liable for injuries suffered by the libellant seems to be wholly speculative as the infection might well have arisen from various causes unrelated to the respondent's action. It is impossible to prove that letting Chinese come on board, assuming that conduct was negligent, was the proximate cause of libellant's disease. Since either of the several inferences was permissible, the party having the burden of proof must lose.⁹⁷⁴

On review by the United States Supreme Court the trial court's judgment was reinstated. The court concluded on the causation question:

Of course no one can say with certainty that the Chinese were the carriers of the polio virus and that they communicated it to the petitioner. But upon balance of the probabilities it seems a reasonable inference for the District Court to make from the facts proved, supported as they were by the best judgment medical experts have upon the subject today, that petitioner was contaminated by the Chinese who came aboard the ship November 11, 1945, at Shanghai. Certainly we cannot say on review that a judgment which was based upon such evidence is clearly erroneous.⁹⁷⁵

There is one difficulty with using these cases to support the proposition that incidence figures themselves will be sufficient to support a cause-in-fact finding. In each of the cases, in the light of medical knowledge as to the incubation period from the time of exposure to the onset of such diseases as typhoid fever and poliomyelitis, it generally would be accepted that the sickness resulted from an exposure within short period of time before the illness manifested itself. In each case where recovery was allowed on the basis of the existence of an epidemic it would seem that the exposure in a particular place, though not from a particular source, was the cause-in-fact of the illness. The real question was one of proximate cause, a legal conclusion to be reached only if one can say

⁹⁷⁴ Id. at 954-55.
that the fact the employment carried the person into the surroundings meant that the disease arose out of the employment. The cases suggest, of course, that exposure in a situation where there is a significant increase in the incidence of a disease can be considered a proximate cause if the defendant owes some duty to the plaintiff to save him from such exposure. The cases also suggest that it will be, or at least can be, found that a disease that might come from many sources can be considered as coming from the more likely source, i.e., contact with groups in which the incidence of the disease is much higher and therefore the probabilities of catching the disease are considerably greater.

Perhaps even more significant for radiation cases is Travelers Insurance Co. v. Donovan.\textsuperscript{976} The only evidence submitted to prove that plaintiff contracted tuberculosis in the course of employment under the Workmen's Compensation Act was that the incidence of tuberculosis was greater in Kyoto, Japan, where she contracted tuberculosis, than it was in this country, or at least in Washington, D.C., where she had been working before being assigned to Japan. The figures stipulated were that the incidence in Kyoto was five times that in Washington, D.C., being roughly a thousand cases instead of two hundred cases per 100,000 of population. Both the district court and the court of appeals upheld the compensation awarded by the defendant commissioner. Each court cited the statutory presumption that claims come within the provisions of the act and recognized the same result might not be reached under common law rules. In upholding the award the circuit court said:

The carrier has brought forward no substantial evidence opposed to the presumption, along the lines of which we spoke in Robinson. On the contrary, the agreed statement shows that the risk of contracting tuberculosis in Japan was some five times greater than in the District of Columbia. It is conceivable that the incidence of the disease in both places was so minimal as to require the conclusion that the five-fold ratio was itself \textit{de minimis}. But the carrier offered no proof to that effect, and we certainly cannot derive any such conclusion from our own inspection of the record.\textsuperscript{977}

While the burden of proof applied by the courts in a workmen's compensation case may be somewhat different than that used in the usual tort case, it is extremely significant that the court found the award to be supported solely on the basis of the evidence of increased incidence. This case is more significant than the others because it is well known


\textsuperscript{977} Id. at 888-89.
that tuberculosis bacilli can lie dormant in the body for a long period of time and become active under any number of circumstances. The court apparently accepted the increased incidence of tuberculosis in Japan as sufficient evidence that tuberculosis in this particular case arose out of exposure in Japan itself, rather than because of some internal change in the plaintiff causing dormant tuberculosis to flair up, although admittedly the court did not deal specifically with this assumption as such.

A very recent case in which the type of statistical evidence here discussed obviously was used appropriately enough involves injury to sheep from radioactive fallout as a result of bomb tests at the Nevada proving ground. The plaintiff claimed that some of his sheep were injured from the radioactive fallout but the district court denied recovery in *Bulloch v. United States.* The court concluded that the expert witnesses for the defendant were some of the “best informed experts in the country,” and that their judgment that no radiation damage could possibly have been caused by the fallout was sufficient to deny recovery. It is apparent that the evidence of the government witnesses and their conclusions were based upon scientific tests and statistical data derived from them. The court said:

> Plaintiffs argued that there were differences in the sheep involved in controlled experiments and the Bulloch sheep, and that by reason of these differences a finding that radioactivity was the cause of plaintiff’s damage would be possible. But the experts maintained their opinions to the contrary for the most part with these differences in mind. It does not lie with the Court to question the great weight of the testimony that these differences were not determinative, in the absence of at least some evidence that they were. Moreover, if I could entertain a contrary view on this phase of the evidence, I would be confronted with the positive testimony from those best in a position to know that the maximum amount of radioactive fallout in any area in which the sheep could have been, would have caused no damage.

The court indicated that it was odd that none of the other animals or persons in the same camp were injured and also indicated that there was evidence that radioactivity in the area after the test shot was not above normal background radiation levels. Nevertheless, the most important evidence was that of experts, clearly based on empirical data from experiments conducted on similar animals. While the court did

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978 *Supra* note 930.
979 *Id.* at 827-28.
not discuss the admissibility of such evidence or the validity of the techniques by which the conclusions of the government witnesses were reached, this is one case in which such evidence actually was used by a court for the purpose of proving cause-in-fact or a lack of causal relationship.

The use of this kind of statistical data in determining whether the requirement of "more probable than not" has been satisfied is tremendously significant for the radiation injury case. Many of the types of diseases or injuries which are caused by radiation are also caused by other sources or forces, and the testimony of scientists and experts ordinarily will be to the effect that exposure to a certain amount of radiation, at least for many types of injuries, will increase only the risk that an injury will result. If the risk is increased sufficiently, then it would be scientifically sound to say that the damage that subsequently appears was more probably caused by the radiation than by some other possible explanation. Likewise, in the case of future injuries, and the present prediction of their likelihood, the use of incidence figures based upon the statistical calculations of past experience in similar situations will become tremendously significant if we appreciate the possibilities that follow from acceptance of some of the scientific theories and postulates supported by respected scientists and scholars. These are set out later in the chapter, as are our conclusions as to the significance of such information when combined with the rules of probability and the types of evidence that can be used to prove probability.980

(2) Future Injury—Standard of Certainty and Statistical Proof

The prior discussion of the standard of probability and the use of statistical evidence to prove causation perhaps will be brought into sharpest focus by looking at a problem that seems likely to occur very frequently in radiation cases; namely, whether or not to award damages for future injuries not yet manifesting themselves. Here again is an area of tort law in which radiation cases will cause the courts to analyze more carefully a problem which up to now has been simply an incidental one. A detailed study of future injuries is warranted from this standpoint alone, but it is also significant in appraising the inadequacies of our legal principles concerning damages generally in tort cases.

The very fact that many, if not most, of the physical symptoms resulting from overexposure to radiation manifest themselves only after a

980 Infra discussion after note 1061.
period of delay makes the consideration of future injuries perhaps the most important of all. Not only may the effects be delayed but in many situations whether or not an injury actually will arise is a matter of probability, not certainty. With the increased use of statistical data to articulate these probabilities, the legal profession will be forced to analyze more closely the validity of assumptions as to scientific facts and the legal policy decisions based thereon, which may have been made in previous cases where such questions were for the most part only peripheral.

If a person has been irradiated negligently and some form of compensable injury soon follows, there may well be a reasonable probability that other compensable consequences of the same negligent act will become manifest at a later time. In such case the injured party is confronted with the principle which allows but a single recovery for each wrongful act. Except in the case of continuing nuisance and continuing trespass, the common law system typically provides a single lump sum judgment in the accident case. Few, if any, states will allow the plaintiff to "split" his cause of action so as to sue separately for injuries appearing at different times, if occasioned by the same negligent act. All damages, future as well as past, must be taken into account at the time of trial. This principle has been well established and the applicable rules have been worked out with some precision, as will be pointed out below.

A difficult legal dilemma arises, however, when an individual is negligently exposed to radiation and no relatively immediate injury manifests itself, although there exists a reasonable probability that injury will develop in the future. One well might ask why the injured person cannot wait until the injury manifests itself before seeking damages. Certainly this would seem to be the most logical method of disposing of the matter. Unfortunately, however, some of the possible biological effects of irradiation may be considerably delayed, and this period of delay may exceed the period of the statute of limitations on such a cause of action. In addition, the injured person also faces the possibility that the negligent actor, or his estate, may no longer exist when the injury actually manifests itself. The question then is whether or not a negligently exposed person can obtain recovery before the injury becomes tangible, visible, or disabling. Both of the problems suggested, i.e., splitting the cause of action and present proof of future injuries, are concerned with future damages; however, the latter is legally somewhat more perplexing.

981 Harper & James §25.2.
(a) Future Injury Preceded by Compensable Injury

The primary notion of compensation is that of repairing the plaintiff's injury or of making him as nearly whole as may be done by an award of money; in other words, as nearly as possible placing the plaintiff in the same position he would have enjoyed had the defendant's wrongful act or omission not injured him. \(^{982}\) Even if the injury exists at present in observable, disabling, and compensable form, its conversion into a pecuniary award is a highly speculative process. Unfortunately, in the absence of legislation, this situation is one which the courts cannot avoid yet it does not follow that they must accept undue speculation with respect to the existence of the injury for which compensation is sought. Under negligence and strict liability rules, whether derived from statutory or common law sources, actual injury is a prerequisite to the plaintiff's right of action. \(^{983}\) The question then arises as to what is meant by "actual" injury or damage. The term suggests two elements: that the symptoms indicate an existing compensable injury as opposed to an injury yet to manifest itself in compensable form, and that its existence be proved with reasonably certainty. These two elements comprise a part of what has often been referred to misleadingly as the "rule of certainty."

The certainty rule, in its most important aspect, is a standard requiring a reasonable degree of persuasiveness in the proof of the fact and of the amount of the damage. Through its use, the trial judge is enabled to insist that the jury must have factual data—something more than guesswork—to guide them in fixing the award. \(^{984}\)

While the courts in practice have discarded any notion of absolute certainty if they ever really entertained it, this does not mean that there are no applicable standards. Such a standard is established in what appears to be a leading case in this area, *Strohm v. The N. Y., L. E. & W. R. R.* \(^{985}\) In this case the plaintiff's expert witness, a physician, personally had examined the plaintiff some time subsequent to the injury. During the course of the examination, the physician received from the plaintiff a description of his symptoms following the accident. In response to a hypothetical question embodying the plaintiff's apparent

\(^{982}Id.\ at §25.1.\)
\(^{983}Ibid.\)
\(^{984}McCormick §26.\ (Emphasis added.)\)
\(^{985}96\ N.Y. 305 (1884).\)
condition and symptoms, this witness stated at the trial that possibly epilepsy, meningitis, or traumatic dementia was indicated for the future. He could not determine which of the three. As to the permanence of the existing injury, the witness stated that it was very likely to be permanent. He elaborated this by saying, "I mean that the boy will always have some remnants of this injury, some reminder of it, great or small, that is certain; how much he will retain I cannot tell, but I think it very likely he will retain." 986

In reversing the decision and remanding the case the court held that it was error for the trial court to permit the jury, in estimating the damages, to include compensation for the mere hazard of the future injuries to which the expert testified. By way of establishing the rule as to future injury and the rule as to the admissibility of opinion evidence on this matter, the court said:

Future consequences, which are reasonably to be expected to follow an injury, may be given in evidence for the purpose of enhancing the damages to be awarded. But to entitle such apprehended consequences to be considered by the jury, they must be such as in the ordinary course of nature are reasonably certain to ensue. Consequences which are contingent, speculative, or merely possible, are not proper to be considered in ascertaining the damages. It is not enough that the injuries received may develop into more serious conditions than those which are visible at the time of the injury, nor even that they are likely to develop. To entitle a plaintiff to recover present damages for apprehended future consequences, there must be such a degree of probability of their occurring, as amounts to a reasonable certainty that they will result from the original injury. 987

A few years later, the same court, in Tozer v. N.Y.C. & H.R.R. 988 again had occasion to rule on this point. In this case the infant plaintiff was injured in a collision between the defendant's train and a wagon in which the plaintiff was riding. Medical testimony was admitted at the trial over the defendant's objection. This testimony concerned the consequences which might result from the injury, and what results might be expected in the future. The medical witness testified that there was a possibility that some disease of the brain might set in, even after the lapse of a year, and cause the death of the person who had sustained such an injury although he had apparently recovered. Experts also testi-

986 Id. at 306-7.
987 Id. at 306. (Emphasis added.)
988 105 N.Y. 617, 11 N.E. 369 (1887).
fied that a person who had sustained such an injury to the brain might, and frequently did, become insane, that there was no limit to the period of time within which such a result might occur, and that cases were recorded where such consequences followed an apparently complete recovery. In reversing a judgment for the plaintiff and granting a new trial, the court said:

This case falls within our decision in *Strohm v. N.Y., L.E. & W.R.R. Co.* . . . The testimony which was received, under exception, as to the ulterior consequences which might ensue or be apprehended from the injuries received by the plaintiff, was quite as objectionable as that for the reception of which the judgment in the case cited was reversed.\(^988\)

The doctrine was further refined, and a distinction was pointed out, in the case of *Griswold v. N.Y.C. & H.R.R.*\(^990\) In this case the defendant, relying upon the *Strohm* case, appealed from an order affirming a judgment in favor of the plaintiff. At the trial, the counsel for the plaintiff, after proving an existing injury which the plaintiff suffered from the negligence of the defendant, was allowed to inquire of a medical witness having knowledge of the plaintiff's condition as to the probability of her recovery. Defendant's objection to this kind of evidence was overruled. The judgment in the plaintiff's favor was affirmed.

Adverting to the *Strohm* and *Tozer* cases, and quoting from the case of *Turner v. City of Newburgh*,\(^981\) the court stated that these decisions

"... simply preclude the giving of evidence of future consequences which are contingent, speculative and merely possible as the basis of ascertaining damages, . . . [T]hey in nowise conflict with the rule allowing evidence of physicians as to a plaintiff's present condition of bodily suffering or injuries, of their permanence and as to their cause." \(^992\)

The court then pointed out a distinction by stating:

There is an obvious difference between an opinion as to the permanence of a disease or injury already existing, capable of being examined and studied, and one as to the merely possible outbreak of new diseases or sufferings having their cause in the original injury. In the former case that disease or injury and its symptoms are present and existing, their indications are more or less plain and obvious, and from their severity or slightness a recovery may reasonably be expected or the con-

\(^{988}\) *Ibid.*

\(^{990}\) 115 N.Y. 61, 21 N.E. 726 (1889).

\(^{981}\) 109 N.Y. 301, 309, 16 N.E. 344 (1889).

\(^{992}\) *Supra* note 990 at 63.
trary; while an opinion that some new and different complication will arise is merely a double speculation—one that it may possibly occur, and the other that if it does it will be a product of the original injury instead of some other new and, perhaps, unknown cause.993

Further clarity, both with respect to the standard of certainty and as to what testimony is admissible, was furnished by the court when it said:

Medicine is very far from being an exact science. At best its diagnosis is little more than a guess enlightened by experience. The chances of recovery in a given case are more or less affected by unknown causes and unexpected contingencies; and the wisest physician can do no more than form an opinion based upon a reasonable probability. . . . [B]ut necessarily the opinion must rest upon a balance of probabilities, inclining the medical judgment one way or the other, and the opinion given is none the worse because it expresses, and does not conceal, that it rests upon a reasonable probability strong enough to justify the formation of an opinion.994

In Alberti v. N.Y., L.E. & W.R.R.,995 a case involving future consequences of an existing injury, medical witnesses were permitted to testify as to their opinion regarding the future consequences of the injury. The witnesses gave their opinion that the plaintiff would never be any better and that he would never be able to straighten his legs. A witness also was asked to state the length of time that the plaintiff might live in the natural and ordinary course of events. He answered that he could give only the probability of this period from the histories of other similar cases. The court held that this testimony was admissible under the rule of the Strohm case, so long as he answered in terms of reasonable probability. A judgment for the plaintiff was affirmed. It is not clear from the opinion whether or not the damages contained an element for shortened life span.

In another case in which the facts are not pertinent here and in which the statements are largely dictum but nevertheless useful, the appellate division tried to cast further light upon the doctrine of the Strohm case. In Clegg v. Metropolitan St. Ry. the court said:

The evidence that was condemned in the Strohm Case as speculative and hypothetical related to the possible development in the plaintiff of diseases which were nonexistent at the

993 Id. at 64.
994 Ibid. (Emphasis added.)
995 118 N.Y. 77, 23 N.E. 35 (1889).
time of the trial. . . . The condemnation of such proof is a very different thing from saying that evidence cannot properly be received as to the probable effects of a present condition. . . . [T]he judgment of medical experts as to the probable consequences of an injury comes within the rule of reasonable certainty. 996

Finally, in the case of Cross v. City of Syracuse 997 the court of appeals again tried to clarify the "reasonable certainty" rule of the Strohm case, and, in doing so, appears to have given it a somewhat different twist. In this case a physician was asked the following question:

Assuming Miss Cross had not had any pain in her left side previous to the time of this accident and that on March 2d she was walking north on Butternut Street and stepped into a hole with her left foot and fell on her left side, and that she was black and blue on the left side, her hip, side and shoulder were black and blue, and that since that time she experienced severe pain in that left side, are you able to state with reasonable certainty in the ordinary course of nature, how long those severe pains will continue in her left side? 998

The question was objected to and the objection was overruled. The further question then was asked: "First answer . . . whether you can answer that with reasonable certainty." The physician answered, "I can hardly answer that question that way; I would say yes, however."

With respect to this question and answer, the defendant's brief on appeal put forth the following proposition to show error in the trial:

"It is elementary that the proper question in a case of this character to ask a medical expert is, whether he is able to testify with reasonable certainty, upon the subject. If such a question is answered in the negative, the expert should not be permitted to testify further on that subject. If the answer is in the affirmative, he is permitted to testify, if the question is material, proper, based upon the evidence in the case, and is a proper subject of expert testimony." 999

In affirming the judgment of the trial court for the plaintiff, the court of appeals pointed out that the defendant's proposition was based on a misapprehension which appeared to be quite general in the profession as to what was decided by the court in the Strohm case. By way of elaboration of this misapprehension, the court stated:

The prevalent mistake in regard to that decision [in the Strohm case] is the supposition that it forbade the introduc-

997 200 N.Y. 393, 94 N.E. 184 (1911).
998 Id. at 395.
999 Id. at 396.
tion of any opinion evidence as to the probable consequences of an existing condition due to injury unless the opinion could be pronounced with reasonable certainty. The Strohm case in fact laid down no such rule. . . . [T]he Strohm case applies only to the development of diseased conditions apprehended in the future but not present at the time of the inquiry. There is no intimation in that case that opinion evidence is not properly receivable as to the probable effects or duration of an existing condition. There are many subsequent cases which show that this court did not intend to hold that expert testimony was inadmissible as to the consequences likely to flow from the present condition of an injured person.\textsuperscript{1000}

This series of New York cases has been frequently cited and followed by the courts of other states.

In analyzing the position of the New York court it first should be noted that the courts have distinguished, at least for purposes of expert opinion and hypothetical questions, between the future consequences of a present injury, existing at the time of trial, and a future injury arising out of a present condition but where there is no observable injury of this type at the time of trial. While the distinction is somewhat tenuous (and perhaps scientifically questionable), it would appear that duration and permanency, future likelihood of incapacity, possibility of recovery, and other such effects of an existing injury which are considered to ensue "in the ordinary course of nature," can be shown by opinion and hypothetical testimony of expert witnesses. Furthermore, the Cross case indicates that a physician may give opinion testimony or answer hypothetical questions even though the prognosis is not based on a reasonable certainty or probability that the described results will follow. In that case the court definitely ruled that the physician could answer a hypothetical question concerning the future duration of the plaintiff's pains from an existing injury, even though he apparently admitted that he could not do so with reasonable certainty.

On the other hand, future injury arising out of a present condition, whether or not that condition is an injury in itself, apparently would embrace those injuries which are different from the original condition or injury and do not exist at the time of the trial. As to such injuries, the rule is that the expert cannot testify at all unless he first can state that the probability of their occurrence is so great as to amount to a reasonable certainty that they will result from the original injury.\textsuperscript{1001}

\textsuperscript{1000} Id. at 396-97.

\textsuperscript{1001} See the discussion in Richardson, Evidence §529 (7th ed. 1948).
Although this distinction is exceedingly important for trial purposes, it probably does not alter the fundamental rule of certainty as to damages. That is to say, in theory, it does not lighten the plaintiff's burden of proof with respect to that category of injury which has been characterized as being “in the ordinary course of nature,” while maintaining it with respect to future, new, and different injuries. It would appear that the court with respect to both types must instruct the jury that they can award damages only for those injuries which they find, from the evidence, are “reasonably certain” to ensue as a consequence of the defendant's wrongful act or omission. The distinction seems to be concerned only with the evidentiary rules of admissibility; where the injury presently exists, the plaintiff is allowed to introduce evidence, in the form of expert opinion and answers to hypothetical questions, based on less than reasonable certainty that the possible consequences of the existing injury will ensue. This does not mean, however, that the jury can award damages, after all of the evidence is in, on less than reasonable certainty that such a consequence will ultimately result.

Why is the distinction observed? There appear to be several reasons why the New York courts make this distinction. The principal reason is implied by language from the Griswold case. There the court refers to the “obvious difference” between an objective and a subjective condition. It points out that the former is observable, while the latter is not. The objective condition is observable by the physician and the jury in many cases. These very appearances are additional evidence as to the dimensions of the injury; in theory anyway, the jury has something else to consider in addition to the description and the tentative, yet admissible, prognosis of the physician. This is not the case if the plaintiff claims damages for a future injury not yet manifested. In such case there is usually nothing in the plaintiff's physical condition which permits the jury to observe either the existing or future dimensions of the injury, and there is some question, at least in the mind of the court, as to whether the physician is in any better position to observe them. Thus it would seem that the courts are crediting the jurors with some prognostic abilities regarding objective, external disorders, and their duration or permanence, but they are unwilling to do so with regard to future, different, and unobservable disorders.

Another reason for the distinction is suggested by the language of the Griswold case when the court referred to opinion testimony of experts regarding “some new and different complication” as being a “double

1002 Supra note 990.
speculation." In that statement the court expresses its concern with whether the complication will exist in fact in the future and with whether it fairly can be attributed to the existing, present condition caused by the defendant's negligent act or omission. With respect to the duration or permanence of an existing injury, there is little or no question of causation, assuming causation has been shown with respect to the injury itself; however, proof of causation with respect to an existing condition does not establish the second causal relationship; i.e., the relationship between an existing condition and a future injury.

The case of Cogswell v. Frazier illustrates the attitude of the Maryland court toward inconclusive testimony regarding permanency of an existing injury. In this case the plaintiff had sustained a comminuted fracture of the left tibia and fibula (the two bones of the lower leg. The accident occurred in March of 1943, at which time a physician, who was the only expert called at the trial, operated on the leg. In January of 1944, when the case came to trial, no union of the bones had occurred. The physician stated that further treatment was possible, but that if union did not occur within one or two months (from the date of testifying), it probably would not take place at all. In answer to a question regarding permanency of the injuries, the doctor stated:

"Since I have stated that the medical case is not finished, you understand, I say that this injury which he has sustained and the marks thereof will be permanent. The scar and the injury to the bone will always be able to be seen. I can't state whether he will go on and heal his bones and be able to walk without his brace at this time. I simply say that his injury is permanent but that the final effects, at this time, are not possible to be stated." 1004

In affirming a judgment for the plaintiff that awarded damages for permanent injury, the court stated:

In view of the full testimony which the doctor had previously given as to nature of this particular injury, the questions asked him as to the extent and probable effects of it were natural and and logical ones to follow, and were relevant and admissible under the accepted rules of evidence. The opinions sought of him, and given, were entirely within the professional knowledge which he acquired as the attending physician and as medical expert. . . .

Moreover, his answers to these questions were as clear and as definite as could reasonably have been expected of any

1003 183 Md. 654, 39 A.2d 815 (1944).
1004 Id. at 662-3.
witness, and the jury was entitled to have the benefit of them—especially as this was the only witness called upon to furnish the medical testimony which was an integral part of the case.\textsuperscript{1005}

With reference to this case it should be noted that the physician stated with certainty that the scar and bone deformity were permanent, but that he could not state with reasonable certainty whether the injury was permanently crippling.

A somewhat more restrictive rule is illustrated by the case of \textit{Stevenson v. Penn. Sports \& Enterprises}.\textsuperscript{1006} In this case the attending physician testified that at the time of his last examination the plaintiff had a partial disability of twenty per cent. He further testified that the condition of the plaintiff’s injured heel was “possibly permanent,” although it might gradually improve. The testimony of another medical witness was similarly uncertain as to prognosis. In affirming a reasonable award for the plaintiff, including elements of future damages, the court said:

The problem here involved is one of prognosis on which a doctor cannot be required to express his opinion with the same definiteness required in a causation question. In many cases of personal injury the honest opinion of a doctor may well be that a plaintiff will “gradually improve” or that the injury may “possibly be permanent or may possibly get better within a year.” This uncertainty of honest medical opinion should not be the basis for any finding by the jury of permanent [Emphasis by court.] injury but is sufficient, on the other hand, for the jury to find some future disability.\textsuperscript{1007}

Thus, the equivocal prognosis of an expert with respect to the permanency of an injury is admissible in Pennsylvania, but, by itself, will not support a jury finding of permanency.

\textit{Central Truckaway System v. Harrigan}\textsuperscript{1008} indicates that the New York admissibility distinction as to opinion evidence is not followed everywhere, and that such testimony is always admissible in some states even though the opinion relates to a future injury as distinguished from a future consequence of a present injury. In this case the plaintiff was injured in an automobile accident occasioned by the negligence of the defendant. An expert witness was questioned as to the permanency of the injuries and the likelihood that the plaintiff would develop traumatic arthritis in his spinal column. While the court reversed and

\textsuperscript{1005} \textit{Id.} at 663.

\textsuperscript{1006} 372 Pa. 157, 93 A.2d 236 (1952).

\textsuperscript{1007} \textit{Id.} at 165. (Emphasis added.)

\textsuperscript{1008} 79 Ga. App. 117, 53 S.E.2d 186 (1949).
remanded a judgment in the plaintiff's favor on other grounds, in re-
sponse to the defendant's contention that the evidence or opinion con-
cerning permanency and future injury should not have been admitted, 
it said:

The testimony appears to be the professional opinion of the 
doctor. It is therefore not subject to the objection that it 
constitutes speculation on his part rather than a statement of 
his professional opinion. The doctor in the instant case had 
attended this plaintiff and was in position to be thoroughly 
familiar with his injuries. He was competent to give his 
opinion as to their permanency. A part of this opinion appears 
to have been based on the likelihood of the development of 
traumatic arthritis in some of the cervical vertebrae of the 
plaintiff. The evidence was admissible for this purpose. . . .

"The opinion of experts, on any question of science, skill, 
trade, or like questions shall always be admissible; and such 
opinions may be given on the facts as proved by other wit-
nesses." The weight and credit to be given the testimony of 
such experts is for the jury.1009

Wigmore takes a rather strong stand on the question of opinion testi-
mony of physicians. As he points out, testimony as to the condition of 
health concerns the "internal actuality," as distinguished from external, 
corporeal appearances. This distinction, he has stated, is important 
for it affects the qualifications of the witness who will usually be re-
quired to be a medical expert.1010 In discussing the opinion rule with 
respect to questions of probability and possibility, capacity and tendency, 
cause and effect, he further states:

. . . [T]he reason why the Opinion rule is urged against 
them is in general that the thing to which the witness testifies 
is not anything which he has observed, but is a quantity which 
lies in estimate only and is the result of a balancing of concrete 
data.

This is no sufficient reason for excluding such statements 
from qualified witnesses; because it must almost always be 
impossible for a witness to reproduce in words absolutely all 
the detailed data which enter into his estimate, and there can be 
no danger in receiving such an estimate from him. . . .

It should be added that Courts sometimes misapply the 
Opinion rule to enforce the doctrine of Torts that a recovery 
for future personal injuries must include only the certain or 
fairly probable, but not the merely possible, consequences; so

1009 Id. at 127. (Emphasis added.)
that the judge instead of covering the subject by an instruction to the jury as to the measure of recovery, excludes from evidence a physician’s opinion expressed in terms of possibility only. This attempt to control the course of expert testimony is of course unreasonable in itself.\textsuperscript{1011}

Judging by the above statement, it would seem that Wigmore certainly would approve of the court’s attitude in the Central Truckaway case,\textsuperscript{1012} and that he would disapprove of the distinction reached in the New York decisions. Is his criticism justified? Is this attempt to control the course of expert testimony really unreasonable?

Several factors combine here to make this control by the courts entirely reasonable under our present system of compensation. Everyone would agree that no person should be compelled to pay compensation when his act or omission has not or will not produce injury, even though that act or omission could have produced injury. While it is somewhat risky to speak in terms of universals, it does not seem too much to state that the burden of showing a compensable injury is always on the person claiming to be injured. There is no doctrine, analogous to that of \textit{res ipsa loquitur} which raises a presumption of physical or psychological injury or shifts the burden as to this issue. Accepting this as the standard attitude and considering the sympathetic attitude of juries toward plaintiffs generally, when opposed by large corporations in general and insurance companies in particular, as well as the extreme complexity of the medical features, it certainly does not seem unreasonable to require experts to preface their prognostic opinions with the statement that they are based upon the same standard of reasonable certainty or probability as is required of the plaintiff, unless it is made clear that the award should be reduced as the degree of probability becomes smaller. In most cases of future injury this expression of opinion is the only evidence as to the occurrence of the injury which the jury has to assist them. The danger that they will accept the ominous, though remote, prophecies of the plaintiff’s experts as sufficient is too great to justify such inconclusive testimony. Even assuming that neither the trial nor the appellate courts will allow the jury to find future injury upon the assertion that it is merely possible, such testimony is a waste of time. What is needed here is some clarification on the part of the courts (or possibly by legislatures) as to what is meant by reasonable certainty or probability. This would serve for the edification of both

\textsuperscript{1011} Id. at §1976.

\textsuperscript{1012} Supra note 1008.
the expert and the jury, and it should not be a liberalized rule of evidence that would allow the expert to discuss every remote contingency, unless we change our rules of compensation.

One other justification can be given for the New York distinction concerning the degree of certainty required to make expert opinion testimony admissible. This admissibility rule reflects a recognized modification of the general rule of certainty. This modifying doctrine is illustrated by a part of the opinion in Story Parchment Co. v. Paterson Parchment Paper Co.

It is true that there was uncertainty as to the extent of the damage, but there was none as to the fact of damage, . . . and there is a clear distinction between the measure of proof necessary to establish the fact that petitioner had sustained some damage, and the measure of proof necessary to enable the jury to fix the amount. 1013

While this case involved a Sherman Anti-Trust Act cause of action, it still is generally applicable throughout both the tort and the contract areas of law. 1014 It does not seem unreasonable to require the plaintiff to show either the present existence or the likelihood of future existence of the injury with substantial certainty; however, having proved this fact and that the injury was caused by the wrongful act or omission of the defendant, and recognizing the inherent lack of precision in determining the dimensions of the injury and converting them into a money value, it may not be unreasonable to allow the plaintiff to offer, and the jury to consider, the best evidence available as to the extent of the injuries. This does not solve the problem where there is conflict between witnesses as to the degree of certainty.

The case of Cordiner v. Los Angeles Traction Co. 1015 offers a good illustration of an intelligent discrimination between the fact of future injury and its extent. The plaintiff was injured in a collision between the streetcars of the defendant street railway companies. On appeal the defendants conceded the plaintiff's right to recover, but contended that the amount of recovery should be limited to loss that the plaintiff was "reasonably certain" to sustain. Pursuant to this attack, the defendants pointed specifically to the testimony of certain experts who were allowed to testify as to the future results of the plaintiff's injury.

The evidence showed that as a result of the collision the plaintiff had

1015 5 Cal. App. 400, 91 Pac. 436 (1907).
suffered a fracture at the base of the brain. A Dr. Dukeman, in response to a question as to whether there would be any danger of a relapse at any time in the future, stated:

"There is some danger . . . . [he further elaborated by saying] I should look for more serious and fatal results from a fracture at the base of the brain than at any other place. I should look for this after apparent recovery, apparent recovery so far as anybody can tell; I would always look for something. . . . In the majority of cases I would look for future trouble. I can't tell what will happen in this case. My experience and knowledge as a physician has taught me that in a majority of cases of this kind, where there has been, to even the eye of a doctor, a complete recovery, . . . various symptoms, would happen. I should look for convulsions in the majority of cases of that kind where there had been a complete recovery, to the eye even of a doctor." 1016

Another expert, Dr. Brainard, also in response to a question concerning the condition of the plaintiff after an apparent recovery, answered, "‘[A]nd we might expect from the injury the symptoms that rise frequently from a case of suffering from a fracture at the base of the brain. There is danger of convulsions or epilepsy, danger of mental deterioration, danger of paralysis.’" 1017

With respect to this evidence, and in affirming the judgment of the lower court for the plaintiff, which contained elements of future damages, the court said:

The evidence here tended, in an appreciable degree, to prove the ultimate fact; that is, the reasonable certainty that future evil consequences would result from the injury, and was properly admitted for the consideration of the jury—it being its function, upon a consideration of the evidence as a whole, to determine its sufficiency as proof of the ultimate fact. . . . Testimony of duly qualified experts which shows that in a majority of cases where the injury . . . results in future epilepsy, paralysis, or mental deterioration, tends to prove the reasonable certainty that such consequences will follow in any given case of like injury. 1018

Observe that Dr. Dukeman’s testimony concerned three facts: (1) the present existence of a potentially injurious condition in the plaintiff’s brain, (2) the future probability that injurious consequences

1016 Id. at 403. (Emphasis added.)
1017 Ibid. (Emphasis added.)
1018 Id. at 404-5. (Emphasis added.)
would follow (based on the "statistics" of similar injuries), and (3) the type of injury which could be occasioned by such a condition. As to the first two facts, the doctor's certainty was expressed with as much precision as is generally possible. He was certain of the present existence of a potentially injurious condition, even though there had been an apparent recovery, and he stated that "in a majority of cases of this kind" injurious consequences would follow. Notice that neither doctor could predict with any kind of certainty, however, the precise character or type of future injury which would follow. As to the future existence of injurious consequences the experts were reasonably certain; but, as to the type and extent of the injury, they were not certain. The opinions as to all three facts were admissible, and were sufficient to support an award for future damages. It is submitted that, in many situations, a physician will be able to predict future injury generally, but will not be able to identify and name the precise result. As will be shown, this is particularly true in radiation exposure cases. Assuming that the plaintiff should be able to collect now for future injury (a different system really should be worked out), there does not appear to be any logical reason why he should be prevented from recovering by the lack of a name for the ultimate injury. Injury, and the science which is concerned with it, is not tied to nomenclature, and insofar as is possible, the law should be equally unrestricted.

While the above attitude illustrates a commendable one on the part of the California courts, their more recent decisions indicate that they are carrying this lenient attitude as to the admissibility of expert opinion to rather extreme lengths with regard to future, new, and different injuries. Often it seems that the courts now believe that a jury has substantial prognostic faculties of its own and needs no expert opinion as to "certainty" of future, new, and different injuries. Any expert opinions on such injuries are admissible, so it would appear. In *Riggs v. Gasser Motors* the plaintiff had suffered a severe concussion of the brain. With respect to future injury, an expert witness was allowed to state:

My opinion of the outcome of the injury is this—it is very likely that in the end the result will be some permanent damage. It is very frequent [Emphasis added.] that we even find epilepsy, traumatic epilepsy, as we call it, following a severe brain injury. If the fracture of the skull is severe enough—if the injury is severe enough—we might get that as a result, but nobody knows, except for time, and time will only tell what

\footnote{1019 *Infra* recommendations discussion following note 1123.}
will come here. *No doctor could say with reasonable certainty* [Emphasis added.] that the results I have described would not follow.¹⁰²⁰

On appeal from a $20,000 judgment in plaintiff’s favor, the defendant claimed that the award was excessive, and that the testimony as to the brain injury was too speculative. Notice that the physician did not say that epilepsy was reasonably certain, but rather, that no doctor would say with reasonable certainty that it would not occur. The court affirmed the judgment, saying, “That question we think is as much within the judgment of the jury as within the province of any court, and unless we can say, with reasonable certainty, that such injuries *will not affect* the future of the plaintiff, we are at a loss to say that the damages awarded are the result of either passion or prejudice.”¹⁰²¹ This begins to look as if the burden of proof as to the possibility of future injury can be shifted to the defendant in California.

In *Bauman v. San Francisco*¹⁰²² the defendant city appealed from a judgment in favor of the plaintiff and from an order granting plaintiff’s motion for a new trial upon the issue of damages alone. At the trial a physician, who had operated on the plaintiff following the injury, was asked to give his prognosis. He stated that, “The prognosis in this case is good, providing the particular patient does not develop epileptic seizures.” When asked if such result was “probable,” the trial judge ruled that the doctor could not answer unless he would state that epileptic seizures were “reasonably certain” to occur. The doctor stated that he could not state whether or not this patient was “reasonably certain” to have such seizures and added that, “I would not say it was reasonably certain.” The court then ruled that his testimony be stricken from the record.

In affirming the order granting the plaintiff’s motion for a new trial on the issue of damages, the court said, with respect to the stricken testimony:

> The law does not require a doctor to state that future results are “reasonably certain” to occur before his testimony is admissible. Before the jury may allow a recovery for future consequences the evidence must show with reasonable certainty that such consequences will follow, and the jury should be so instructed. The testimony referred to above would not, standing alone, support an award for damages for future

¹⁰²¹ Id. at 645 (Emphasis added.)
consequences. But that does not mean that such evidence was not admissible. The ultimate fact to be determined by the jury is whether it is reasonably certain that future evil consequences will flow from the injury. Any evidence reasonably tending in an appreciable degree to prove that fact is admissible. Its sufficiency to prove that fact is largely for the jury.\textsuperscript{1023}

What other evidence is there as to the incidence of future injury besides the prognosis of experts, at least where there is no conflict between the experts? The California courts do not indicate how the jury can find a result to be reasonably certain to follow when the physicians themselves are only willing to say that it is possible, unless this is implied in the following statement, quoted from the \textit{Cordiner} case:

Testimony of duly qualified experts which shows that in a \textit{majority} of cases where the injury consists of a fracture at the base of the brain, such injury results in future epilepsy, paralysis, or mental deterioration, tends to prove the reasonable certainty that such consequences will follow in any given case of like injury.\textsuperscript{1024}

By this the court may be recognizing a distinction between what a physician is willing to state will occur with reasonable certainty and what the professional statistics disclose has actually happened in a majority of cases of similar injuries. If in a majority of cases epilepsy, paralysis, or mental deterioration has followed fractures at the base of the brain, then perhaps the jury is justified in finding such results reasonably certain to occur in the particular case, even though the attending physician is unwilling to so state with respect to the particular patient. This may be a semantic difficulty in equating legal and scientific degrees of certainty. The doctor might have answered affirmatively if asked if it were more probable than not that injury would result.

An interesting device is used in the \textit{Cordiner} case, and in three others considered below, which may become highly significant with respect to radiation injuries, especially since it seems to enable the plaintiff to partially avoid the restrictive attitude of many of the courts toward contingent and speculative evidence. This is the technique of emphasizing and seeking recovery for a present condition which, although it is not presently incapacitating or otherwise injurious, was caused by the defendant's wrongful act or omission and has the predictable, potential effect of making the plaintiff substantially more susceptible to

\textsuperscript{1023} \textit{Id.} at 163.

\textsuperscript{1024} \textit{Supra} note 1015 at 404-5. (Emphasis added.)
particular or general injuries in the future. While in the *Cordiner* case the emphasis was on the future consequences themselves, in the testimony of Dr. Dukeman there was an unmistakable allusion to a present condition, a dangerous, yet unknown pathological condition, which remained "in the majority of cases" even after an apparent recovery. The question is, will the courts regard this condition in itself a compensable, presently existing injury when it has been wrongfully inflicted?

*Crank v. Forty-Second St., M.H. & St. N.A. Ry.*\(^{1025}\) appears to indicate that the technique may be successful. In this case the plaintiff was injured while riding upon the defendant's streetcar. The nature of the injuries was not specified. On appeal the defendant conceded the proof of causation and negligence, but claimed that the award was excessive, charging error in the trial judge's instruction to the jury to the effect that, upon the subject of the permanency of the injuries, they might take into consideration the plaintiff's increased general susceptibility to disease. There was evidence that the plaintiff required medical attention for a considerable period of time and that the injury was permanent and would affect her during the remainder of her life. A physician testified that if she was sick from other causes, the result of this injury always would complicate other illnesses. The court stated that this evidence furnished grounds for the consideration by the jury of the results of the injury and affirmed for the plaintiff. The standard imposed was that of "reasonable certainty that they [the results] will be permanent." In concluding, the court pointed out that:

> It is true, it may be, that the plaintiff will never suffer from any other illness; but where the injury is of such a character as renders her less able to contend against the ordinary ills which flesh is heir to it does not seem to be at all speculative to allow the jury to take such a state of affairs into consideration in making compensation to the plaintiff for the injuries suffered.\(^{1028}\)

The court seemed to be entirely unconcerned with whether the plaintiff would ever actually suffer from this existing condition. The condition in itself did not incapacitate her, at least in the sense for which recovery was allowed, and the plaintiff was not required to show with reasonable certainty or probability that she would be in such position in the future as to make the condition actually harmful.\(^{1027}\)

\(^{1025}\) 6 N.Y.S. 229 (1889), aff'd without opinion, 127 N.Y. 648, 27 N.E. 856 (1891).

\(^{1026}\) Id. at 230.

\(^{1027}\) See discussion *supra* at notes 452 ff.
The case of Coover v. Painless Parker, Dentist, discussed previously, warrants further consideration here. This was an action for damages for personal injuries sustained by the plaintiff as a result of overexposure in the taking of dental X-ray photographs by the defendant. The defendant appealed from a verdict in the plaintiff's favor for $10,250 on the ground that the amount, in view of the injuries sustained, was excessive. Specifically, the defendant argued that the evidence as to the possibility of cancer was wholly conjectural and uncertain and that that element rightfully could not be considered by the jury. After quoting from the record the testimony concerning the plaintiff's present condition and describing her skin, the court set forth the following portion of the record:

"A. . . . The light (x-ray) has destroyed these hair follicles—you have a skin that is not functioning and our medical literature is full of cases of cancer—carcinoma that have developed upon a senile skin following an X-ray burn.

"Q. You give your professional opinion to the effect that Mrs. Coover at this time might be in danger of a cancerous growth? A. I do not say that she has a cancerous growth, she has not, but a cancer may develop on this area—it is common."

* * * * *

"A. . . . That [the scars on plaintiff's face] will be permanent, and there may possibly be some further changes in the skin. On this senile skin not infrequently develops new growths, little neoplasm, warty growths, and from these warty growths, the carcinoma develops; sometimes that is a year, sometimes it is two years—sometimes it is three or four years before they develop."

[The physician also testified that over the area affected the plaintiff had a skin that is predisposed to cancer, that she had some disturbance of the sensory nerves of her face.]

"Q. In the event the sensory nerves have been destroyed, in this portion of the face that is burned or impaired, what would be the natural consequence of such a condition, in other words, what effect would that have on Mrs. Coover? A. The most important sequela from a dermatological standpoint is the possibility of carcinoma—of a cancer."

"Q. It may happen that she can go on through life without that occurring, I suppose? A. It is possible, but we do find many times, carcinoma developing upon the scars of X-ray burns, in all of our literature they speak of that as very, very likely sequela, it is the thing to be guarded against and to be watched." 1029

1028 Supra note 452.
1029 Coover v. Painless Parker, Dentist, supra note 452 at 113-14. (Emphasis added)
The trial court instructed the jury that they were to consider as elements of damage only such physical injury as they found the plaintiff was reasonably certain to suffer in the near future. In affirming the judgment for the plaintiff the court said:

If we assume that respondent’s skin condition was considered by the jury it by no means follows that this was improper. While the actual condition of cancer may have been conjectural and uncertain, the record contains positive evidence that a condition actually exists which makes this dread disease much more likely. We think this predisposition in itself is some damage, and when caused by the wrongful act of another it is an interference with the normal and natural conditions and rights of the other, which must be held to be a real and not a fanciful element of damage. The necessity of constantly watching and guarding against cancer, as testified to by the physician, is an obligation and a burden that the defendant had no right to inflict upon the plaintiff.

In Leenders v. California Hawaiian Sugar Refining Corp., the plaintiff’s eye had been injured as a result of the defendant’s negligence. A physician testified that the tear duct did not carry off the water from the plaintiff’s eye, and that such a condition would result in an abnormal accumulation of bacteria and that, in the event of the eye being scratched in the future, the presence of these germs might cause an infection or an ulcer which could impair the patient to a great extent or even result in the loss of the eyeball. On appeal the defendant attacked this testimony as speculative. In affirming the lower court’s judgment for the plaintiff, the court said:

The fact that plaintiff had been physically impaired so as to increase the possibility of future infection in the eye was a proper matter to be considered by the jury in determining the extent of his present and permanent injury. The jury could not properly award him damages on such evidence on the theory that such infection with its attendant results was reasonably certain to occur. It could take into consideration the actual impairment of his eye which permanently decreased his resistance to infection with all the results that might be attendant thereon. The size of the verdict does not indicate that the jury awarded damages on the theory that it regarded the future impairment of plaintiff’s eyesight or the loss of his eyeball as reasonably certain.

The opinion did not disclose the size of the judgment.
The ramifications of these cases have great significance for radiation exposure claims. It is accepted that when a person is irradiated, there is definite "impact," whether by matter or energy is immaterial. The probability of collision between the cell matter of his body and the alpha or beta particles, neutrons, or the gamma ray photons is so great as to be almost 100% certain. If there are collisions, it must necessarily follow that some change in the body cells has taken place, some increment of ionization. Scientists, and certainly geneticists, inform us that the effects of these changes on healthy cells are nearly always deleterious and permanent. In the words of the geneticists: "Any radiation is genetically undesirable, since any radiation induces harmful mutations." Furthermore, there is substantial opinion among scientists that any amount of radiation is pathologically undesirable. It is not surprising that the court in the Coover case was impressed and persuaded by such an argument, that they found this a condition and a "burden that the defendant had no right to inflict upon the plaintiff." The most startling feature of the doctrine in radiation cases is that if the plaintiff can prove the existing, irradiated condition with reasonable certainty—and he should not have too much difficulty in this connection—the probabilities of some existing effect are overwhelming, and if this condition in itself is "some damage," then both the possibility of future injurious results and the character of those results go to the amount or extent of the injury. Under the New York admissibility rule, opinions of experts on these latter facts can be stated with less than reasonable certainty. In fact, this is what happened in each of these cases. In none of them did the experts predict, with reasonable certainty, that the actual, incapacitating results would follow from the existing condition.

Consider, also, the impact of this doctrine on claims for psychological injury. The existing condition theory can be highly advantageous to a plaintiff alleging such injuries, for it gives him real, objective justification upon which to predicate his neurosis—his apprehensive suffering with regard to an untimely and painful demise. There is at least an implication in the Coover case that the injury for which the court allowed recovery had such a subjective element. The court said, "The necessity of constantly watching and guarding against cancer . . . is an obligation and a burden that the defendant had no right to inflict upon the plaintiff."
One further observation should be noted. In both the Coover and Leenders cases, the courts do not treat the "predisposition" or existing condition and the ultimate, future injury as the same thing. The court, in the Coover case, refers to the predisposition, for which recovery is allowed, as "some damage." Apparently, in theory at least, the measure of recovery for the predisposition would not be the same as it would be were the cancer fully developed. If the courts are willing to regard the predisposition as a compensable injury in itself, however, and if they allow opinion testimony of the possible consequences of the condition, it is not unreasonable to expect that the jury will award damages on the basis of the gloomiest and most pessimistic prognosis. It is one thing to distinguish between the two with respect to the question of existence and quite another for the jury to distinguish between them when considering the monetary dimensions of the injury.

(b) Future Injury Not Preceded by Compensable Injury

Thus far the cases have been concerned with the future consequences of existing injuries which may follow a past or existing compensable injury—past or existing as of the date the cause of action is brought. But what of future injuries which are not preceded by any compensable injury or incapacitating condition that has been reasonably contemporaneous with the negligent act or omission? Briefly stated, the plaintiff in such a case, due to the negligent act or omission of the defendant, will suffer injury at a future date. The first question is, When does the cause of action accrue? The second question is, Assuming that the cause of action accrues at the date of the negligent act or omission (if it does arise at this time the statute of limitations, except possibly for a recent Arkansas enactment, will preclude recovery for many injuries), how does the plaintiff prove the future injury for purposes of obtaining damages?

Cases concerning this question are very difficult to find. In most instances injuries to persons have been more or less immediately observable. There is usually little time interval between impact and initial

\footnote{La Porte v. U. S. Radium Corp., 13 F. Supp. 263 (D.C. N.J. 1935). Injuries may be delayed as much as 35 years; see report in N.Y. Times, May 27, 1958, p. 21, col. 4. The Arkansas enactment, described infra note 1371, might be interpreted to permit tolling the statutory period on the theory that it is not known whether the potential defendant is a wrongdoer until the victim's symptoms appear in the future. This would be an unfortunate application when no provisions are made for the problems raised by long-delayed injuries.}
effect. While there have been numerous instances in which plaintiffs have anticipated future injuries and claimed damages for them, this practically always has been in connection with allegations of and claims for existing injuries. A situation in which a person will not suffer recognizable and compensable injury for a considerable period after the negligent act or omission which is its cause, and in which there is no interim indication of the condition, has been comparatively rare in the pre-atomic era. Even where such a situation is possible, the fact that the person who will ultimately suffer injury is not sufficiently aware of his condition means that he will not bring suit against the person responsible. No cases involving this exact situation have been found. Inasmuch as the cases offer so very little direct light on this question, attention should be focused on the cases where, by reason of a statute of limitations, the principal question has been whether the plaintiff has been too late in bringing his action. Even these cases shed little light upon when the plaintiff could have brought the action.

*Schmidt v. Merchants Despatch Transp. Co.* is one case in which the court gave particular consideration to when the plaintiff could have brought his action. In this case the complaint alleged that, while in the employ of the defendant, the plaintiff inhaled foreign substances in the form of dust, and, as a result, contracted a disease of the lungs known as pneumoconiosis, or silicosis. In separate and distinct causes of action the complaint alleged first that the plaintiff’s exposure constituted a breach of a common law duty which the employer owed to the employee, and, second, that there was a breach of a similar duty imposed by statute. The periods of limitation with respect to the breach of these duties were three and six years respectively. The plaintiff brought suit shortly after he became incapacitated and his affliction was identified as silicosis. This time was more than three years after the last exposure to the dust but less than six years. The New York Civil Practice Act, §49, required that “An action to recover damages for a personal injury resulting from negligence” must be commenced within three years after *the cause of action has accrued*. The defendant maintained that the duty owed to the plaintiff was negligently breached, that the plaintiff had only a single cause of action for damages for such personal injury, and that, therefore, the action was barred by the three-year statute of limitations. The plaintiff claimed that his cause of action

1038 See cases discussed under increased susceptibility to disease, *supra* text at notes 441 ff.
accrued, not at the time he inhaled the dust, but at the time when the dust, so inhaled, resulted in a disease of the lungs.

With respect to these contentions, the court conceded that a cause of action accrues only when the forces wrongfully put in motion produce injury, but, by way of explanation, it pointed out that this does not mean that the cause of action accrues only when the injured person knows or should know that the injury has occurred. In answer to the question as to when the injury has occurred, the court said:

The injury occurs when there is a wrongful invasion of personal or property rights and then the cause of action accrues. Except in cases of fraud where the statute expressly provides otherwise, the statutory period of limitations begins to run from the time when liability for wrong has arisen even though the injured party may be ignorant of the existence of the wrong or injury.¹⁰⁴⁰

In the following statement the court indicated that the magnitude of the injury at its inception has no bearing on when it occurred:

Consequential damages may flow later from an injury too slight to be noticed at the time it is inflicted. No new cause of action accrues when such consequential damages arise.¹⁰⁴¹

Applying these rules to the case before the court, Justice Lehman said:

The injury to the plaintiff was complete when the alleged negligence of the defendant caused the plaintiff to inhale the deleterious dust. For that injury, including all resulting damages the defendant was then liable. The disease of the lungs was a consequence of that injury. Its result might be delayed or, perhaps, even by good fortune averted; nevertheless, the disease resulted naturally, if not inevitably, from a condition created in the plaintiff’s body through the defendant’s alleged wrong.¹⁰⁴²

With respect to the question as to when the plaintiff could have brought his action and what damages he could have collected, the court went on to state:

It cannot be doubted that the plaintiff might have begun an action against the defendant immediately after he inhaled the dust which caused the disease. No successful challenge could have been interposed on the ground that the action was pre-

¹⁰⁴⁰ ld. at 300.
¹⁰⁴¹ Ibid.
¹⁰⁴² ld. at 301.
maturely brought because at the time it was commenced no serious damage to the plaintiff had yet developed. In that action the plaintiff could recover all damages which he could show had resulted or would result therefrom. 1043

The court concluded that any cause of action of the plaintiff which must be commenced within three years after it accrued was barred for the above reasons. Nevertheless, it went on to impose liability on the defendant by finding that he had failed to provide the safeguards required by statute, that the statutory duty was imposed upon employers for the benefit of that group of persons of which the plaintiff was a member, and that the statute of limitations upon recovery for injuries arising out of the breach of such a statutory duty was six years.

Whether the court actually would allow recovery before the disease or injury has manifested itself in some form is not made clear, but it does appear that the ruling of the court in the Schmidt case, with respect to when the period of limitation begins to run, represents the majority rule in negligence actions. 1044 If the period of limitation has begun to run it is because a cause of action has accrued. Therefore, the Schmidt holding implies that damages for future consequences should be recoverable if proper proof is made. One writer takes rather strong exception to this majority rule. He states that “by no system of law giving weight to practical considerations could a cause of action accrue in respect of any mere act or neglect exposing one to disease, prior to the time when, if at all, a disease actually results—save for special circumstances, as of fright or apprehension.” 1045

Several courts have evolved a theory, however, whereby the continuing negligence is regarded as a single wrong against which the limitation period commences to run, only from the time of cessation of the wrong, or cessation of the inhalation of the dust, gas, or fumes or exposure to deleterious substances. In instances of disease contracted by employees outside of the workmen’s compensation laws, some courts have established that the limitation period runs from the termination of the employment. 1046

The United States Supreme Court in Urie v. Thompson 1047 did not follow the majority view. In this case the plaintiff, a former fireman on defendant’s steam locomotive, filed suit in a Missouri court under the Federal Employers’ Liability Act to recover for injuries. He al-

1043 Ibid.
1044 See cases collected in Annot., 11 A.L.R. 2d 277, 283-89 (1950).
1045 Id. at 279.
1046 Id. at 289-95.
leged that after thirty years of service he had been forced to cease work because of silicosis occasioned by continuous inhalation of silica dust which arose from sand emitted in excessive amounts by the locomotives' poorly adjusted sanding apparatus. Urie filed suit on November 25, 1941. Under the terms of the then prevailing three-year statute of limitations, the court could not entertain the claim if Urie's cause of action accrued before November 25, 1938. Urie became too ill to work in May of 1940, and his condition was diagnosed as silicosis a week or so later. The defendant contended that Urie, having been exposed to silica dust since approximately 1910, unwittingly must have contracted silicosis before 1938, and hence that his cause of action accrued more than three years before the action was brought. Alternatively, the defendant also argued that each inhalation of silica dust was a separate tort giving rise to a fresh cause of action, and that Urie, therefore, was limited to a claim for inhalations after November 25, 1938.

The court, in ruling in the plaintiff's favor, rejected "such mechanical analysis of the 'accrual' of the petitioner's injury—whether breath by breath, or at one unrecorded moment in the progress of the disease," stating that it would only serve to thwart the congressional purpose 'under the Federal Employers' Liability Act. While the court simply could have ruled that the limitation period commenced to run on the date of termination of employment, as has been done in a number of cases between employer and employee, it said that since the record contained no suggestion that Urie should have known he had silicosis earlier than May of 1940:

"It follows that no specific date of contact with the substance can be charged with being the date of injury, inasmuch as the injurious consequences of the exposure are the product of a period of time rather than a point of time; consequently the afflicted employeee can be held to be 'injured' only when the accumulated effects of the deleterious substance manifest themselves."

The statement is itself a quotation from the case of Associated Indem. Corp. v. Industrial Accident Commission.1050

One other case dealing with silicosis should be noted. In Henson v. Dept. of Labor & Industries the court, quoting from Reed & Emerson, The Relation Between Injury and Disease, at 183, stated:

"Silica dust inflicts injury to the lungs, not because of the physical properties of the individual particles, as the hard,  

1048 Id. at 169.  
1049 Id. at 170.  
sharp particles of quartz and carborundum; but its danger lies purely in its poisonous chemical action. Because of this, it causes tiny areas of necrosis in the walls of the lymph spaces of the alveoli in which it is deposited, at which necrotic points, by ways of healing, there develops fibrosis and a proliferation of the surrounding epithelial cells, the latter explaining the nodule formation.

"Silicosis is a progressive disease, the lung changes continuing to develop for one or two years after complete removal of the individual from the silica hazard, this advance probably due to the continued chemical action of the silica stored in the lung tissues." 1051

This court also pointed out that:

It is evident, as shown by the authority just quoted, that, in most if not all cases, the symptoms of the disease do not manifest themselves until after a long period of exposure to silica dust and that an individual may not become aware of any disability until long after he has ceased work. 1052

From this it would appear that silicosis is one of the types of injury most closely analogous to those frequently caused by irradiation.

Aside from the fact that in the Urie case the plaintiff was bringing an action under the Federal Employers' Liability Act, which the Supreme Court has often construed at least "liberally," 1058 the principal distinction between this and the Schmidt case appears to be the manner in which the two courts look at the injury. Notice that in both cases the courts were concerned with "injury" and not with "disability," and that both courts were concerned with when the injury occurred, for this is when the cause of action is said to accrue and when the limitation period commences to run. In the Schmidt case the New York court takes a very mechanical position; the injury occurs when there is an "invasion" of the plaintiff's body by the substances whose chemical activities cause the fibrosis and epithelial cell proliferation which constitute the disease itself. As in the Crank 1054 and Coover 1055 cases, discussed in the foregoing section, the incipient or initial condition caused by the defendant's wrongful act is the "injury," and the silicosis itself is regarded as "consequential damages" for which "no new cause of action accrues." Medically speaking, this view of the New York and the Cali-

1051 15 Wash.2d 384, 386-87, 130 P.2d 885 (1942).
1052 Id. at 387.
1054 Supra note 1025.
1055 Supra note 1028.
fornia courts probably is the correct one. The initial “invasion” or “impact”—the inhalation of the deleterious dust or exposure to radiation—constitutes the injury, and all conditions and consequences which follow naturally therefrom, irrespective of what additional causes may concur, are simply new increments of the initial injury. In essence, the situation is really no different from that in the cases discussed in the previous section. For example, in the Cordiner case the plaintiff had made an apparent recovery at the time of trial; in so far as the present was concerned he probably had merely a potentially dangerous condition, which, at the time was not incapacitating. The only difference between this situation and that of Schmidt before he developed silicosis, is that Cordiner had suffered past injuries which were themselves compensable. Since there is no qualitative difference between their conditions with respect to future damages, there is no logical reason why the one should be able to collect for future damages because he has suffered past damages while the other should not be able to recover for future damages because he has not suffered past damages. Any such distinction is scientifically untenable and should be so regarded legally as well. So long as the legislative policy is to bar claims of a certain age, the courts must allow recovery for future damages that are reasonably certain to ensue regardless of whether there is past or present damage.

In the Urie case the court expressly rejected any “mechanical analysis of the ‘accrual’ of petitioner’s injury.” The court, however, did not say that petitioner could not bring an action until he was incapacitated, it used the word “manifest.” It would seem that Urie was injured and a cause of action accrued “when the accumulated effects of the deleterious substance” manifested themselves to him. Depending upon his knowledge, the period of limitation could have begun running at any time between the date when his lungs contained a sufficient quantity of the silica dust to give rise to the disease and the time when he was hospitalized with silicosis. This imparts a subjective quality to injury and does not impose the objective criterion of present disability; future disability is still sufficient to warrant recovery if properly proved. The decision in this case is predicated on notions of “fairness” and congressional policy, and not upon any substantially different attitude toward when an injury occurs or what constitutes a compensable injury.

Admittedly the Schmidt and similar cases are not directly concerned with the problem under consideration and so are not too persuasive

1056 Supra note 1015.
authority for the proposition that an action can be brought for future damages before any disability or other compensable circumstance or condition has arisen. Nevertheless, if cases containing such an implication are rare, cases stating the converse are even rarer, at least none have been found. This fact, plus the fact that the courts have repeatedly allowed damages for future consequences in connection with past and existing damage, should give some weight to the conclusion. Where such a cause of action is asserted, it will not fail, or at least should not, because of any absolute prohibition against the claim but rather because the prognosis in the particular case does not meet the standard of reasonable certainty.

Although distinctions could be suggested, an analogy can be drawn to certain allergy cases.\textsuperscript{1057} These cases indicate that for purposes of an award under workmen's compensation laws, an occupationally derived allergy may be regarded as a "disability" regardless of the fact that upon separation from the irritant, the condition disappears. In \textit{Arkansas Nat'l Bank of Hot Springs v. Colbert},\textsuperscript{1058} for example, the court sustained an award of the workmen's compensation commission for total and permanent disability. Claimant-appellee, a sixty year old woman, was compelled to give up her employment as a bank cashier when it was discovered that her dermatitis was caused by an allergy to nickel and carbon, substances she came in contact with in the form of coins and carbon paper. Under the Arkansas statute—"The following diseases only shall be deemed to be occupational diseases. . . . Dermatitis, that is, inflammation of the skin due to oils, cutting compounds, or lubricants, dust, liquids, fumes, gases or vapors."\textsuperscript{1059} The court, applying the general rule of liberal interpretation of such a statute, found that the claimant was allergic to the "dust" from coins and carbon paper. Although at the time the award was given the claimant's dermatitis had cleared up entirely, an allergist testified that it would return if contact with the substances was resumed.

Surely a better system can be found to take care of such cases so as to avoid the "either-you-recover-or-you-don't" aspect of our two-value system. A suggested solution that takes greater cognizance of the statistical probabilities is suggested later.\textsuperscript{1060}

\textsuperscript{1057} Collected in 4 N.C., A. 3d 559 (1955) under the heading "Compensability of allergy without present disabling manifestation."

\textsuperscript{1058} 200 Ark. 1070. 193 S.W.2d 806 (1946)


\textsuperscript{1060} \textit{Infra} recommendations discussion following note 1123.
If the rules of proof described above are to be followed in radiation injury cases, what results might be reached based upon present opinions of responsible scientific persons? The postulation of some of the results should bring into focus much more sharply the inadequacies of the proof concepts and standards now applied by our courts. Some of the results may be startling to say the least. A warning is necessary therefore, lest the discussion that follows be misunderstood. The same warning will be repeated at the end to emphasize the purpose of the discussion and to place it in proper perspective, taking account of the limitations that are inherent in the information available.

First, it should be remembered that our knowledge of the biological effects of radiation is still quite inadequate. The expert opinions used in the examples below are in many cases tentative and admittedly less than certain. Likewise, in many cases there is responsible scientific opinion to the contrary. In each case, however, the opinion expressed is that of a responsible, respected scientist who is speaking without regard to legal concepts, particularly without reference to those involved in tort litigation. In each case the eminence of the expert is such that, to the extent expert witnesses are permitted to testify, his testimony would be submitted to the jury and whatever our differences of opinion as to what is the best policy, the jury under our present system would be permitted to decide which of the opposing views was to be accepted as "true." As pointed out previously, therefore, while the results are startling in some cases, it is submitted that each of the postulates could actually lead to the result suggested on the basis of existing rules of proof.

Before plaintiffs' lawyers make too much of the examples to be discussed, it should be indicated that to use present scientific information in the manner allowed by the jurisdiction most liberal in its admission, and under our present rules, would be quite premature and lead to absurd results. Our thesis in fact is that as yet scientists do not know enough about the biological effects of radiation to place too much dependence upon their conclusions, arrived at for scientific and not legal purposes, except in the most obvious cases, until more is known about these effects. It is our view that such scientific information should be admitted in evidence in actual litigation only if we change our present system of trying and proving the damage and causation elements in tort cases. Since in most cases the understanding of the lawyer, and
even more certainly that of the jury, as to the validity and weaknesses of scientific evidence is so inadequate, and since the likelihood of serious injustice is so great, it seems most unwise to allow the laymen on juries to evaluate scientific opinion of the kind now finding its way into print.

Our thesis is that radiation cases will show how completely inadequate is our present system of proving causation and damages, and this is particularly so in the kind of cases likely to arise in the event of over-exposure to radiation. They clearly should not be used to award damages or to assign causality for future injuries. We suggest there is a better way to do it.

Our tentative conclusions probably will not be acceptable initially to either plaintiffs' or defendants' lawyers. On reflection, however, both groups may come to feel there is merit in the suggestions. In any event the possibilities in radiation cases, if present rules are used, should be set forth, even though the results themselves may be too startling to be accepted as a method of measuring and allocating the losses that seem inevitable as we expand the use of atomic energy sources. We believe that the case is clear for initiating a combined scientific-legal study of the proper legal use of the most valid, presently accepted scientific information. In this way the proof problems as to causation and damages can be identified and dealt with intelligently on some other basis than the happenstance of an isolated case and the information available to the lawyers who happen to be trying it. This well may be an area in which there must be legislation if we are to arrive at anything like a just scheme for taking care of radiation injuries through the litigation process.

(a) Specific Types of Radiation Injuries

(i) Leukemia

Leukemia is the injury about which we have the most scientific data bearing upon the certainty of causal relationship. There is responsible scientific opinion as follows: (1) Radiation "will produce an increased incidence of leukemia. At present the rate of leukemia for the few most heavily exposed survivors at Hiroshima is about 1.3 per cent. Radiologists, some of whom have received chronic irradiation on the order of 1,000 r. have 7 to 10 times as much leukemia as has the general population."1061 (2) The ratio of observed cases of leukemia among the sur-

1061 Hearings Before the Special Subcommittee on Radiation, Joint Committee on Atomic Energy, 85th Cong., 1st Sess., 1957, p. 981 [hereinafter cited as Radiation Hearings]. See also figures at 986 on English study, indicating increase of from 4.1 per 10,000 persons irradiated to 17.6 per 10,000. Also at 988, 916, 1791.
Survivors at Hiroshima in the zone where supposedly fifty rems exposure was received was 2.6 times greater than should have occurred normally during the period observed.\textsuperscript{1062} (3) "[T]he data obtained from surveys of exposed human populations indicate that there is a clear association between leukemia and previous radiation exposure."\textsuperscript{1063} (4) Of the survivors at Hiroshima, in the region estimated to have received only twenty-five rems (with a maximum possible dose of 100 rems), ten persons died of leukemia, four of whom would have been expected to die on the basis of spontaneous incidents.\textsuperscript{1064} (5) Out of a group of 1,400 children treated with from 100 to 300 units of radiation, seven developed leukemia where only one would have been expected from the natural incidence of leukemia.\textsuperscript{1065} (6) "[R]adiation induction of leukemia is proportional to the radiation exposure and . . . for whole-body radiation exposure the number would be entirely consistent with an estimation that 50 r. doubles the chance of development of leukemia."\textsuperscript{1066} (7) Two hundred roentgens exposure to children has been found to induce cancer in later life. It also has been found that exposure to as little as three to five roentgens during the last two months before birth has caused cancer a few years later.\textsuperscript{1067} (8) "The laboratory evidence for the leukemogenic action of ionizing radiations is overwhelming, the Hiroshima—Nagasaki experience dramatic, and the evidence for an increase in carcinoma of the thyroid after therapeutic irradiation of supposed enlargement of the thymus highly suggestive. More disturbing than all this, however, is an English publication . . . indicating that the fetuses of women subjected to x-ray pelvimetry during pregnancy develop leukemia and malignancy during childhood twice as frequently as do non-irradiated. . . . Of course, it is total body radiation that the fetuses receive, but the dose probably does not exceed 2,500 mr. [2.5 rems]."\textsuperscript{1068} (9) No one has yet been able to demonstrate an increased incidence of leukemia or other cancer of the person living in a brick house in Denver who is exposed to 4.5 rems in a thirty year period as against 3 rems for a person living in a frame house at sea level, nor among the inhabitants of Travancore, India, where the thirty year

\textsuperscript{1062} Id. at 989, table 1. But note limitations on accuracy. See also pp. 1554, 1624.
\textsuperscript{1063} Id. at 992. Compare scepticism as to such conclusions at 906-07, 909.
\textsuperscript{1064} Id. at 957.
\textsuperscript{1065} Id. at 958.
\textsuperscript{1066} Id. at 1132. (Emphasis added.) See also 1791.
\textsuperscript{1067} Id. at 1264. Effect from fall-out alone enough to double rate of leukemia in some places; 929.
\textsuperscript{1068} Hodges, "Health Hazards in the Diagnostic Use of X-Ray," 166 J.A.M.A. 577, 578-79 (1958). He warns our proof is not very accurate. (Emphasis added.)
accumulation may be as high as fifty rems.\textsuperscript{1069} (10) Natural background radiation may be responsible for ten to twenty per cent of the observed leukemia.\textsuperscript{1070} (which might be taken to mean that a dose of less than twenty rems would cause a doubling of the leukemia rate.) (11) "The evidence is increasingly in" the direction that there is no threshold for either the somatic or genetic effects of radiation.\textsuperscript{1071}

Assuming for purposes of analysis the accuracy and relevancy of these statements (which actually should not be done in our opinion at the present time, if present rules are followed), observe the case that could be made for a plaintiff. If as little as 2.5 rems exposure of a foetus and from 25 to 50 rems exposure of an adult doubles the incidence of leukemia, then a person so exposed could claim (ignoring the statute of limitations problem) that if he should develop leukemia at a later date the chances are better than fifty-fifty that his leukemia resulted from the radiation exposure, rather than from all other causes together. Therefore "more probably than not" his leukemia was caused by the radiation to which he was exposed. It is submitted that prognostications of this kind are every bit as good as, if not better than, the opinion of just any doctor or even an expert in the field, offered in the form of testimony, that "more probably than not" or that "there is a reasonable probability" that the injury resulted from a particular exposure. Yet this is the conclusion to which the present tort rules concerning proof of causation and damages would lead us if applied logically to radiation cases on the basis of present scientific information.

(ii) Pre-Birth Injuries—Genetic Damage

The following statements have been made by responsible persons:

(1) "Radiation, whether acute or chronic, has a definitely damaging hereditary effect, because, in contrast to most cells of our bodies, there is no threshold for damage to the hereditary material and there is no recovery from injury in them."\textsuperscript{1072} (2) "While the majority of these genes [mutated genes] may have no recognizable effects for a number

\textsuperscript{1069} Id. at 581-82. See also Burnet, "Where Is Science Taking Us?" 41 Sat. Rev. 38-39 (Aug. 2, 1958).
\textsuperscript{1070} Neel, "The Delayed Effects of Ionizing Radiation," 166 J.A.M.A. 908, 912 (1958).
\textsuperscript{1071} Id. at 914.
\textsuperscript{1072} Radiation Hearings 981. See also 998, 917. See also excerpts from U.N. Commission's Report on Effects of Nuclear Radiation, reported N.Y. Times, Aug. 11, 1958, p. 8, cols. 1-8. Cf. statement reported in N.Y. Times, Aug. 16, 1958, p. 3, col. 4, that chronic doses have less genetic effect than acute doses. See also more extended report in N Y Times Feb. 8, 1959, p. 32, cols. 3-8.
of generations, practically all are potentially bound to result eventually in undesirable conditions." 1078 (3) Thirty to eighty roentgens are estimated to be the doubling dose for mutation.1074 (4) "[M]utations produced by radiation are probably as a class much worse in nature than those which arise spontaneously." 1075 (5) Minor mutations are as important in the long run if not more so than gross mutations and the mutations are directly proportional to the radiation dose except for very high levels of radiation.1076 (6) There is no threshold level of radiation below which radiation damage does not occur.1077 (7) There is no recovery with a time lapse so far as genetic damage is concerned.1078 (8) "Man may prove to be unusually vulnerable to all ionizing radiations including continuous exposure to low levels, on account of his known sensitivity to radiation, his long life, and the long interval between conception and the end of the period of reproduction." 1079

Here again if we accept the validity of such scientific opinion, at least to the point of admitting it for consideration, a jury would be justified in finding that exposure to radiation of an amount which already has happened in a number of cases has the effect of doubling the mutation rate. If the jury should then find that the deformity in the child is a result of a gene mutation and that the defendant exposed either one of the parents before conception, or the mother while carrying the child, to something less than 100 rems the chances are more likely than not that the mutation is the result of radiation rather than some other natural cause. It is perfectly clear that a certain number of such malformations would occur even without the particular radiation exposure that resulted from defendant's negligence or the operation of an ultra-hazardous source, but if one relies upon probabilities, such evidence would justify a jury's reaching the conclusion that "more probably than not" it came from defendant's source.

One cannot help but ask whether this is the kind of evidence that can

1078 Radiation Hearings 799.
1074 Id. at 917, 1017-18, 1603. See also Neel, supra note 1070 at 912; Hodges, supra note 1068 at 579-80. May be as low as ten roentgens; Radiation Hearings 1033, 1036.
1075 Id. at 1032.
1076 Id. at 1013. See also 1757; Neel, supra note 1070 at 909, 914. But see doubts indicated in Radiation Hearings 1755, and statement of Dr. Warren of UCLA, reported N.Y. Times, April 21, 1958, p. 25, col. 1.
1077 Radiation Hearings 1090. At least the burden of proof is on one who argues that there is threshold; Neel, supra note 1070 at 909.
1078 Radiation Hearings 1095.
be intelligently considered by a jury or even by lawyers in the present state of scientific knowledge. To make the case turn on whether the percentage is forty-nine or fifty-one, illustrates the unfairness, in an individual case, of our system of awarding damages on the basis of probability. It is true that the defendant can introduce expert testimony casting doubt on the validity of the statements made by the plaintiff’s scientists, but this may not have the desired effect on the jury which probably will be permitted to decide the question if there is a conflict between the scientists or experts.

In such cases, defendant can find such statements as (1) “The radiation dose necessary to double the mutation rate appears to be about 50 roentgens. It should be clearly understood that this is an estimate, and competent geneticists have submitted proposals from 5 to 150 roentgens.” 1080 (2) “With respect to the genetic effects which have been extensively studied by biologists, there are sufficient uncertainties even in these data so that it is not possible to accept them as entirely unassailable. These include the fact that data at low levels do not exist, that data are confined at present to Drosophila and to a few small mammals such as mice, that the mutation rate due to ultraviolet radiation appears to be nonlinear, and there is reason to believe that some of the energy transfer with ionizing radiation is in part of the same character as that with ultraviolet radiation. *Man has existed since time immemorial in a sea of radiation* where fairly large differences because of altitude and special geographic places also are present. It is difficult to reconcile some of the conjectures to be made at very low levels with the natural radiation doses to which man has already been subjected.” 1081 (3) “It is our contention . . . that available data . . . are so inadequate that semi-quantitative treatments are ill advised since, except to the relatively few who have made a detailed study of the problem, they impart an error of mathematical exactitude and scientific accuracy to an area where the errors are sometimes large and often indeterminate. There is doubt concerning the advisability of calculations which have the appearance of mathematical exactitude to persons not thoroughly indoctrinated in genetics and unfamiliar with the shaky basis of the primary examinations (but) exposures to radiation of all types should undoubtedly be minimized until we have a clear idea of just how harmful these effects are.” 1082 (4) It is extremely difficult to

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1080 Radiation Hearings 910. (Emphasis added.)
1081 Ibid. See also 1780, 1785-91. See also Hodges, *supra* note 1068 at 581-82.
measure the dosage to the gonads or reproductive organs to the point of being almost speculative.\textsuperscript{1088} (5) “In ordinary circumstances only a small fraction, perhaps one or two per cent, of the hereditary abnormalities which appear in a generation can be attributed to fresh gene mutations. For the offspring of any given parents the risk from increasing the mutation rate is very slight.”\textsuperscript{1084}

The question is again presented, should juries be allowed to “play” with this kind of material, which even the scientists are accused of mishandling?

(iii) Shortened Life Span

That radiation exposure will shorten the life span of the exposed person seems to be generally agreed upon by scientists. Certainly a plaintiff can find not only ample expert testimony to support this general conclusion but also he will find a considerable body of expert opinion which will reduce into disarmingly certain estimates the correlation between exposure dosage and the length of shortening. One finds such statements as: (1) “Human beings are too variable in their responses to radiation and in their state of health to permit any direct correlation, but it is probable that an acute dose of about 300 r. or repeated small doses totaling 2 to 3 times that would produce up to 5 years shortening of life span.”\textsuperscript{1085} (2) “[I]t may be shown that an appreciable shortening of the lifespan occurs in mice and rats exposed daily to doses of X-rays in the neighborhood of 0.1 r. Whether this extrapolation is justified or not cannot be decided at the present time. Experimental data on lifespan obtained with other laboratory animals are quite fragmentary and extrapolation to low daily doses is even more uncertain. No quantitative information is available in the case of man. Because the possibility of a shortening of the lifespan in man by small daily doses cannot be excluded, the available experimental data may be assumed to indicate the desirability of lowering the permissible daily dose for lifetime exposure of the whole body to penetrating radiation.”\textsuperscript{1088}
(3) "[M]ost mutations in man would produce various body impairments leading to increased susceptibility to disease, lower life expectancy, increased embryonic death rate and similar things." 1087 (4) "[T]here is growing reason in infer that this shortening of life and the other long delayed damage done to an exposed individual have their basis in damage done to the genetic material—the chromosomes and their contained genes—of the body’s ordinary cells, those of the blood, skin, glands, and so forth, similar to the damage done in his reproductive cells that is passed on to later generations." 1088 (5) Any damage to the chromosomes or the genes results in a decreased resistance to disease and the consequent shortening of the life span no matter how small the dose. 1089 (6) "It is almost certainly through the individual cell deaths and impairments that minute doses of radiation, long continued or repeated, exert their action in shortening the life-span of the exposed individual. This effect, first analyzed by Boche and then by Sacher, had been calculated to cause a reduction in length of life in the order of several days for every roentgen unit received by the body as a whole during a person’s lifetime." 1090 (7) Assuming a loss of ten days for each roentgen of exposure, 400 r. would shorten a human life by eleven years. 1091 (8) There is no threshold effect so far as shortening of life span from radiation is concerned, it being proportional to the dose. 1092

If these facts, or rather opinions are accepted, they lead inevitably to the conclusion that exposure to radiation, even at a very low level, reduces the life of an exposed man to some measurable degree. The opinions even have considerable significance in connection with proving certainty of damages to the genes which unite and become the embryo, later born as a child. Accepting the usual rules of evidence expressed in terms of probability, a tenable argument can be made that exposure of the parents would create a very good chance that the life expectancy of the child, later conceived and born, has been reduced. Considering the accidents that already have happened, as in the recent incident in the Oak Ridge Laboratory where a workman was found to have received

1087 Id. at 1012.
1088 Id. at 1052.
1089 Id. at 1054.
1090 Id. at 1067. (Emphasis added.) See also 1093 (five to thirty-five days for each unit of radiation received by the father).
1091 Id. at 1094. See also 1103 (14 years per 100 r.); 1122-24.
1092 Id. at 1110, 1118. See also N.Y. Times, Oct. 2, 1957, p. 35, col. 1. (One to fifteen days per r.)
320 rems full body exposure,\textsuperscript{1093} how many cases for damages for a shortened life span are actually possible at the present time, not to mention the future, assuming the law permits recovery? Argument can be made to the contrary, of course, as in the case of incidence of leukemia and genetic damage. Yet the statements of experts to the effect that shortened life span probably results from irradiation are certainly sufficient to go to the jury, and in fact there seems to be general agreement that there is some shortening of the life span, the question being only as to amount.

There are statements to the contrary, such as: (1) The difference in life span found between the normal white male population and radiologists in America can be explained on differences in age composition of the two groups, rather than on the basis of exposure to ionizing radiation.\textsuperscript{1094} (2) "From the point of view of the span of life, I feel for projections to low levels this falls in exactly the same kind of category. \textit{We cannot determine what is happening at very low levels.}" \textsuperscript{1095} (3) "All data presented at the present time are either presumptive or speculative for very low doses. They rest in hypotheses derived from the theoretical aspect of dose effects at high levels. I believe there is \textit{sufficient uncertainty} so that it would be unwise, and \textit{in fact nonscientific}, to make conclusive decisions on the basis of these extrapolations." \textsuperscript{1096} (4) There has been no reliable evidence yet of a shortening of life span in people living in Denver or more importantly in Travancore, India,\textsuperscript{1097} and studies in the United Kingdom have failed to demonstrate a shortened life span effect.\textsuperscript{1098}

The defendants also can point out that there are many other factors which cause an equal or in some cases greater shortening of life span than exposure to high amounts of radiation. For example, it is estimated that life expectancy is reduced five years for living in the city instead of the country, three and one half years for being twenty-five per cent overweight, and seven years for smoking one pack of cigarettes
Even assuming that recovery should be allowed for shortening of life span, how can it be determined whether the shortening of the life span is caused by one factor or another? On the other hand, every factor has its own effect independently of the others. When scientists differ as to the quantitative effect of exposure on length of life, the case typically is taken to a jury in our tort system, on the assumption that it can resolve the conflict which experts cannot.

(iv) Increased Susceptibility to Disease

Most scientists agree that exposure to radiation increases the susceptibility to disease or other bodily injury from a later force other than radiation. We find responsible scientific opinion to support the following: (1) Studies of patients who have received radioactive material in the course of medical treatment have been found to have much more fragile skeletal systems in which the bones break much more easily than would otherwise be the case.\textsuperscript{1099} (2) Exposure from ingested radium may be much worse for older people because the body is not able to repair damage as well.\textsuperscript{1100} (3) "[S]ubclinical changes may cause a reduction in the reserve function of organs. This may go undetected in most instances. The combined effects, however, of an intercurrent disease and the reduced function from the effects of radiation may cause more severe effects than either the disease or the radiation separately."\textsuperscript{1102} (4) Most of the testimony of the geneticists indicates that one very likely effect of the exposure of genes before conception is that the resultant child will have a lower resistance to disease.\textsuperscript{1103}

The general agreement among most scientists that exposure to radiation does lower resistance to disease again leaves to the jury the duty of determining not only which scientific conclusions as to the degree of increased susceptibility to accept but also the monetary value of such increase. It may be one thing for a jury to determine the value of such a loss, but it is quite another for it to determine the meaning of the data which scientists use to draw their conclusions that there is a certain increase in susceptibility.

\textsuperscript{1099} See table set out in Radiation Hearings 1107. Some authorities doubt that mutations are mechanisms for causing radiation aging. N.Y. Times, Aug. 14, 1958, p. 4, col. 6.
\textsuperscript{1100} Radiation Hearings 1153-54. See also 1167-68.
\textsuperscript{1101} Id. at 1173.
\textsuperscript{1102} Ibid.
\textsuperscript{1103} Supra notes 1072-79.
Related more or less directly to the specific diseases just listed is the effect of radiation on the general physical well being of the irradiated person. Again there seems to be general agreement that there is some such effect, although it is not easily measured. Among the types of injury mentioned in this category are lowered growth rate among exposed children,\textsuperscript{1104} damage to the blood producing bone marrow\textsuperscript{1105} by doses as low as one roentgen per week,\textsuperscript{1106} a change in the normal ratio in the sexes of newborn children,\textsuperscript{1107} damage to the ability of body cells to divide and replace old cells,\textsuperscript{1108} premature aging,\textsuperscript{1109} and lowering of the intelligence quotient of children whose parents' genes have been exposed.\textsuperscript{1110} One estimate has been offered to the effect that exposure to two roentgens a year of the population generally would cancel all the gains made in general health level and life span by modern medical science.\textsuperscript{1111}

It should be remembered, of course, that such effects can be shown only by the use of statistics. Conclusions apply to averages, and there is a statistical risk only for a specific person. At the present time there seems to be no way of knowing whether the injury will be suffered by a specific individual, or even whether an injury manifesting itself in a specific person came from a particular source, such as radiation. If one uses probabilities as the test, however, such lack of preciseness for individual cases does not refute the validity of the assertion that the injury was caused \textit{more probably by radiation than by all other sources}. Here again we see the effect of our accepted system involving either full recovery or no recovery at all.

(b) Other Legally Significant Scientific "Facts"

There are certain other responsible scientific opinions (not facts) which will have significance in the handling of the legal problems aris-
ing in radiation cases. Any lawyer, in dealing with the kind of evidence which inevitably seems part of a radiation case that is well-handled, should be aware of these as well. In the first place, there is a considerable difference of opinion of experts as to whether experiments conducted with relatively high doses of radiation can be extrapolated on a linear basis to low doses.\textsuperscript{1112} This in turn is closely related to the question whether there is a threshold level below which radiation does not cause injury, or at least does not cause irreparable injury.\textsuperscript{1113} It also should be recognized that much of the contemporary scientific opinion is supported by experiments on other organisms, such as fruit flies and, in a few cases, mice. Doubt exists as to what extent the experience with these other organisms can be extrapolated and used in predicting the effect on man.\textsuperscript{1114} There has been very little experience in exposure of human beings in sufficient numbers to give a statistically sound basis for conclusions.\textsuperscript{1115}

It must be remembered always that opinion as to the correlation between exposure and present or potential future diseases or injuries is statistical in nature and that as yet there is no way of tying down a particular injury to a particular exposure, or to radiation exposure as against other forces, natural or human.\textsuperscript{1116} Equally important, because it may be a contributing or even a sole cause of certain injuries, is the background radiation to which all people are subjected at all times, not only from cosmic rays but also from surrounding material including the earth upon which we live.\textsuperscript{1117} The fact that the manifestations of exposure may be delayed for considerable periods of time, up to at least thirty-five years,\textsuperscript{1118} is also significant, particularly for purposes of the statute of limitations question. In considering the legal significance of radiation dosage standards that have been established by one or another group (private or official), it also must be remembered that the standards set have been merely estimates on the basis of the best

\textsuperscript{1112} Id. at 902-03, 906-07, 909, 910.
\textsuperscript{1113} Id. at 1113, 1116, 1138, 1141; excerpts from U.N. Commission's Report on Effects of Nuclear Radiation, supra note 1072 at col. 6.
\textsuperscript{1114} Radiation Hearings 1096, 1144, 1808.
\textsuperscript{1115} Id. at 807, 945, 957, 958, 963, 965-66, 968, 981, 986, 1115, 1122, 1264, 1554, 1624, 1780. See also Hodges, supra note 1068 at 578-79.
\textsuperscript{1116} Hodges, supra note 1068; Radiation Hearings 1106; Neel, supra note 1070 at 913.
\textsuperscript{1117} Hodges, supra note 1068 at 581-82; Radiation Hearings 1292, 1429. Brazil nuts and cereal are reported to have higher concentrations of radiation than other foods. N.Y. Times, Aug. 18, 1958, p. 45, col. 1.
\textsuperscript{1118} N.Y. Times, May 27, 1958, p. 21, col. 4; Radiation Hearings 1168, 1171, 1557-58, 1560.
existing knowledge. They represent, at best, a balancing of interests, recognizing that some damages may result, but that the advantages outweigh the disadvantages, although always with the basic premise that it is better to err on the side of safety. On the other hand, experience over the last ten years has indicated that our earlier estimates of safe levels probably were too high.

(c) Conclusions

As indicated at the beginning, the foregoing is not an exhaustive collection of all the scientific information that is available to a lawyer trying a radiation case. The information here referred to, however, particularly that collected in the congressional hearings, literally is a gold mine of such information, and undoubtedly is the most extensive collection of the most authoritative opinions to be found anywhere dealing with the problems of radiation injury. If the law continues to insist upon the tort liability concepts that “you either recover total damages or you recover nothing at all,” and uses the weight of probabilities to determine whether there is to be recovery or no recovery, the lines drawn are arbitrary in the extreme, particularly as to future injuries not yet manifested.

The results that may be reached under our present system can be almost ridiculous in atomic energy situations. If a person has been exposed to radiation to the extent that the best scientific opinion would indicate that his chances are sixty to forty of developing cancer or some other radiation injury, then it is perfectly clear, in the long run, that many of those who recover damages will never actually suffer the injury. The closer the percentage is to fifty per cent the more will be compensated unjustifiably, and the closer it is to a hundred per cent the more will recover justifiably. It is equally a hardship to the plaintiff who actually suffers injury in cases where the law of probabilities comes out at something below fifty per cent. He may be able to show only that the probabilities are one out of three that an injury will occur. It is possible that he will be the one who was damaged. It actually can be said under these circumstances that only at the extremes, perhaps between ninety and one hundred per cent and between ten and zero per cent, is anything like “substantial” justice done.

While the system in the long run may work out favorably in terms of the law of averages for society as a whole, this is purely coincidental
and has nothing to do with justice between the individual parties. A defendant who has to pay damages to a person who proves a fifty-five per cent probability but who does not develop the injury later has been forced to pay without good cause. Likewise, a plaintiff who could show only a forty-five per cent chance that he will be injured in the future as a result of present exposure, but develops the injury later, surely feels no better merely because others who proved a fifty-five per cent chance may have recovered unjustifiably. The results have little to do with compensation in any true sense of the word. Even as to present, as distinguished from future, injuries, the chances that factors other than radiation are the real cause of the condition are very great and the results are almost as capricious. The difficulty is that there is no way of knowing whether the particular plaintiff or the particular defendant has been treated fairly in the specific case. It will be purely happenstance.

By taking just one extreme although not impossible example, it can be shown how completely unrealistic and arbitrary the results will be if present tort rules are applied. While the chances of a major reactor burn-up are extremely slight and the possibility that significant amounts of radioactive material will be discharged over heavily populated areas is even less, there is no responsible scientist who will give assurance that it can never happen. The insistence of business interests that the federal government adopt the indemnity program evidences the fact that industry believes such a disaster could take place and it is willing to pay very high premiums for insurance coverage up to the point where the federal government will take over liability. What are the legal consequences under existing rules, assuming the “impossible” becomes a reality? They are ridiculous! Even if this kind of major accident never occurs its possibility serves to dramatize the results we will get in minor accidents. It is a matter of statistical incidence whether the number exposed be large or small; the large number just makes the application of the law of averages in a particular case more dramatic, not any less accurate.

The number of persons and the extent of exposure in the event of a major reactor burn-up with a resultant discharge of radioactive material under circumstances which carry it over a city in concentrated form has been the subject of two scientific studies.1120 Laying aside the most unlikely case of 100 per cent discharge, where literally scores of thou-

sands conceivably might be killed and many more exposed to 300, 100, 50, or 25 rems, what would happen if it were assumed that only twenty-five per cent of the accumulated fission products were discharged over a large city? Even with this amount large numbers would be exposed to whole body irradiation of 100, 50, and 25 rems, and untold numbers to 5 rems. Using the estimates of biological effect set out above, the legal results in damage cases will have only a lottery-like chance of being just, even under present statutes of limitations. If these were changed (as they ought to be) to take care of the long-delayed injuries known to result from radiation, the results could be fantastic!

Fifty-five rads is a general average of the estimates scientists have made as to what constitutes a doubling dose for mutations in human beings. By hypothesis this means that twice as many mutated genes have been created and therefore the chances are just as good, or better if more than this amount of radiation was received by the parents of a mutation-deformed child, that the mutated gene was caused by the particular radiation exposure rather than by all other causes added together. This is inevitable unless the defendant can show something in the individual case that increased the chance of a mutation from these parents above the normal expectancy. But this means that every single genetic deformity in like fashion can be "legally proved" to have come from this one exposure, unless the defendant can show a greater than normal chance of mutation for a particular couple. Yet, scientifically only half or a little more than half of them are attributable to the radiation exposure from the reactor accident. Legally all are so attributable. Every baby, born within the period of the statute of limitations after the exposure of his parents to fifty-five rads or more, and whose deformity is the result of a mutation can show "more probably than not" that his deformity was "caused" by the particular exposure.

Every case of leukemia that occurs within the succeeding decade or so in children who were conceived but not yet born at the time of the exposure of the mother to more than 2.5 rems can also be "proved" legally to have been "caused" by this exposure. The same case can be made, of course, against any person who negligently exposes an expectant mother to a dose which results in the embryo's or foetus' receiving as little as 2.5 rems, and this could happen under any number of quite possible, in fact likely, circumstances.

Not so absurd but equally stunning will be the liability for shortened life span resulting from the incident. Present scientific opinion sup-

1121 Scientific information cited supra notes 1061-1119.
ports the proposition that *every* irradiated person loses something from his life span, one estimate placing it at ten days for each roentgen. *Every* person who receives 200 units of radiation can claim a loss of 2,000 days, or five and one half years, those who receive 100 can "prove" loss of almost three years, those who receive fifty can claim one and one-half years, and those who receive twenty-five can assert a claim for two-thirds of a year. In the case of shortened life span this is actually an effect on each person, and individual differences in susceptibility to radiation exposure certainly are no greater, if as great, as the variation present in most cases where life expectancy is determined by life insurance tables.

The amounts claimed for shortened life span and even increased susceptibility to disease will be striking if all are asserted, and there is at least some fairness in allowing such claims to each person so exposed. The claims for mutation-caused deformities, leukemia, and many other similar injuries whose incidence is substantially increased by radiation exposure, are truly fantastic. Nevertheless, they are recoverable under our present theories of proving causation and damages. Moreover, this is true in all jurisdictions, not just the most liberal, if recovery is allowable whenever it is "more probable than not" that a particular source is the cause of an injury.

Other equally objectionable results will be reached from the plaintiff’s standpoint. These can be demonstrated dramatically by reference to possible *future* injuries, rather than *existing* injuries as in the immediately preceding examples. Taking figures from the English study of irradiated children who developed leukemia, let us assume that 28,000 children are exposed to enough radiation to cause seven instead of one out of 1,400 to develop leukemia sometime in the future, mostly after the statute of limitations has run. Even though the incidence in leukemia has been increased seven-fold, for each child exposed the chances are nevertheless only seven out of 1,400, considerably less than a fifty-one per cent likelihood, not "more probably than not," far less than "reasonable certainty." Yet, if the scientific studies are accurate, the defendant’s negligence has "caused" 140 cases of leukemia that will show up sometime.

The doubling dose for mutations, possibly not so high as for leukemia in adults, certainly could be received by many thousands of persons should there be discharge of radioactive fission products over a city as a result of a major reactor burn-up. Assuming that fifty-five rems is the doubling dose, perhaps 50,000 would receive this amount.
The incidence of genetic mutation from all causes is low so that doubling the number still does not come close to a fifty-one per cent chance that a radiation-induced mutation will result in a particular case. In fact, it would mean only an increased incidence of about one or two per cent in the first generation, hence, no recovery for this kind of future possibility. Again, however, it is assumed by geneticists that, if a large group of people is exposed, a fair number of mutations actually will show up in children born not only in the next generation but for many succeeding generations as well.

These examples should suffice to show that the unfairness of our present damage concepts cuts both ways—for and against plaintiffs and defendants as a group. From this it can be argued that in the overall picture the system works satisfactorily. But this is so only in the same sense that a lottery is fair—it has nothing whatsoever to do with whether a particular plaintiff will suffer injury and so should or should not recover. The defendant's obligation to compensate will be determined "correctly" only by coincidence.

While certainly this same problem is found in many tort cases, particularly in connection with proof of causation, it is peculiarly pressing in the radiation cases. A better system can be worked out, one having a more realistic relationship to the real probabilities, to the benefit of both plaintiffs and defendants, even though it may involve difficulties in administration. Since one of the peculiar characteristics of overexposure to radiation is that only the statistical chances that damage will result are increased, we have a perfect opportunity for experimenting with a different system of proving causation and awarding damages to a possibly injured party. The use of statistics and probabilities involves inaccuracies, of course, but for all of its inaccuracy it comes much closer to both reality and justice than the present system. A system can be worked out that will not make too many changes in the present manner of handling tort cases so far as concerns proof of duty, breach, and even the evaluation (in money terms) of the injury received, and which still will preserve most of the traditional roles of judge, jury, and lawyers.

(4) Some Recommendations

While absolute "truth" and "certainty," are unattainable legal goals, this is no justification for judicial nihilism. Despite their elusive character, the law should not be content with anything less than a reasonable approximation of practical justice. The results reached by applying present theories of proof are remarkably close to those obtained in a lottery.
TORT LIABILITY

(a) Inadequacies in the Present System

The best that can be said for the present situation is that it tends to allow, in the aggregate, the successful assertion of more claims for future injury that ultimately may develop. In individual cases, however, justice often depends on luck. Many tragically injured persons will be denied recovery because the probabilities are a little less than fifty per cent. On the other side of fifty per cent, many will receive "windfalls" for injuries that never develop. In such cases the award is bound to be too much when no injury results and too little when it does. None will receive compensation at the time when it is actually needed, and, from the standpoint of the state, there is little assurance that even the fully compensated individual will not become a burden to society when the injury actually does develop.

Likewise, the technique of seeking recovery for an existing predisposition or predilection toward future injury which is not a present disability, is an unsatisfactory solution to the problem. An award whose amount is reduced in proportion to the degree of probability, as suggested by one or two cases discussed in connection with increased susceptibility to disease, will never be adequate in cases where the condition does become an actual disability. Nevertheless, the proportionate award idea suggests a solution to the problem of future injury. As presently used, however, this method is little better than the more generally accepted solution because no recovery is needed if no injury results, and total recovery is needed if the injury does develop.

As pointed out previously, the rule against splitting a cause of action and the statute of limitations concept are the principal legal obstacles to a more adequate approach to the problem of future injury. As to splitting a cause of action the plaintiff's natural desire is to recover as much as he can immediately, perhaps while he can still find a solvent defendant. If he has to wait, he may recover nothing because the injury does not develop. The defendant also has a natural desire to have his liability determined as soon as possible and therefore he favors a short statute of limitations.

The principal argument favoring a "wait-and-see" doctrine for recovery of damages for future injury is a resultant greater degree of certainty, and, thereby, a fairer treatment of both the plaintiff and the defendant. In addition, society's interests are better served by a system that makes compensation available when the injury actually becomes disabling. At least in the field of radiation injuries an attempt should
be made to modify the present system enough to see that these advantages are achieved.

The changes recommended could be limited to avoid affecting recovery for past or existing injury. Clearly they should not affect the size of the recovery for an existing fully manifested injury or the "guesstimate" as to the value of a fully manifested impairment. The changes should affect the recovery only for those injuries which may possibly arise in the future, both those which may follow an existing manifestation of injury and those which are not preceded by any disabling or otherwise observable condition.

The future injuries dealt with here presuppose knowledge on the part of the victim that he has been irradiated. There scarcely can be any problem of anticipatory recovery for future injury when the injured person is not even aware of his exposure. It seems reasonable to expect that the vast majority of irradiation injuries are going to be suffered by persons connected with the nuclear industry. Most of these persons, through the use of film badges, monitoring, and other detection devices,1122 will know, within limits, when they have been exposed and the magnitude of the exposure.1123 The only other sizable group will include those involved in a disaster of some proportions so that publicity will follow and exposed persons will be duly advised of their exposures. It is reasonable to say that science can now predict, to some extent, and will later be able to do so with even more precision, both the probability of future injury and the extent of the injury should it develop. Since we are dealing with a reasonably measurable quantity, the injury usually being statistically fairly well correlated with the amount of exposure, future radiation injury cases lend themselves to even greater accuracy of prediction than is to be found in the ordinary case of future injury, where there are no quantitatively determinable, causative factors.

(b) Suggestions for Modification of Our Present Rules

The changes here recommended represent an attempt to obtain greater certainty while preserving the desirable features of the present system. They are made with full recognition of the policy considera-

1123 The authors have been told that there may have been an error in monitoring devices in the plant Y-12 accident at Oak Ridge, the error perhaps off by a factor of 10. Discussed supra at note 1093.
tions which militate against a "wait-and-see" approach. A minimum of change is desirable for several reasons. We are as yet somewhat uncertain, both quantitatively and qualitatively, as to the nature of radiation injury. Also it is recognized that we are dealing with legislative, judicial, professional, and business attitudes that are conservative and inclined to regard the existing order as somewhat sacrosanct.

The basic concept is a simple one. We would deny any right to recover at the time of exposure for any injury that will occur, if at all, only in the future. We would allow, or even require, however, that the plaintiff bring an action at once to establish the duty owed to him by the defendant, the breach of the required standard of conduct, and the fact of the plaintiff's exposure to radiation. The present statutes of limitations could remain applicable to this part of the proceeding, at least where the possibilities of exposure are presently known. In addition, the plaintiff should have the burden of proving (1) the percentage probability of occurrence of a future, disabling injury and (2) the probable monetary dimensions of that injury, should it develop. Should a duty be found to exist and should the defendant be found negligent and to have irradiated the plaintiff, there would then be a determination of the percentage of probability of future injury and the amount of probable damages. For purposes of these preliminary determinations all reliable medical statistics in both oral and published form should be freely admissible.

Departure from the present system would come at the point of judgment. No award for future injury should be paid to the plaintiff at this time, except, possibly, the amount necessary for minimum attorney's fees. Instead, the defendant should be ordered to pay into a fund or to obtain insurance coverage to protect the plaintiff for as long as there is real danger that the injury will develop, payment to be made only if the injury actually develops. The amount which would be made available by the particular defendant for the future contingency would be measured by the total damages predicted by the trier of fact multiplied by the percentage probability of the injury's occurrence. For example, if it is determined that the plaintiff, as a result of the exposure has a twenty-five per cent chance of developing cancer, and that, should such injury develop, his damages will be $20,000, the defendant, at the time of the first proceeding, need only contribute $5,000.

The suggested result is far from certain justice in view of the uncertainty of the base for our statistical calculations, but it is far more nearly accurate and therefore fairer than our existing system because
it is based on the injury actually manifested. Admittedly, the defendant has had to pay something upon some claims that may never be justified and upon some claims that he would not have been required to pay at all under the present system, but, if the number of cases is large enough, he is no worse off than before, since he will never pay the full amount of the future damages. Those contributions to what might be called the "contingent injury fund" by other defendants, for injuries that never develop, will be used to meet the cost of those that do and for which full contribution has not been made. From the standpoint of the plaintiff, the suggested system is far more certain. He will be able to recover damages for any negligent exposure to radiation which gives rise to a probability of future injury when that injury does develop. This feature would provide compensation for many who previously could not have recovered because the probabilities were less than fifty per cent, and would deny recovery where subsequent events disclosed that there should not have been any recovery even though the probabilities of occurrence were more than fifty per cent. There is also the advantage that this system provides for compensation at the time when it is needed—at the time when the injured person becomes disabled, a burden on his family or society.

Upon compliance with the order of the court, and payment for any existing damages the plaintiff has shown, the defendant should be absolved from further liability for injury arising out of the negligent exposure in question. Thereafter, the plaintiff will have to seek recovery from the fund at such time as the predicted injury actually develops. Should the injury never develop, the plaintiff should not recover anything. In the event the injury occurs, the plaintiff can then proceed directly against the fund for an amount no greater than that determined by the trier of fact in the first proceeding—$20,000 in the above example. In recovering from this third party or fund, the plaintiff would have to prove the fact of his injury, the dimensions of the injury, and the fact that the injury was caused by the negligent exposure which was proved in the earlier action. All issues of law and fact, decided in the first proceedings, as to duty, breach, and exposure, would be res judicata at this later determination. The earlier determination of damages should be res judicata as to the maximum limit of the award, to give some certainty to the base upon which all statistical calculations must be made.

Let us consider these suggestions in light of the arguments pointed out earlier for and against a delayed recovery for future injury. Stat-
utes of limitations are enacted to prevent the assertion of stale claims with the consequent opportunity for plaintiffs to wait until the tactically opportune moment when witnesses for the defense may no longer be available, although plaintiffs may well have preserved their own evidence. The suggested system will not disturb this desirable goal. Only those issues of fact determined at the initial trial require witnesses with first-hand knowledge of the circumstances of the injury, and the ordinary period of limitation can be applied to this proceeding. The issues of fact determined at the second proceeding require, for the most part, expert witnesses whose ability to testify will be little affected by lapse of time; in fact their testimony will be improved because the symptoms will have manifested themselves.

In addition, the suggested system will enable the plaintiff to establish a source from which he may be certain to recover later. The plaintiff need not run the risk of subsequent bankruptcy or disappearance or hiding of assets by the wrongdoer; such actions will not affect the plaintiff's ability to recover. This seems only fair if the plaintiff is to be denied present recovery. At the same time the defendant's liability will be established and fixed within a reasonable time, and he will be absolved of further liability. The burden of waiting for future uncertainties will be shifted to insurance companies or to a fund, and there will be no present and highly contingent liability for uncertain future injuries.

The suggested modifications are intended to preserve the incentive to maintain the highest standards of care and safety. Atomic energy users, whether strictly liable or liable only for negligence, who are responsible for the greatest number of possible injuries will be required to contribute the largest amount. Admittedly, even this system does not maintain exact correspondence between those who actually cause injury and those who have to pay, but the approximation is as close as other considerations permit and probably closer than under workmen's compensation programs. The resemblance of the present tort recovery to a lottery draw would be obviated.

(c) Administration of the "Contingent Injury Fund"

Obviously the most difficult question that arises in connection with the suggested scheme is that concerning the nature of the fund or other source out of which damages ultimately will be paid—How and by whom is it to be handled? Whether the fund is to be administered by
a government agency or by private insurance carriers, a larger amount of money must be provided than ultimately will be available to claimants. The costs of administration alone, not to mention the profit margins that insurers would require, are going to make inroads on each dollar contributed by the defendants. For this reason there will be a degree of probability above which it will be less expensive for the defendant simply to pay the plaintiff immediately and directly. If, for example, the defendant has to pay one dollar to provide ninety cents of compensation (the remaining ten cents going into overhead), he is just as well off if he pays immediately when the probability is greater than ninety per cent. This of course assumes that the ten cents administration cost should be paid by the defendant. For this reason, direct payment to the plaintiff should be made optional in cases involving more than a certain percentage of probability. It also may be fair to provide that if the probabilities are less than ten per cent or perhaps five per cent, plaintiff should be obliged to take his chances; i.e., no recovery should be allowed.

The principal requirement to assure success of the "contingent injury fund" is that it accumulate a sufficiently large number of proportional contributions to permit application of the theory of probability. The fund itself will represent the accumulation of all sizes of contributions for all degrees of probability of future injury. Its effectiveness will depend in large measure upon the number and variety of claims it represents. Thus, the least effective method would be found in a system wherein each defendant obtained insurance from carriers acting individually and with no pooling of risk between them. Conversely, the most effective method so far as statistical probability is concerned would be a single, nationwide pool or fund, either governmentally or privately administered. Self insurance would seem unworkable.

If a government administered fund were used, it probably should cover the risks arising in more than one state. It could be administered by the federal government and the amount contributed in each case still could be determined by state law and trials in state or federal courts in the same way as is now the case with tort actions. The judgments, however, would be paid into the federal fund rather than to the plaintiff and later the fund would pay full damages to a plaintiff who later contracts the disease. The fact determination that the disease exists at that time could be made by an appropriate state or federal court, or perhaps by an administrative board.

Perhaps a nationwide fund could be created by interstate compact if
A third alternative, of course, would be for Congress to create the fund and lay down the rules to govern liability and recoverable damages for all radiation injuries, superseding all state laws perhaps. The "contingent injury fund" could function, however, without accepting this degree of interference with traditional state control of tort law.

The theory suggested could be adopted so as to make use of private insurance carriers and avoid a government administered fund, whether federal or interstate. This plan might even make it possible to avoid jury determination of the percentage of risk created by defendant's radiation source, a determination not wisely left to a lay jury. Once liability and the amount of recovery were found, the defendant might then provide an insurance policy for the full amount, payable if and when the possible future injury occurs. The insurance company would charge a premium based upon an expert judgment of the probabilities, and if enough radiation risks were pooled by private insurance companies and the statistics were valid, the premiums should cover the total that would be claimed by all plaintiffs who actually suffer the injury in the future. The effect on such premiums of interest earned before payment to the victim is required and of death of some victims by other non-radiation causes could be worked out by the insurance companies, and the premiums charged defendants adjusted accordingly.

In any event, once defendant makes his contribution to the "contingent injury fund," or takes out an appropriate insurance policy if this plan is used, his liability ceases completely. Thereafter the victim, if and when the disease occurs, looks to the fund created by the contributions of many defendants on behalf of many plaintiffs. If the injury does not materialize or if plaintiff dies of other causes first, the amount contributed for him helps defray the awards to other plaintiffs who do suffer the injury.

If the federal indemnity fund described in the last section of this chapter has to be used because claims from a large reactor accident exhaust private insurance coverage, the federal government contributions for future injuries should be made to the contingent injury fund or be used to take out a paid up insurance policy for each plaintiff who proves his case.

Some Experience in Administering Injury Funds. It is not meant to suggest that a workmen's compensation plan of recovery for each injury regardless of tort rules of liability should be adopted and based
on a fixed schedule of awards for each type of injury. Nevertheless, workmen's compensation plans involve some administrative problems not too dissimilar to some posed by our "contingent injury fund." It is worthwhile, therefore, to look at the financing and experience rating aspects of workmen's compensation plans.

In all state and territorial jurisdictions, except Louisiana, employers to whom the workmen's compensation laws are applicable are required to give assurance of their ability to meet their compensation obligations. This may be done by insurance with a private carrier (in all but eight jurisdictions), or with a state fund (in nineteen jurisdictions), or by furnishing proof of ability to carry one's own risk, called "self-insurance" (seven states excepted).\footnote{The statements here made are based on Chapter 4, Somers & Somers, Workmen's Compensation (1954).}

Private insurance is written by casualty companies of three types: stock companies, which are generally non-participating corporate enterprises in which profits are paid to stockholders and policy holders do not directly participate; mutual companies in which the policy holders are shareholders automatically, and generally they divide the profits as dividends; and reciprocals, which generally are unincorporated groups of employers organized to sell insurance to each other. The reciprocals do less than two per cent of the total private compensation business. In 1951, as indicated by net premiums written, private carriers did about 80.6 per cent of the compensation business, state funds covering the remainder. These figures have been relatively constant since 1917, with the state funds gaining a little during the depression period and losing again during times of greater prosperity. The only really significant proportional change is that which has taken place between the stock and the mutuals, the latter having gained appreciably at the expense of the former—from 12.4 per cent of the total in 1917 to 30 per cent in 1951. Stock company carriers have generally recruited from the relatively smaller and middle-sized risks, doing business through brokers operating on a commission, selling a more expensive type of insurance, but giving greater service. The mutuals have tended to attract the larger firms and higher grade risks, escaping some of the overhead inherent in the large sales organizations of the stocks. There is a noticeable tendency for each type to adopt the competitively advantageous features of the other, so the differences between them are disappearing.

On the basis of premiums, state funds account for 19.4 per cent of the compensation business. These funds are of two types: exclusives
(in eight states), and competitives (in eleven). The latter are in competition with the various forms of private carriers but the statutes setting up such funds compel acceptance of every grade of risk, so they tend to cover the highest risks where they are in competition with private carriers.

On the basis of benefits paid in 1952, private carriers accounted for 62.3 per cent, state funds 24.5 per cent, and self-insurers 13.2 per cent. Mutual, stock, exclusive state fund, and competitive state fund carriers are to be found among the ten largest carriers in the country.

The subject of rate making is far too complicated to allow elaboration here; however, some consideration must be given to it, for its very complexity reveals a significant problem or weakness in the suggested “contingent injury fund” scheme to cover radiation injuries. Essentially, rate making, whether by state insurance supervisors, individual carriers, or the National Council on Compensation Insurance, is a statistical study in which optimum probability determinations are the goal. Periodically the various classes of risk, by industry and occupation, are assigned a compensation rate per payroll unit (e.g., $100), which is determined from recent past experience with the class. This “manual classification gross rate” contains two elements: “pure premium” and “expense loading.” Pure premium is that portion of the rate to be used to pay claims, and includes reserves for future benefit payments. It may be adjusted up or down periodically, depending on class experience— and educated guesses. Expense loading is the portion of the rate set aside to defray anticipated underwriting expenses or overhead. These expense loadings have been state approved and are uniform for all private carriers. Traditionally they have stood at or above forty per cent of the total rate, with acquisition costs, brokers’ commissions (17.5%), general administration expenses (7.7%), and claims adjustment (8.2%) comprising the major portion. Generally they have reflected the higher costs of the stock carriers. While in recent years both stock and mutual carriers have managed to reduce their actual expense ratios, established expense loadings have remained constant or even increased slightly. The periodic revisions of these “gross rates” mainly have been changes in the “pure premium” figure and not the “expense loading.” Needless to say, this feature of the rates has occasioned considerable criticism from both employers and labor, and is one of the principal arguments favoring the state fund.

“Merit rating” has been proposed as a solution to many of the inequities of the “gross manual rating,” and is being adopted widely. This
type of rating is intended to distinguish between individual employers within the same industrial classification so that the rates imposed upon each will reflect that employer's accident record with respect to the average. There are three main types of merit rating with an indication of an emerging fourth type: schedule rating, prospective experience rating, retrospective rating, and interstate experience rating. Schedule rating was an early attempt to predicate the individual employer's burden upon the safety installations in his plant. It is of no practical significance today. Prospective experience rating is based on the actual accident experience of the individual employer over the past one to three year period. It attempts to reward the employer with a relatively good safety record, and is both simple and expedient to administer. Unfortunately, it has not affected the “expense loading” and has proved impractical with respect to low-risk, small employers. Retrospective rating, which was originally intended to help the stocks recapture from the mutuals who paid dividends to policy holders, uses only the employer's current policy year experience. He is rated tentatively, at the beginning of the year, by the prospective method. At the end of the policy year a final audit is made of his accident costs, and his final premium is established. This type of rating has also been used to reduce the carrier's expense loading, primarily by striking at brokers' commissions, which have been reduced to as low as six per cent in some cases. This type of rating has been available only to employers paying fairly substantial premiums (e.g., about $5,000 in New York), but has represented a large saving to them. It is criticized as being discriminatory with respect to small employers and as not being in harmony with the concept of a workmen’s compensation program. The fourth and most recent development with regard to individual risk rating is interstate experience rating for employers in interstate operations.

Most of the state funds, whether exclusive or competitive, set their rates in a fashion substantially similar to the method described for private carriers. They often utilize the manual gross rates set by the private rating organizations. The competitives may be found giving advance discounts or dividends or both to employers on an individual basis, and also they may charge above the manual rates for the undesirable risks which they must accept. The really significant difference between the private carriers and the state funds is to be found in their expense ratios. “Over the years competitive funds have devoted, on the average, about 14 per cent of premiums to expenses, exclusives about 6 per cent,” as opposed to 29 per cent for the stocks and 16 per cent for
the mutuals. In connection with these comparisons it must be remembered that the competitives tend to get the worst risks and the exclusives get all grades of risk. The Ontario fund, which is an exclusive and must pay all the costs of administration, adjudication, etc., has paid eighty-nine cents in benefits for every dollar of receipts. No part of the Ontario workmen’s compensation program is supported by taxes. Of the eleven cents per dollar that goes for expenses, 2.5 cents goes for safety and mine-rescue work.

Two features of these workmen’s compensation rates are significant in a consideration of our “contingent injury fund.” The first of these is the fact that the carriers themselves, whether private or public, who are liable for the benefits the law requires, are the determiners of the probability of injury. Their techniques for doing so are exceedingly complex and intricate. It is extremely doubtful if any jury or administrative tribunal could do the job with equal accuracy. It is obvious that no carrier is going to accept a judicially determined probability of future injury as a basis for insuring against the risk of liability; it would be financial suicide for it to do so. Before accepting a proportionate contribution from a defendant, and agreeing to accept the possible future liability, the fund administrator will have to make an independent determination of probability, and charge accordingly. From the standpoint of the private insurer, at least, a determination of probability by the trier of fact in a judicial proceeding is somewhat superfluous, although it might be mentioned that both jury and insurer will be inclined to err in the same direction — i.e., toward greater probability.

The second feature of the workmen’s compensation rates that reveals a substantial problem in connection with the suggested “contingent injury fund” is the high cost of the insurance. The high level of expense ratio, especially that of the stock companies, may be prohibitive. Perhaps private insurance is out of the question, but our system of justice should not be absolutely bound to existing insurance programs.

(d) Some Not Dissimilar Experience in New York

An experiment tried in New York presents a very interesting analogy to our suggestion. In 1933 the New York legislature amended its workmen’s compensation law to include a “fund for reopened cases.” The purpose of this fund is to establish a method by which risk of claims

1125 Id. at 125-26.
1126 Id. at 314.
recurring beyond the statutory period shall be borne by all employers and carriers, and to insure in proper cases the benefits of the workmen's compensation law to injured workmen regardless of prior denials and time limitations. It also serves to cushion the burden on the employer and carrier by relieving them from a continuing liability. Under New York law a person whose case is closed may come back later and state that he is still disabled or that his condition has worsened and that he can no longer work, in which case his right to additional compensation can be reopened if he presents medical proof of his condition and of the fact that it was caused by an industrial accident or occupational disease. The fund was created as a result of a recognition that there were numerous cases of industrial injury and disease which were arising, returning, or worsening after an award of compensation. Under existing law the courts had held that, when a case was closed, as to the type of injury, it could not be reopened upon this issue after three years from the date of injury. If the injury had been classified, for example, as "temporary partial disability," such a finding could not be disturbed after three years, no matter what tragic developments might ensue. In a remarkable illustration of industry responsibility, employers and insurance carriers withdrew their objections to allowing the Commission to reopen cases even after an unlimited number of years—provided they got some relief in return.

As a result of these conditions, the law was amended to provide that in a reopened case, if the award was made more than seven years from the date of accident and more than three years from the date of the last payment of compensation, the award would not run against the employer or his insurance carrier directly, but would run against the "fund for reopened cases." This fund, in effect, became a reinsurer of all employers and private carriers for "stale" cases.

Initially, it was thought that there would be comparatively few cases requiring compensation seven years after the date of accident and more than three years after the date of the last compensation payment. Therefore, only $250,000 was set aside to initiate the fund, and it was further provided that in the case of an industrial death, where the deceased had no dependents to whom compensation was due, the employer or carrier would pay $1,000 into this fund. These funds soon were found to be insufficient, so the act was amended to require a $1,500 contribution for each "no dependency" case. The amendment also

authorized the chairman of the Workmen's Compensation Board to examine the fund periodically and calculate its liabilities. If the fund does not exceed those liabilities by $250,000 he is authorized to make assessments against all private insurance carriers, including self-insured employers, to make up the deficit.

Because of the understandable popularity of this fund, two subsequent modifications were found necessary. The first of these was a rather generous statute of limitations. Under the present law, no case may be reopened and charged against the fund more than eighteen years after the date of accident or more than eight years after the last payment of compensation, whichever may be the longer. It also was found necessary to provide for a defense for the fund. A Special Fund Conservation Committee was created with five members, one from the stock companies, one from the mutual companies, one from the State Insurance Fund, one from the Compensation Insurance Rating Board, and one self-insurer. In any reopened case the chairman of this committee is authorized to designate the employer or insurance company that was primarily responsible for the compensation to act as defender of the fund and represent it with respect to the particular claim.

Apparently, the New York "reopened case fund" is unique among the workmen's compensation laws of the United States. The similarities between it and our "contingent injury fund" recommendations for radiation injuries are clear. Each is intended to meet the same problem—the problem of delayed injury. The fund provides one source from which recovery for delayed injury is made available. It should be noted that in New York employers and private carriers were willing to accept the right of the employee to have his case reopened and the injury reclassified, for purposes of additional compensation, if their direct liability was cut off at a reasonable time, even though as a group they paid in any event. The private insurance companies apparently had no desire to insure indefinitely and they did not object to a state administered fund. The method of financing this fund is especially significant. The requirement of contributions up to $1,500 from carriers and insurers who are liable for "no dependency death" cases, is essentially arbitrary from the "fault" standpoint, but it is expedient and it can hardly be termed "unjust." Notice that the "reopened case fund" was faced with the same problem that confronts the "contingent injury fund," i.e., the problem of lack of correspondence between predicted liabilities and reserves and actual liabilities and payments. If anything, the New York fund encounters a larger problem, for no attempt is made
to predicate individual contributions upon the probability of injury for which the individual may be responsible. This problem has been resolved by authorizing the Board to levy assessments upon all carriers to make up the deficit. If employers and private carriers will accept this arrangement, there is no reason why they should not be equally willing to accept liability to the proposed "contingent injury fund" for radiation injuries. In connection with this latter fund, problems of solvency of the fund can be resolved in the same way. Thus, the individual found to have been negligent could be required to make a present contribution to a national, public fund. The amount would be determined by the monetary dimensions of the possible future injury, multiplied by the percentage probability of its occurrence. This contribution could be augmented by a pro-rata payment for the expense of administration of the fund. Furthermore, any deficits that arise in the fund as a result of inaccurate predictions by the triers of fact at the initial trial could be made up by the use of assessments against all users of nuclear energy sources. These assessments could be made proportionate to the amount of radiation (both as to intensity and quantity of source) used by the different operators.

There are some very vital distinctions between the New York "re-opened case fund" and our "contingent injury fund." The New York scheme takes care of future injuries only where there is present injury for which recovery can be had within the time and coverage limitations of the regular workmen's compensation provisions. Our fund would be available to those whose only injury is possible future damage and defendants would contribute to the fund every time they are legally responsible for exposure which may cause future harm. This should be fairer, not only to the injured but also to the members of the defendant's group as well, because each will contribute an amount based on his own fault or liability and in proportion to the amount his activities increase the possibility for future recovery against the fund. This preserves much more realistically the concept of individual responsibility for harm caused by a particular activity and also takes care of what in radiation cases may prove to be a very large group of plaintiffs who can show no present compensable symptoms but of whom a statistically predictable number will suffer serious injury.

The fairness of the "contingent injury fund" is only as great as the degree of validity of the statistical evidence used. They are not completely reliable by any means, but the results from their use will be infinitely more "just" than those reached in ordinary tort cases today.
Many of those within the “more probably than not” group will die long before a feared injury manifests itself and from completely unrelated causes. This will be a “saving” to the “contingent injury fund” which can be passed on to those other plaintiffs who actually suffer the future injury feared and deserve fully adequate financial help.

The “contingent injury fund” concept has another important advantage in multiple wrongdoer or causation cases. Advantage can be taken of the merits of contribution between joint tortfeasor ideas in normal tort cases and of last-employer concepts found in some workmen’s compensation plans. In radiation injury cases the “amount of damage” caused by each source can be approximated much more closely than in the usual accident case for the reason that the damage done, particularly as to future injury, correlates rather closely with the amount of radiation received, although it may be difficult sometimes to determine this amount. By making each source, if there is legal liability for radiation from that source, contribute its share to a common fund there will be no need to hold each fully liable and subsequently make the one against whom a judgment is entered find and recover from the others legally liable.

The multiple causation situation suggests one of the most important possible inequities and perhaps the greatest difficulties inherent in the “contingent injury fund” plan. Since most of the injuries which radiation can cause also may arise from other forces for which the particular defendant may not be responsible, what assurance can be given that a future injury that manifests itself will not have been caused by some source which has made no contribution to the fund; e.g., cosmic rays, other background radiation, or radiation properly used in medical treatment? The short answer is that such assurance cannot be given. This does not justify rejection of the plan, however, because the same objection is even greater as applied to present tort liability rules. The same multiple causation possibilities exist whichever damage system is used, and the “contingent injury fund” idea lends itself much more readily and justly to a solution than does our present rigid two-value scheme of “recovery in full or no recovery at all.” Possible shortages in the fund when the injury is attributable to causes making no contribution could be avoided in one of three ways: (1) the number of exposed persons who die for other reasons before the future injury manifests itself may be sufficient to offset those injuries actually caused by other forces, somewhat as in the New York “reopened case fund”; or (2) the government can make a lump-sum contribution annually representing
the statistically estimated contribution of such non-liable sources; or (3) the plaintiff will be allowed to recover only such proportion of the total damages as is represented by the contribution to his injury by contributing sources, the remainder to be taken care of by his own resources, which in many cases today might include his own medical, hospitalization, and loss-of-income insurance. Each of these solutions within the “contingent injury fund” scheme is much more acceptable than our present system of making the result depend upon “more probably than not” which gives a black-or-white result depending on whether the particular case falls on one side of fifty per cent or the other. Under our present system, by hypothesis, in cases in which the probability falls between twenty-five and seventy-five per cent, the result reached in the particular case is “more probably than not” wrong!

(e) Concepts of the Civil Law Concerning Principles of Damages

The problems involved in awarding damages are universal. Accordingly, advantage should be taken of experience under other systems of law. The civil law has taken a somewhat more realistic approach than that followed in the common law countries.

Specific Performance. In France the principle of specific performance allows for reparation of losses caused by tortious interference with property. The remedy is strictly within the discretion of the judiciary, but where the interests of justice are best served, and a lessening of burdens of evaluation may result, a court may order the “restitution” to the victims of a lost, destroyed, or damaged item, the substitute to be equivalent in quality, quantity, or general serviceability and value. The court may permit the defendant to choose between giving the plaintiff a like item or paying a certain sum. An impartial officer of the court will decide whether the object delivered by defendant to plaintiff substantially corresponds to the lost, damaged, or destroyed article. A court may also insist on specific “restitution” as the only just remedy, and effective enforcement is generally assured by a judicial device called “astreinte,” which corresponds roughly to a pecuniary penalty which increases as the defendant delays performance. For example, in a case in which the defendant tortiously had cut and harvested the plaintiff’s

1130 This section is based on research in the original language done by Rinaldo L. Bianchi, J.D., Mich. 1955. Mr. Bianchi served on the staff of The University of Michigan Law School from February 1955 to June 1957. He is currently with the firm of Covington & Burling, Washington, D.C.
The court ordered that an equivalent amount be delivered by the defendant. The same kind of automobile wheels has been ordered delivered to the plaintiff, as have tires, and where the defendant accidentally destroyed the plaintiff's truck, the court ordered him to obtain and deliver to the plaintiff a truck of the same quality and make. The judge is free to choose between a money judgment and specific performance. As for the availability of the concept of specific performance in tort cases, an eminent French author has remarked that, since the remedy is used in contract cases, there is even more reason (à plus forte raison) that the court should have similar powers in tort cases. This might be a very appropriate remedy where personal property has been contaminated by radioactive material and can be replaced with something quite similar thus eliminating any concern about the salvage value in determining damages.

Money Judgments. Other types of damage that do not lend themselves to specific restitution, such as personal injuries, are subject to the unlimited power of the courts in matters of remedy. A judge, in his discretion and depending on the circumstances of the case, can set the date and the place of payment of a judgment of indemnity. He can decide whether the judgment should be in the form of one lump sum, or in installments, or as an annuity. The requests of the parties are not binding on the court. The only limitation on the powers of the courts in the choice of remedies is the prohibition against judgments that encroach on the freedom of the defendant or upon his civil rights.

Provisional Decrees. The discretionary powers of the courts in France are broad enough to include all possible claims within the cause of action together with the power to render a provisional decree designed to allow reopening for later discovered damages. Periodic revisions of a judgment may also be ordered to diminish or terminate as well as to increase the installments of an annuity granted to a plaintiff, according to whether his condition has improved, disappeared, or deteriorated.

It is remarkable that no article of the French Code directs the courts

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1135 Savatier. 2 Traité de la Responsabilité Civile 171, n. 5 (1941).
1136 S.N.C.F v. Ulma, Paris App., March 1, 1945, Gaz. Pal. 1945, 1, 155
to follow such procedures. The system has developed by case law from the implications of a single word in Article 1382 which states the general theory of tort liability based on fault. The article merely states that the defendant who is found liable must make reparation. From that point it has become a matter of judicial development, subject to limitations of personal freedom, to decide the techniques best suited to the particular case. The French Court of Cassation repeatedly has affirmed that the courts are free to choose the mode of compensation in tort cases according to their own judgment, taking into consideration all of the circumstances of the cases.\textsuperscript{1137}

An annuity, in personal injury cases, may often correspond more accurately to the extent of the defendant’s damages than will a final lump sum which must be adjusted to take into account the permanency of the particular loss. In addition, as previously noted, judging the possibility of future new injuries or the aggravation of a present injury is guesswork at best. Atomic energy injuries probably will present this dilemma in many cases. Should there be a major radiation disaster, a defendant may be better able to stand the imposition of smaller periodic payments over a period of years than a huge lump sum if, as expected, the federal indemnity program is dropped in the future. The French experience at least shows that delay in determining the exact nature and extent of future damages can be administered.

Another French technique throws light on the feasibility of our suggested “contingent injury fund.” It is a process of distribution of the damages according to the respective liability of the parties. In Correia v. Lucet\textsuperscript{1138} the plaintiff was found one-fourth responsible for an accident and the defendant three-fourths. An impartial expert established that plaintiff had suffered a two months’ total disability and a continuing twenty per cent disability, which condition, however, could improve in time. The trial court granted an award of three-quarters of the medical expenses, plus the cost of plaintiff’s bicycle which was damaged, and two months’ salary. The “moral damages” (\textit{pretium}


\textsuperscript{1138} Angers, April 2, 1935, Gaz. Pal. 1935, 2, 36.
doloris), based upon aesthetic prejudice from disfiguration, plus the twenty per cent continuing disability were assessed at a yearly pension of 1,000 francs, account being taken of the victim's station in life. The appellate court affirmed the judgment saying, however, that the defendant was entitled to request that the judgment include a reservation of his right to petition at a later date for a reduction or discontinuance of the installments if the plaintiff's condition should improve or be cured. The civil law does not use the concept of contributory negligence but instead uses a system of apportionment based upon relative "contributory causation."

Again, in Cugno v. Parzy the victim of a car accident suffered brain injuries accompanied by diminution of mental powers, muscular atrophy of the left arm, and other injuries of the left hand. The court decided that since these conditions might improve in the future, a final judgment would not be in character with the nature of the injury. An annuity was granted, made subject to periodic revision every two years depending upon whether the plaintiff's condition improved, deteriorated, or remained the same.

Similarly, in Abram v. Petit the victim of a motor car accident was left with a nervous disorder persisting after his other wounds had healed. An expert witness declared that the condition was curable and that it might disappear leaving no traces. The court ruled that it would be unjust to award a final sum. An annuity was granted, made subject to revision every two years, and subject to discontinuance if the plaintiff's condition should be cured.

The procedural difficulties that these techniques would encounter under the common law are overcome rather nimbly by the French courts. It is the theory of the French doctrine that a judgment passes only upon the damages actually submitted to the court at the time of trial and not on "new damages" stemming from the same cause. To be sure, a court can make an express, final decision that all possible claims from a cause are merged in the judgment, but, short of that, "new damages" give rise to a new cause of action. It is not always easy to decide when "new damages" exist which were not present and claimable in the first instance; but, for example, the loss of a second eye after the judge has passed on the loss of the first one is "new damage."

The courts have also shown a tendency to regard an injury which was not definable nor perceivable at the time of the first judgment as "new damage," sufficient to support an action for supplemental indemnity. In *Corne v. Pozzi*¹¹⁴² the initial judgment rendered in 1946 granted the plaintiff a lump sum of 125,000 francs. A few years later he petitioned for a re-examination. As to an objection of *res judicata* the court said that the aggravation of an injury suffered in an accident in itself is a new cause of action for damages, distinguishable from the cause of action first litigated, and supplemental damages may be requested. Experts must be called, of course, to testify as to whether the aggravation is a direct consequence of the accident, and to determine its extent.

Again, in *Canac v. Abline*¹¹⁴⁸ the argument of *res judicata* was rejected in a case involving subsequent aggravation of damages, even though there was no reservation of the right to reopen the original judgment. The French courts have gone so far as to say that *res judicata* is always subject to an exception, even in cases where the injuries constitute only an aggravation of a condition existing prior to the the first judgment at which time they were either unpredictable as to their future extent or not perceivable by normal means of investigation.¹¹⁴⁴

The right to revision of judgments and awards is by no means automatic in French law. The courts are merely empowered to use sound judgment to achieve equitable disposition of particular cases; they actually make rather sparing use of this prerogative. Generally a party cannot reopen a case if the first court purported to adjudicate the entire damages in a lump sum and made no reservation as to the reopening of judgment. This is so in most cases even if a party has expressly reserved the right to open the case and the court recorded this reservation in the judgment. The appellate courts generally oppose the tendency of trial courts to award indemnities subject to future modifications based solely on a rise in the cost of living. In general it is said that variations in the cost of living are not attributable to the tort and thus should not be taken into account in a judgment awarding future compensation.

¹¹⁴⁸ Grenoble, Jan. 20, 1936, 154.
¹¹⁴⁴ (Ex Parte) Blandin, Conseil d'Etat, July 1, 1949, Gaz. Pal. 1949, 2, 305, in which the plaintiff was given a supplemental income to compensate for the devaluation of the currency at the time of the second trial in a case arising out of government liability for injuries caused by an army vehicle.
(f) Conclusions

If the French can administer their provisional judgment system there would seem to be no real, insurmountable obstacle to administering the "contingent injury fund" plan which actually should be much more satisfactory from the defendant's point of view since, if he is successful, he will be discharged at the first trial. Plaintiffs should gain because they do not have to pursue a defendant who perhaps at a later date may be bankrupt or who may have disappeared. Also, provision would be made for the case where there is as yet no observable injury to be compensated. The necessity of enormous awards, increasingly frequent in recent common law decisions, may in part be due to the "now or never" approach to tort liability. In the case of radiation injuries, results in keeping with this liberal trend under the present system may even lead to an impossible situation.\textsuperscript{1146} It is time we changed our damage rules as well as re-evaluated our concepts concerning proof of both causation and damages.

The suggested "contingent injury fund" might seem to do harm to interests of lawyers handling tort cases, yet even here it should call only for an adjustment of their way of handling fees and planning income. There should be no reduction in total income over a period of years. Perhaps the greater degree of certainty of outcome would make it possible even to increase total professional incomes because the cases could be handled more expeditiously.

In any event it seems that a fairer system between the important parties in tort actions, the plaintiff and defendant, can be worked out, and this is the most significant consideration, a concept which the profession will surely applaud.

If the suggested plan proves to be adequate for future injuries, there is every reason to believe it also might be made applicable to present injuries where there is less than real certainty that a particular force or cause is responsible for a specific injury. If it works, this should do much to increase the lay public's respect for law as a means of achieving justice in tort cases, something the public and non-legal experts often doubt, and rightfully so in many cases.

\textsuperscript{1146} See text \textit{supra} at notes 1120-21 for a discussion of possibilities should there be a major reactor incident and the "more probable than not" rule applied.
6. Application of *Res Ipsa Loquitur* Concepts

a. In General

Assuming that negligence rather than strict liability rules are applied in radiation cases, (and surely this should be true in a large percentage of the cases) the plaintiff may seek to invoke the doctrine of *res ipsa loquitur*. If so, his burden of proving the defendant’s negligence and that it caused his injury will be made easier.

Without help from this doctrine it may prove to be extremely difficult to establish by direct evidence that a particular radiation accident was the result of negligence. The plaintiff may find himself totally unable to pinpoint precise negligent acts or omissions, probably because of (1) ignorance on both his part and the defendant’s as to exactly what happened, or (2) death of potential witnesses and destruction of material physical evidence, or possibly (3) assertion of government secrecy restrictions. Therefore, while he stands an excellent chance of recovery once his case is placed in the hands of a sympathetic jury, the plaintiff in these three situations may lose on defendant’s motion to dismiss.

*Res ipsa loquitur*, literally translated, means “the thing speaks for itself.” In terms of legal practice, the phrase connotes a method of proof by circumstantial evidence. In most jurisdictions, the plaintiff is given the advantage of an inference that the defendant was negligent and thereby he escapes a nonsuit. *Res ipsa loquitur*, however, can be used only in restricted circumstances. To speak for itself, an accident must be one that normally does not occur without negligence, and it must arise from a force or instrumentality “controlled” (in a loose sense) by the defendant.1146 Establishing these conditions precedent to the application of *res ipsa loquitur* may frequently be almost as difficult as establishing negligence directly; but, in the usual case, the plaintiff’s burden on the negligence issue is substantially lessened by resort to the doctrine, and at least a psychological obligation is placed on defendant to offer rebutting evidence.1147 Hence the doctrine is extremely popular with plaintiffs’ attorneys.

There is no logical reason why *res ipsa loquitur* should not be applied in radiation injury situations, and a number of writers have

1146 See Prosser 199-211. Additional conditions, that plaintiff eliminate the possibility of his own contributing conduct as the responsible cause and that the evidence be more accessible to defendant than to plaintiff, are also frequently listed. *Ibid.*

1147 See the discussion of the procedural effect of *res ipsa loquitur* in the text accompanying notes 1197-1204 infra.
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noted its possible application to such cases. Seldom, however, has more than a superficial treatment been given to the doctrine's possibilities in this context, and for this reason, a relatively extensive discussion of res ipsa loquitur is warranted here.

(1) Development

In the past quarter-century, practically all of our leading tort authorities have attempted definitive examinations of res ipsa loquitur. In spite of or perhaps because of this, confusion reigns to a considerable extent, at least as to the refinements of the doctrine. General unanimity among commentators and courts exists, however, on many of the major principles.

There is wide concurrence, in the first place, that res ipsa loquitur is an evidentiary rule which, at least in its original state, was based on common sense. Early English jurists recognized that in some instances, circumstantial evidence on the issue of negligence might be such that a jury reasonably could exclude every hypothesis other than that defendant's negligence was a proximate cause of the accident. Plaintiff was allowed in these cases to use res ipsa loquitur as a form of circumstantial evidence. This proved, of course, to be of great assistance to him.

One of the early statements, defining the cases in which res ipsa loquitur would be permitted, is found in Scott v. London & St. Katherine Docks Co. The court said:

But where the thing is shewn to be under the management of the defendant or his servants, and the accident is such

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1151 See e.g., Prosser, "Res Ipsa Loquitur in California," supra note 1150 at 184-85.
that as in the ordinary course of things does not happen if those who have the management use proper care, it affords reasonable evidence, in the absence of explanation by the defendants, that the accident arose from want of care.\textsuperscript{1152}

Use of the doctrine was limited, therefore, to instances where the reasonable inference to be drawn from the facts adduced by the plaintiff was that the defendant, or someone for whose acts he was legally responsible, had been negligent in causing plaintiff's injury.

In the years that followed the \textit{Scott} decision, this original "pure" statement of \textit{res ipsa loquitur} became clouded by judicial efforts to identify the doctrine with responsibilities of carriers, since most of the cases in which it was applied involved railroads or other common carriers.\textsuperscript{1153} It remained for Dean Wigmore to clear the air in this country with a careful definition of the situations in which the rule should be applied:

\begin{enumerate}
\item The apparatus must be such that in the ordinary instance no injurious operation is to be expected unless from a careless construction, inspection, or user; \item Both inspection and user must have been at the time of the injury in the control of the party charged; \item The injurious occurrence or condition must have happened irrespective of any voluntary action at the time by the party injured.\textsuperscript{1154}
\end{enumerate}

The fifty-odd years that have passed since Wigmore's statement first appeared have witnessed relatively unanimous judicial acceptance of his formula in determining when to apply \textit{res ipsa loquitur}. Nevertheless, it is no more than a guidepost. The three conditions precedent to application have been gradually both eroded and expanded, and today, while commentators' catchphrases bear remarkable similarity to Wigmore's, the doctrine must be examined in greater detail if its contemporary nature and extent are to be pictured accurately.

In examining the conditions, however, it is important to keep in mind one traditional limitation on its use. \textit{Res ipsa loquitur} traditionally is said to deal only with the question of proof of breach of duty in a negligence action. It has no application to actions based on intentional wrongdoings or to actions based on some form of strict liability. The doctrine is thought not to apply to any issue in a negligence action other


\textsuperscript{1153} See Prosser, "Res Ipsi Loquitur in California," \textit{supra} note 1150 at 185-89 and cases cited therein.

\textsuperscript{1154} 4 Wigmore, Evidence §2509 (1st ed. 1905).
than breach of duty, although some of the cases are beginning to corrup the doctrine's purity in this latter regard.\textsuperscript{1155}

There are two principal aspects of the \textit{res ipsa loquitur} conditions. The first deals with the probability that the accident would not have happened without negligence; this is strictly a matter of the nature, scope, and breach of a particular duty to use care. We ask whether this kind of accident normally would happen without negligence; if not, the accident speaks for itself. This is the first condition precedent to the use of \textit{res ipsa loquitur}.

The second aspect involves the second and third conditions precedent to application—\textit{i.e.}, connecting defendant with responsibility for this particular accident and discounting plaintiff's responsibility. These inquiries must range beyond a strict duty analysis; indeed, the question becomes specifically one of causation-in-fact. Generally, on these issues the question is whether defendant most probably is the person to be held accountable for the accident, and this involves examination of the various other possible causes.

Thus, in a sense, this second aspect of the \textit{res ipsa loquitur} prerequisites is really an inquiry as to cause-in-fact: Did defendant's action cause the injury? Typically, \textit{res ipsa loquitur}, however, applies only to that part of the cause-in-fact question dealing with whether it was a particular defendant who set the injurious force in motion, but not whether a given type of force did in fact cause the particular injury which plaintiff suffered.

The difference between these two quite separate aspects of \textit{res ipsa loquitur} has not always been kept in mind. The doctrine that the accident speaks for itself can be applied only when both are satisfied, and they call for fundamentally different evaluations of the facts. The reader should keep this in mind in analyzing each of the three conditions precedent.

(2) Prerequisites for Applying

(a) Nature of the Accident

Prosser rephrases Wigmore's first condition in these terms:

The requirement that the occurrence be one which ordinarily does not happen without negligence is of course only another way of stating a principle of circumstantial evidence, that the accident must be such that in the light of ordinary

\textsuperscript{1155} See text following note 1189 \textit{infra}.
experience it gives rise to an inference that some one has been negligent.1156

At the extremes the appropriateness or inappropriateness of res ipsa loquitur under this definition is frequently obvious. If a boiler explodes,1157 or impurities are found in a food product,1158 there is a rather strong tendency to infer that someone has acted negligently. If, on the other hand, a car skids,1159 or a person falls alighting from a public conveyance,1160 it is eminently possible—absent contrary evidence—to conclude that no one has been negligent. Nevertheless, in many instances, the decision whether res ipsa loquitur is appropriate is of the “hairline” variety, ultimately turning on the subjective process of weighing the various possible causes of the accident. While there is considerable disagreement on the matter,1161 it is perhaps fair for our purposes to generalize that courts will deem this first condition satisfied if it appears “more probable than not” that someone’s negligence was a proximate cause of the accident.1162

In most instances involving ordinary accidents, the layman is fully qualified to decide this question of probability. Cases often arise, however, in which expert testimony would appear valuable in determining whether the incident is one in which negligence ordinarily would be involved. Because of an early conception that an accident could not speak for itself before a jury unless a layman were fully qualified to weigh the probabilities, some courts have excluded expert testimony on this issue.1163 The commentators generally agree today, however, that experts should be permitted to give opinion testimony on the negligence probability issue in appropriate cases,1164 and there is a growing trend in this direction.1165 Expert testimony has been permitted in a variety

1156 Prosser 202.
1157 Kleinman v. Banner Laundry Co., 150 Minn. 515, 186 N.W. 123 (1921).
1162 Prosser, “Res Ispa Loquibur in California,” supra note 1150 at 194. See discussion generally of test of probability, supra notes 923 ff.
1165 See the supplementary opinion of the California appellate court modifying Costa v. Regents of University of California, cited at note 1163 supra. For a careful study of res ipsa loquitur cases in which expert testimony has been admitted, see Note, 106 U. Pa. L. Rev. 731 (1958).
of cases, particularly those involving complex or dangerous instrumentations, both for the purpose of invoking res ipsa loquitur and for showing it inapplicable. 1166

In addition to expert testimony, the question of probability undoubtedly is further affected by a considerable number of peripheral factors not involving the immediate circumstances of the accident. The safety record of an industry, for example, for certain types of operations can be of considerable importance. This is evident when one considers that, while in the early cases the courts held res ipsa loquitur inapplicable to aircraft accidents, there is today a growing acceptance of the conclusion that this type of incident is appropriate for imposition of the doctrine. 1167

Another contributing factor affecting the balancing process may be the relationship of defendant and plaintiff. Once defendants in litigated cases begin to be held liable in certain fact situations, "the inference of negligence becomes all the easier to draw. As the precautions that defendant must take to avoid injury increase there is a proportionate increase in the number of available hypotheses involving carelessness." 1168 Thus in situations involving the carrier and his passenger, 1169 or the conduct of hazardous activities 1170 by the defendant, res ipsa loquitur is more likely to be applied than in typical negligence situations.

In the final analysis, these latter tendencies represent no more than specialized manifestations of basic policy decisions. It is inevitable in any subjective process that fundamental conceptions of policy will affect a court's decision, and the application of res ipsa loquitur is no exception. Thus if the nature of a person's activity is such that society demands that he assume an insurer's responsibility, res ipsa loquitur

1166 See cases cited in Note, 106 U. Pa. L. Rev. 731, 736-37 (1958). See also discussion of X-ray cases in which res ipsa loquitur has been at issue, text accompanying notes 1213-1245 infra.


1168 Malone, supra note 1150 at 78. "It should be noted that this reasoning applies not only where there is a relationship which calls for great care, but whenever the dangerous nature of the defendant's conduct calls for commensurately great precautions. This does not mean (logically) that an inference of negligence may be drawn in all cases calling for great care, but that it may be more easily drawn from facts that otherwise might be regarded as equivocal." Harper & James 1084.

1169 E.g., Osgood v. Los Angeles Traction Co., 137 Cal. 280, 70 Pac. 169 (1902).

becomes the "poor cousin" of liability without fault. A court unwilling to accept and apply the latter doctrine can often accomplish the same end result by easing the plaintiff's evidentiary burden with *res ipsa loquitur*. Conversely, when the defendant is engaged in an activity which, although it is potentially dangerous, society desires to foster, considerably less judicial enthusiasm for application of *res ipsa loquitur* should be encountered.

(b) "Control" by the Defendant

It would be erroneous to read literally Wigmore's second condition, that the instrument be in defendant's control at the time of injury. Myriad cases have presented fact situations in the past fifty years which do not involve exclusive physical control by defendant, but the application of *res ipsa loquitur* nevertheless is considered appropriate. The most famous of these are the "exploding bottle" cases in which the defendant normally relinquishes physical control long before the accident takes place. Indeed, the plaintiff himself usually has exclusive physical control at the time of injury. In these and similar cases, the concept of physical control at the time of accident ceases to effectuate its original purpose, and it generally is held sufficient that the defendant, or one for whose acts the defendant is legally responsible, had dominion over the instrumentality at the time when, more probably than not, the negligent act took place. Other difficult cases are solved merely by requiring that the defendant have the "right to control" as opposed to actual physical control. If the foregoing is true, the persistence and expansion of the 'doctrine'—in spite of trenchant and penetrating logical criticism—may well be attributable to the strong general trend towards strict liability and social insurance—a trend which is corroding a system of liability nominally based on fault. This would also account for the greater readiness to invoke the doctrine in certain kinds of situations, and within certain relationships, where the pull towards absolute liability has been particularly strong, or where the accident victim's burden of proof has been particularly forbidding." Harper & James 1079-81.

1171 "In a system where the adoption of an agnostic position will deny recovery to the accident victim (who has the burden of proof) the practical impact and importance of *res ipsa loquitur* has probably consisted in its tendency to invite or encourage the assumption of broad and doubtful postulates favorable to liability in many situations where the courts would otherwise be understandably reluctant to adopt them, at least without the aid of expert opinion. If the foregoing is true, the persistence and expansion of the 'doctrine'—in spite of trenchant and penetrating logical criticism—may well be attributable to the strong general trend towards strict liability and social insurance—a trend which is corroding a system of liability nominally based on fault. This would also account for the greater readiness to invoke the doctrine in certain kinds of situations, and within certain relationships, where the pull towards absolute liability has been particularly strong, or where the accident victim's burden of proof has been particularly forbidding." Harper & James 1079-81.

1172 For this reason, a number of courts have declined to apply the doctrine to malpractice actions. See Note, "The California Malpractice Controversy," 9 Stan. L. Rev. 731, 737 et seq. (1957).

1178 E.g., Escola v. Coca Cola Bottling Co. of Fresno, 24 Cal.2d 453, 150 P.2d 436 (1944); Zentz v. Coca Cola Bottling Co. of Fresno, 39 Cal.2d 436, 247 P.2d 344 (1952); Weidert v. Monahan Post Legionnaire Club, 243 Iowa 643, 51 N.W.2d 400 (1952).
physical control,\textsuperscript{1174} or by stating that defendant's duty to control is non-delegable in law.\textsuperscript{1175} Prosser has termed the control concept as "pernicious and misleading" and suggests that the second condition precedent to application of \textit{res ipsa loquitur} be phrased that "the apparent cause of the accident must be such that the defendant would be responsible for any negligence connected with it."\textsuperscript{1176} This latter suggestion is broadly accepted by the commentators and the tendencies may be in this direction. The courts, however, generally display greater conservatism, and it is seldom, in a \textit{res ipsa loquitur} opinion, that the control theory in some form is not at least mentioned by name.

A further aspect of the second condition, tacit in what already has been said, is the requirement of exclusivity. The control or right to control the harmful instrumentality by the defendant must be such that other causes may reasonably be discounted. These other causes need not be eliminated, but "their likelihood must be so reduced that the greater probability lies at defendant's door."\textsuperscript{1177}

As was the case with the first condition, this process involves a balancing of probabilities. Here, however, the court deals in terms of probable \textit{causation-in-fact}, whereas for the first condition, an entirely different evaluation—probability of \textit{negligence}—was required. The general judicial approach to the causation question, nevertheless, should not diverge substantially from that indicated previously, and we may equally expect courts to bring similar policy considerations into play when the strict logic of \textit{res ipsa loquitur} fails in a particularly appealing case.

The principal area in which such considerations have arisen is that involving multiple defendants. The plaintiff often may find it impossible to narrow the reasonable hypothetical causes of an accident to an instrumentality in the exclusive care of one person. At first glance, logically \textit{res ipsa loquitur} cannot be applied, since the probabilities do not point toward the defendant. If, however, the plaintiff has discounted all causes but two or three, each independent of the others but all in some way within the defendant's legal responsibility, there is no

\textsuperscript{1176} Prosser 206.
\textsuperscript{1177} Harper & James 1086.
reason for refusing *res ipsa loquitur.*\textsuperscript{1178} True, causation is not proved precisely, even by probabilities, but the question is of no importance when the defendant is responsible for all the probable causes. Similarly, where there are several defendants operating in a joint enterprise, so that each is legally responsible for the others' negligent acts, the courts are willing to apply the doctrine to defendants as a group.\textsuperscript{1179}

The difficult case, and the one evoking the most discussion, involves multiple defendants who operate independently. Even if the plaintiff is injured under circumstances making it probable that negligence was the cause of the accident, there may be more than one possible source of the negligence and more than one defendant possibly responsible for several sources. It may be that the plaintiff will be unable to give circumstantial proof indicating that the injury resulted "more probably" from any single defendant's negligence. For this failure to pin exclusive responsibility on one defendant in a case where the enterprise is not joint, is the plaintiff to be denied the use of *res ipsa loquitur*? Again, logically the answer must be in the affirmative, since application of *res ipsa loquitur* is predicated on the assumption that at least it is more probable than not that the defendant was responsible. When the plaintiff fails to sustain this logical burden, he should not be allowed the use of *res ipsa loquitur*—in the traditional view. In several decisions, however, this logic has been overlooked in judicial response to certain fundamental conceptions of social policy, and *res ipsa loquitur* has been extended beyond the original and logical limits, implied by "the situation speaks for itself."

The most significant of these cases is the California decision of *Ybarra v. Spangard.*\textsuperscript{1180} During an operation for removal of an appen-

\textsuperscript{1178} "There are, indeed, cases in which a showing that every instrumentality to which a given injury could with reasonable probability be attributed was under a defendant's management has been accepted by the courts as, for practical purposes, the equivalent of a showing that the defendant controlled the particular instrumentality that did cause it." Hubbert v. Aztec Brewing Co., 26 Cal. App. 2d 664, 687, 80 P.2d 185 (1938). See also Judson v. Giant Powder Co., 107 Cal. 549, 40 Pac. 1020 (1895).

\textsuperscript{1179} The famous case of *Summers v. Tice,* 33 Cal. 2d 80, 199 P.2d 1 (1948), is illustrative of this point. In that case, plaintiff was on a hunting expedition with the two defendants. Plaintiff was shot in the eye with a single shotgun pellet after defendants had fired at a quail almost simultaneously. The court approved a trial court finding that "defendants were jointly liable and that thus the negligence of both was the cause of the injury or to that legal effect." Id. at 84. Without mentioning *res ipsa loquitur*, the court held that the circumstances of the injury required "that the burden of proof . . . be shifted to defendants . . . They are both wrongdoers—both negligent toward plaintiff." Id. at 86. The court cited Ybarra v. Spangard, 25 Cal. 2d 486, 154 P.2d 687 (1944) as authority. Cf. Cook v. Lewis, (Canada) [1952] 1 D.L.R. 1.

\textsuperscript{1180} Supra note 1179.
dix, the plaintiff received an injury to his shoulder. The precise cause of the injury was unknown, but apparently it resulted from an external trauma occurring while the plaintiff was under anesthesia. The plaintiff brought suit against the hospital and all of the persons who had been present at his operation. He sought to apply *res ipsa loquitur* against each of them. The court held that the doctrine applied, stating:

The control, at one time or another, of one or more of the various agencies or instrumentalities which might have harmed the plaintiff was in the hands of every defendant or of his employees or temporary servants. This, we think, places upon them the burden of initial explanation. Plaintiff was rendered unconscious for the purpose of undergoing surgical treatment by the defendants; it is manifestly unreasonable for them to insist that he identify any one of them as the person who did the alleged negligent act.

The other aspect of the case which defendants so strongly emphasize is that plaintiff has not identified the instrumentality any more than he has the particular guilty defendant. Here, again, there is a misconception which, if carried to the extreme for which defendants contend, would unreasonably limit the application of the *res ipsa loquitur* rule. It should be enough that the plaintiff can show any injury resulting from an external force applied while he lay unconscious in the hospital; this is as clear a case of identification of the instrumentality as the plaintiff may ever be able to make.\(^{1181}\)

While there is some indication in this language that the court’s holding may have rested on a theory of mutual legal responsibility among defendants, the court purportedly goes on to apply *res ipsa loquitur* without reliance on this theory. In essence, the justification is merely that under the circumstances it would be “manifestly unreasonable” to call upon the plaintiff to identify the instrumentality or the person controlling it. The circumstances appearing significant to the court were (1) that the defendants had rendered the plaintiff unconscious for the purpose of performing an operation, (2) each had a duty of care toward plaintiff, and (3) each of them at one time or another had control of instrumentalities that could have caused the injury. Thus, the court reasoned, the defendants—rather than the unconscious plaintiff—were in a much better position to pinpoint the negligence and should be required to do so.

The *Ybarra* decision naturally has evoked considerable comment and

\(^{1181}\) *Id.* at 492-93.
some criticism. 1182 Seavey, the principal critic, argues that it is error to "impose liability upon all the members of the group where it is evident that the harm was not the result of group action and that most of the members of the group were innocent of wrongdoing." 1183 This argument has considerable force if we assume that none of the defendants except the negligent party knows how plaintiff was injured, since the chances are that all defendants will be found liable by the jury. If, on the other hand, we assume that the defendants have knowledge as to the particular act of negligence, but are withholding it out of a sense of mutual protectiveness, Seavey's suggestion loses some of its vitality. The court could use Ybarra reasoning only to force out of defendants an explanation for the accident, in a situation in which very likely they all do know what happened. It need not hold innocent defendants liable, unless they refuse to testify as to what they know and did. If every defendant testified he was not responsible, all might still be held liable under the Ybarra rationale.

Prosser, while not specifically approving the result in Ybarra, justifies it on the ground of a "special responsibility for the plaintiff's safety undertaken by everyone concerned." 1184 He visualizes other situations in which courts might reach similar results because of the special relationship between the defendants and the plaintiff.

A second rationalization is possible. The court may have felt that while the relationship inter se of defendants was not sufficiently strong that the application of res ipsa loquitur could be based on a theory of joint venture, neither were the acts so completely separate that the court should not attach some group responsibility to their conduct. All of the participants in the operation, together with the hospital, could be said to have entered consciously on a course of conduct which included cooperation and mutual reliance in handling plaintiff. This conscious unity of purpose thus might have been, at least for the California court, a sufficiently strong substitute for exclusivity that the second condition could be said to be reasonably satisfied. It may be one way of forcing each of the group in effect to assume responsibility for the actions of all, and therefore force them to check on each other.

1182 Commenting on the decision, see e.g., Prosser, "Res Ipsa Loquitur in California," supra note 1150 at 223 et seq.; Harper & James 1091; McCoid, "Negligence Actions against Multiple Defendants," 7 Stan. L. Rev. 480 (1955). For a criticism, see Seavey, supra note 1150.

1183 Seavey, supra note 1150 at 648.

1184 Prosser 208. See also Prosser, "Res Ipsa Loquitur in California," supra note 1150 at 224.
If either this explanation or Prosser's analysis is accepted, we transcend traditional *res ipsa loquitur* concepts. The doctrine's prerequisite of causal probability in fact is left unsatisfied, since the plaintiff has shown only that (most probably) one of several persons, not acting in legal concert, acted negligently. He does not show which one. Theories of "special responsibility" or "moral interrelationship" on the defendants' part do not fill this logical vacuum, they merely circumvent it. Rather than attempting to fulfill the traditional conditions precedent to *res ipsa loquitur*, these theories proceed fundamentally on a different social policy. At most, this is "quasi" *res ipsa loquitur*, by which a convenient evidentiary tool is wielded liberally to effectuate an overriding conception of just result.

As Seavey points out, all of the defendants in *Ybarra* were probably insured. If we take this one step further and assume that all were insured by the same company, the *Ybarra* result becomes irresistible. In practical effect, when this is the case, the situation is no different as to ultimate liability (of the insurer) than if one defendant were responsible for several negligent forces. Although the plaintiff cannot precisely denominate the offending force, the courts need not be troubled, since the defendant (or the insurer) is going to be liable in any event. Reasoning such as this becomes another rationalization for *Ybarra*, if we can assume coverage for all by a single insurer, something that should be proved, not assumed.

Harper and James pass off the result as a manifestation of the general trend toward strict liability and social insurance. It is clear, however, that there may be many occasions on which a court would be willing to shift the burden of explanation to the defendant, yet refuse to impose strict liability. A traditional argument underlying imposition of *res ipsa loquitur* has been that the defendant has superior knowledge of the precise facts of the accident and that use of the doctrine will force these facts out. *Ybarra*, certainly is a case of this

1185 Seavey, *supra* note 1150 at 648, n. 15.
1186 Hospitals normally obtain insurance for their "employees," which could often mean that all the persons present at an operation were covered by the same policy. See generally, McGibony, *Principles of Hospital Administration* 207 (1952); Hines, "Hospital Malpractice Liability Insurance," 34 Chi. B. Rec. 135 (1952).
1187 "This is no retreat from individualizing the finding and treatment of fault, but rather a retreat from insistence upon fault (in accident law) and from the fiction that damage claims are paid out of the pockets of individual wrongdoers. It is simply a recognition both of the fact and the desirability of spreading accident losses according to the principles of insurance." Harper & James 1089.
1188 The superior knowledge of defendant has frequently been listed as a prerequisite for application of *res ipsa loquitur*. While courts and commentators roundly discount
nature—one feels (and the court felt) a spontaneous urge to call upon the defendants to explain. This is different from holding the defendants strictly liable as a group. It is to be admitted that often, when only one defendant is involved, imposition of *res ipsa loquitur* has the same effect as applying strict liability. When there are multiple defendants, however, acceptance of the doctrine frequently may mean only that the defendants will be forced to introduce evidence against one another, particularly when they are insured by different companies. This evidence may be sufficiently strong that the logical exclusivity requirement eventually will be satisfied in reverse, *viz.*, causation is established after, not before, *res ipsa loquitur* is applied.

Ideally, faced with a situation like *Ybarra* where it is obvious that someone has been negligent, the court would like to see liability imposed on that one person and no others. Since plaintiff’s evidence does not reveal that person’s identity, the court must choose between two alternatives: (1) deny application of *res ipsa loquitur* and in effect nonsuit plaintiff; or (2) apply the doctrine and wait for defendants to fight out the causation issue. Choice of the latter alternative, of course, creates the risk that innocent defendants may be as ignorant of the precise facts as the plaintiff and thus ultimately may be held liable despite their innocence. In *Ybarra*, however, the strong possibility that the defendants actually had superior knowledge—plus the presence of insurance, the unconscious state of the plaintiff, and the special relationships involved—probably served to make the choice an easy, if logically questionable, one.

In any event, the *Ybarra* doctrine today is firmly entrenched in California malpractice law, having been applied on several recent occasions. Such a rule today, there is no doubt that the suspicion of such superior knowledge is a strong factor influencing courts to apply the doctrine. Prosser 209–210.

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the source of the particular offending bomb. The companies were entirely independent of one another; there was in no sense the cooperative undertaking or conscious unity of purpose present in Ybarra. *Res ipsa loquitur* was held to apply even though it was clear that one of the defendants was entirely innocent. 1191 If *Ybarra* is read in its broadest terms without regard to the particular fact situation involved, *Litzmann* follows the pattern. In the latter case, however, there was not even a semblance of concurrence of action among defendants, and it would seem that *Ybarra* has been stretched further than the actual opinion would justify. Statements of law and of fact are so interspersed in *Ybarra* that it is somewhat difficult to say that the case stands for any particular abstract propositions, without reference to the facts on which the propositions are based.

Prosser's justification for the *Ybarra* decision, that of "special responsibility" on the part of the defendants toward the plaintiff, could perhaps be stretched to cover the *Litzmann* situation. This could mean that the possessor of any unusually hazardous instrumentality would run the risk of the imposition of *res ipsa loquitur* against him any time the plaintiff sustains injuries for which his instrumentality might have been a cause. Discounting the possibility of superior knowledge on the part of the particular potential defendant, such a broad doctrine would appear unwarranted.

*Litzmann* also might be said to stand upon another ground that under particular circumstances would not make imposition of *res ipsa loquitur* against independent defendants seem quite so unjust. The facts show that there were only two defendants, one of whom clearly was negligent, the other of whom clearly was innocent. In other words, the probability of one or the other being the responsible negligent person was "50-50." Although *res ipsa loquitur* is phrased logically in "more probably than not" terms, who is to measure the difference between "50-50" and "51-49"? 1198 Some might argue that since the probabilities are only a guess in a close case anyway, we should be willing at least to extend our thinking to the case where we know the probabilities are equal.

The theoretical difficulties with this type of argument are fairly obvious. In the traditional sense, the justification for having the *res ipsa loquitur* doctrine at all is the fact that we can reasonably denominate the defendant as the responsible cause. In essence, then, the question be-

1191 Litzmann v. Humboldt County, *supra* note 1190 at 85.
1192 See the quoted portion of the opinion accompanying note 1181 *supra*.
1193 For a critical discussion of this type of approach to the probabilities question, see Jaffe, *supra* note 1161.
comes whether to take what was once a legitimate evidentiary tool and make it an instrument of social policy. Many courts would argue that even the “51-49” probability is not good enough to justify imposing *res ipsa loquitur* upon the defendant, for the reason that they do not feel qualified in such a close case to say flatly that the defendant’s negligence is the more probable cause. These courts are acutely aware, it would appear, that our system of justice (for better or worse) requires the plaintiff to prove his case, or lose,

Dilution of the *res ipsa loquitur* requirement to the “50-50 line” theoretically, if not practically, works contrary to this basic principle.

If *Litzmann*-type thinking is accepted for cases involving two named defendants, the next question is what to do when there are six or seven defendants or more, only one of whom is negligent and none of whom is connected in any way with his fellow defendants. This would be the case if, instead of two companies at the fairgrounds, there had been several. The plaintiff clearly cannot invoke *res ipsa loquitur* in its true sense, for our assumption is that he has no evidence which points more strongly to one defendant than any of the others. The “50-50 probability” thesis of *Litzmann* is unavailable, of course, and there is no room for argument, as in *Ybarra*, that the defendants engaged in a joint enterprise or conscious mutual undertaking to treat the plaintiff with care. Nor is there nearly as good a basis for assumption of superior knowledge on the defendants’ part, since they are independent operators with no knowledge of how others acted or perhaps even of their existence. Indeed, application of *res ipsa loquitur* to these facts—“calling upon defendants to explain”—can only be predicated on an argument that the defendants are possessors of dangerous instrumentalities and probably are insured against public liability. This, of course, begins to sound like strict liability talk. But, in one sense, it goes much further than that: it eliminates the causation requirement from the plaintiff’s cause of action as well. Assuming no superior knowledge on the defendants' part which eventually would force liability on the one negligent party, *Litzmann*-type thinking would make innocent parties—without proof of negligence or causation—liable for the acts of an unrelated wrongdoer. This is surely a curious result and not likely to be approved by too many courts or commentators. Any attempt to so “liberalize” the second *res ipsa loquitur* requirement is dangerous and improper.

The validity of our present scheme of tort liability, as applied to radiation injuries, is discussed elsewhere in this chapter. See text following note 1060 *supra*. 
Ybarra may be justified on the ground of joint undertaking, or group responsibility, or revealing concealed common knowledge. The line between a joint venture and the concept of conscious unity of purpose that we may distill from the opinion necessarily is a hazy one. Can we not say that when the relationship between each defendant and plaintiff is such that the defendant’s duty of due care also includes guarding the plaintiff from the negligence of the other defendants, this will be sufficient to satisfy a group unity requirement for multiple defendant cases? This stays within the legitimate extremes of the res ipsa loquitur doctrine since, although detailed causation is admittedly not proved, neither is such proof important, inasmuch as each member of the group is responsible for the others’ misconduct.

If Prosser’s “special responsibility” thesis is adopted, res ipsa loquitur can easily get out of hand. A court might find that all the fireworks companies on the fairgrounds owe nine-year-old boys special responsibility. Then res ipsa loquitur could be applied despite a lack of any other relationship among the defendants and, in effect, the causation requirement is eliminated.

As long as insurance is not compulsory for all business and professional enterprises and as long as all insurance is not derived from a single source, causation remains a legitimate element of a tort action. In taking what was once a logically justifiable evidentiary device and converting it into a lever for forcing evidence out of multiple defendants, the courts run the danger of eliminating causation as a prerequisite to recovery in this type of case. Probably not many courts would be willing to say, “We will shift the burden of going forward to defendants in the hope that their evidence, reluctantly divulged under the threat of liability, will narrow the cause-in-fact to the one responsible defendant; but if it appears from their evidence that their knowledge of the circumstances is no greater than plaintiff’s, he must be nonsuited for failure on the general issue of causation.” Courts are much more likely to apply res ipsa loquitur against independent multiple defendants on the breach of duty issue, in the sense that somebody was negligent, and upon the defendants’ failure to pinpoint the source of negligence, permit the jury to find all the defendants liable, for “failing to rebut the inference of negligence,” without further regard for the issue of causation-in-fact. Depending upon how one chooses his words, this process either eliminates causation or permits res ipsa loquitur—if we may still call it that—to solve the general causation issue as well as the breach of duty issue.
This is valid, of course, if plaintiff predicates his cause of action on a theory of group responsibility—he need trace negligence only to the group. However, if the plaintiff's case is such that not all the members of the group are responsible for the negligence, a mere tracing of causation to the group is insufficient. It should be insufficient whether done by direct evidence, or indirectly, by way of inference.

In any event, whatever one's conclusion as to the legitimacy of the Ybarra-Litzmann trend, the lawyer must be prepared to recognize clearly the existence of such deviations from a logical application of *res ipsa loquitur*. The device is logically used only when it is more probable than not that a particular legal entity is responsible for the negligence connected with an accident. When it is used without this foundation—either to force out evidence under a threat of liability or to impose liability because of overriding social conceptions—*res ipsa loquitur* is a different concept than that traditionally accepted by American and English courts.

(c) Eliminating the Party Injured

The final basic requirement for application of *res ipsa loquitur*, as stated by Wigmore and as generally accepted by modern writers, is that the accident must have happened "irrespective of any voluntary action . . . by the party injured." 1195 This is an obvious corollary of the second condition, that the defendant be responsible for any negligence connected with the accident. The plaintiff therefore must eliminate himself, as well as third persons, as reasonably probable causes before an inference of negligence through *res ipsa loquitur* is available against the defendant.

This does not mean, however, that the plaintiff must not have been an active participant when the accident occurred. Indeed, as in the exploding bottle and collapsing seat cases, he may be in exclusive control of the instrumentality. But it is sufficient for the plaintiff to show that he was using the instrumentality in an ordinary manner such that the inference of the defendant's negligence is still reasonably probable.1198

1195 4 Wigmore, Evidence §2509 (1st ed. 1905). Prosser states this condition: "The possibility of contributing conduct which would make the plaintiff responsible is eliminated." Prosser 199. This is logically a different issue than that of contributory negligence and must be demonstrated by plaintiff even in states where generally he is not given the burden of proof as to absence of contributory negligence. See Harper & James §19.8.

(3) Procedural Effect

Should the plaintiff satisfy a court’s conditions precedent to the application of *res ipsa loquitur*, the pertinent question becomes: What procedural advantage, aside from the fact that he is temporarily relieved from proving negligence directly, does the plaintiff gain from the doctrine? Initially, of course, he escapes the possibility of a nonsuit, but what then?

There is considerable disagreement among the courts on this question. The vast majority of American courts—supported by the commentators—hold that successful invocation of *res ipsa loquitur* creates an *inference* of negligence on the part of the defendant.\(^{1197}\) This is an inference which the jury may or may not accept, as it chooses, just as the jury decides the weight to be given to other forms of circumstantial evidence. No legal burden is placed upon the defendant to introduce rebutting proof. His failure to do so will not result in a directed verdict against him, and the jury may even find in his favor upon completion of the case.\(^{1198}\)

If this were the only effect of *res ipsa loquitur*, one might wonder why claimants’ attorneys seek so tenaciously to bring it into every possible case. The answer lies in a general feeling about how juries react in negligence cases. Lawyers seem to feel that in the great majority of these cases all the plaintiff needs is to get beyond nonsuit, to place his case in the jury’s hands; the vision of a rich, heavily insured defendant will do the rest. The end result, if this is an accurate description, is no different than if strict liability had been applied formally in the first place.

A minority view holds that *res ipsa loquitur* has an even greater effect on the procedural burden. Some courts say that it creates a legal *presumption* which, if the defendant does not offer some probative evidence to the contrary, will permit a directed verdict for the plaintiff once all other elements of a negligence cause of action are shown.\(^{1199}\)

\(^{1197}\) Prosser 211-12.

\(^{1198}\) Sweeney v. Erving, 228 U.S. 233, 33 S.Ct. 416 (1913). In California, however, while the courts hold that application of *res ipsa loquitur* created only an inference of negligence, “in all res ipsa loquitur situations the defendant must present evidence sufficient to meet or balance the inference of negligence, and that the jurors should be instructed that, if the defendant fails to do so, they should find for the plaintiff.” Burr v. Sherwin Williams Co., 42 Cal.2d 682, 691, 268 P.2d 1041 (1954). A procedural effect such as this, as we shall indicate, traditionally is reserved for the presumption. See text preceding note 1199 infra.

\(^{1199}\) Prosser 212. Dean Prosser notes that this doctrine derives from early cases involving injuries to passengers caused by common carriers, where the latter had the
In addition, a few decisions have given *res ipsa loquitur* the effect of shifting the burden of proof from the plaintiff to the defendant, requiring that the latter show a preponderance of evidence in favor of non-negligence. Under the inference and presumption views, the burden of proof of course does not shift from the plaintiff, although the presumption view temporarily does shift the burden of going forward with the evidence to the defendant.

There is disagreement, as well, on the question of the effect to be given to evidence introduced by the defendant to show non-negligence. This depends, of course, on the effect originally given *res ipsa loquitur*. In states where application of the doctrine permits only an inference of negligence, the defendant can introduce no evidence and hope that the jury will find in his favor anyway, or he may introduce whatever evidence he has to show non-negligence. This normally will consist of proof of safety precautions taken in the particular manufacturing or operational process, and the jury will be free to weight the inferences suggested by this evidence against the original *res ipsa loquitur* inference. In presumption states, on the other hand, the defendant must provide probative evidence showing non-negligence or suffer a directed verdict. It is to be doubted, however, that the mere introduction of probative evidence will cause the presumption of negligence to disappear entirely from the case, as is often said to happen with presumptions other than that created by *res ipsa loquitur*. Finally, in those states in which the burden of proof is said to shift, the defendant himself must introduce enough evidence of non-negligence to sustain the ultimate burden of persuasion, i.e., the evidence must preponderate in his favor.

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1200 Prosser 212. For a decision going even farther than this position, see *Thomas v. Lobrano*, 76 So.2d 599 (La. App. 1954) discussed in some detail in text following note 1229 infra.

1201 Harper & James §19.11.

1202 "A presumption, in other words, gives to evidence an artificial effect over and above its logically probative effect. The difference is far more theoretical than real. Few defendants fail to offer some defense by way of explanation or rebuttal in litigated *res ipsa* cases. And if no defense is offered, defendant is usually gambling on a court ruling that the doctrine does not apply. He does not expect to win from a jury and almost never will. Plaintiff does not need a directed verdict and is ill-advised to move for one except under a procedure for reserving decision on such a motion until after verdict. For these reasons few of the cases which use the language of presumption actually deal with a situation where it would affect the result." Id. at 1101-02.


1204 Harper & James §19.11.
b. In Radiation Cases

(1) Radiation Injury Characteristics

As indicated previously, there is no generic reason why courts should refuse to apply *res ipsa loquitur* to cases involving radiation injuries. On the other hand, certain characteristics of radiation injury will perhaps make application of the doctrine more difficult than in the normal tort actions. The obstacles posed by these characteristics will be most formidable when the plaintiff attempts to satisfy the second condition precedent, that of the defendant's responsibility. In view of the fact that there exists only limited (and in this respect, not very helpful) judicial precedent for application of *res ipsa loquitur* to radiation injuries, a brief reminder of the characteristics of radiation which will cause the most trouble is warranted.

First, ionizing radiation, unlike other forms of injurious force, cannot be detected by the usual senses. Unless an individual wears a film badge or similar device, or unless the event through which he receives radiation is so dramatically apparent that he cannot escape the realization, a person may be injuriously exposed without ever being aware that he is in danger. Any demonstration of defendant's "control," even in a loose sense, over the harmful instrumentality is obviously made more difficult when the plaintiff cannot, upon discovering his injury at a later time, pinpoint the incident of exposure. If the plaintiff has been subjected to more than one potential source of substantial radiation, less than all of which are within the defendant's control or responsibility, he may have an extremely difficult task in reasonably discounting other sources as probable causes.

This picture is further confused by a second consideration—the fact that even though the plaintiff may suspect that he has received radiation from a defendant's source, resultant injuries may not appear for years. Particularly is this true when the emissions are of low intensity, but periodically repeated. The greater the lapse of time between the defendant's act and discovery of injury by the plaintiff, the more difficult it becomes to conclude that the injury was caused by the defendant.

Proof of causation-in-fact becomes even more difficult when account is taken of the fact that a number of injuries caused by radiation—i.e.,

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1205 See Chapter I, Section C. 4.

Including cancerous conditions—can be caused by other forces.\textsuperscript{1207} To a considerable extent, scientists and medical men have established rational predictions of injury resulting from radiation,\textsuperscript{1208} but this typically is a matter of greater likelihood of injury, not of known direct causal connection with a particular person's injury. This often means that the plaintiff must discount, besides emissions of radiation controlled by other persons, the remaining possible causes of the condition of which he complains.

Despite this rather bleak picture, one further characteristic of radiation may assist plaintiffs seeking to invoke \textit{res ipsa loquitur}. In some respects, the effect of multiple and continuing radiation is cumulative in nature, so that each new radiation incident serves to aggravate latent injury potential.\textsuperscript{1209} Let us assume that a plaintiff has received exposure from several sources in a given period of time. None of these sources emanates from the defendant. Their effect, however, has been cumulative, and when the defendant appears on the scene, the plaintiff's body tolerance for radiation is nil. The plaintiff receives just enough radiation from the defendant's instrumentality to result in perceptible radiation injury. He sues the defendant, and seeks to invoke \textit{res ipsa loquitur}. Assuming the incident is one which ordinarily would not occur without negligence, can the plaintiff satisfy the second condition precedent—reasonably discounting those causes of injury for which the defendant is not responsible?

The answer apparently is "yes." It is not to the fact of the plaintiff's injury that \textit{res ipsa loquitur} is applied—that is an entirely separate issue of proof. \textit{Res ipsa loquitur} deals only\textsuperscript{1210} with the questions of breach of duty: whether it can be said, more probably than not, that the circumstances indicate that the defendant has violated his duty to use due care in his relationship to the plaintiff. This being the case, it would appear that the plaintiff, to employ \textit{res ipsa loquitur}, only must show that the defendant more probably than not was responsible for the single instrumentality charged to him. While perhaps not the exclusive cause of injury, the defendant's act is at least a cause-in-fact—it is a substantial factor. The exclusivity aspect of the second \textit{res ipsa loquitur} prerequisite does not require that the defendant's negligence

\textsuperscript{1207} See Chapter I, Section C. 4. e. (4) et seq.
\textsuperscript{1208} Chapter I, Section C. 4.
\textsuperscript{1209} See discussion of cumulative effect, \textit{supra} Chapter I and discussion \textit{supra} text following note 750.
\textsuperscript{1210} N. b. discussion concerning use of \textit{res ipsa loquitur} to obviate the causation-in-fact issue as well, text following note 1191 \textit{supra}. 
be the sole cause of the plaintiff's injury. Conceivably, *res ipsa loquitur* might be applied to the separate but contributing acts of several defendants—each of whom could be shown to have been negligent in his relationship with the plaintiff. Such a finding is not to be confused, however, with the *Litzmann* and *Ybarra* situations, where the probabilities indicated that only one of the named defendants in fact caused the injury. Here, to the contrary, the assumption is that the cumulative nature of radiation injury means that possibly more than one "negligent" radiation source, over a period of time, could concur in the ultimate injury. This concurrence should be sufficient basis for liability under normal tort rules. The plaintiff, therefore, while faced with the problems of non-detectability, latency, and unidentifiability in solving the question of probable cause-in-fact, need only establish that the defendant's radiation source was probably one cause-in-fact. *Res ipsa loquitur* is then presumably available.

(2) Precedent: The X-Ray Cases

Judicial consideration of the applicability of *res ipsa loquitur* to radiation injury accidents has been confined to malpractice actions for negligent use of X-ray machines. These decisions to some extent turn on the special physician-patient relationship, and their value as precedent for other nuclear energy enterprises must be discounted accordingly. Nevertheless, it appears likely that the medical use of radioisotopes may be one of the most fertile sources of future negligence litigation in the atomic energy area. The X-ray cases thus assume considerable importance, since there should be no appreciable legal difference between radiation injury induced by over-exposure to X-rays and that caused by other radioactive substances.

Regrettably no general rule of thumb can be distilled from the decisions either permitting or denying application of *res ipsa loquitur* to X-ray accidents. Unequivocal affirmative precedent favoring use of the


1212 "If defendant's conduct was a substantial factor in causing the plaintiff's injury, it follows that he will not be absolved from responsibility merely because other causes have contributed to the result. Nothing occurs in a vacuum, and the event without multiple causes, numbered in the thousands, is inconceivable. In particular, the defendant is not necessarily relieved of liability because the negligence of another person is also a contributing cause." Prosser 222. See discussion *supra* text at notes 923 ff.

doctrine exists today in at least six jurisdictions,\textsuperscript{1214} and several other states have announced rules so similar in end result that they must be numbered in the "friendly" group.\textsuperscript{1215} Application has been specifically denied, however, by the courts in nine jurisdictions.\textsuperscript{1216} In three states—the best example being California—there appear to be irreconcilable conflicts among recent pronouncements, and no clear rule can be said to have evolved.\textsuperscript{1217}

The over-all judicial disharmony cannot be justified solely on the basis of differing factual situations, although as will be indicated below, the facts of a particular case, particularly the amount of radiation received, may have considerable influence. Principally, differences rest on divergent judicial attitudes toward (1) the doctrine of \textit{res ipsa loquitur} in general, (2) the nature of the physician-patient relationship, and (3) the peculiarities of X-ray accidents and the likelihood that negligence is responsible for radiation injury. In Michigan, for instance, the court has specifically repudiated the doctrine of \textit{res ipsa loquitur} or its


\textsuperscript{1215} E.g., \textit{Louisiana}: Thomas v. Lobrano, \textit{supra} note 1200; \textit{Virginia}: Hunter v. Burroughs, 123 Va. 113, 96 S.E. 360 (1918).


\textsuperscript{1217} \textit{Arkansas}: Gray v. McLaughlin, 207 Ark. 191, 179 S.W.2d 686 (1944) (applying rule closely similar to \textit{res ipsa loquitur}) and Routen v. McGhee, 208 Ark. 501, 186 S.W.2d 779 (1945) (denying applicability of \textit{res ipsa loquitur} to this class of cases); \textit{California}: Bennett v. Los Angeles Tumor Institute, 102 Cal. App.2d 293, 227 P.2d 473 (1951) (denying applicability for several reasons) and Costa v. Regents of University of California, \textit{supra} note 1163 (assuming applicability of the doctrine); \textit{Iowa}: Shockley v. Tucker, 127 Iowa 456, 103 N.W. 360 (1905) (applying doctrine akin to \textit{res ipsa loquitur}) and Berg v. Willett, 212 Iowa 1109, 232 N.W. 821 (1930) (denying application); \textit{Wisconsin}: Rost v. Roberts, 180 Wis. 207, 192 N.W. 38 (1923) (approving instruction on \textit{res ipsa loquitur} or closely analogous doctrine) and Kuehnemann v. Boyd, 193 Wis. 588, 214 N.W. 326 (1927) (denying application in physician-patient context).
equivalent in malpractice cases and has seen no need for varying the precedent when it was faced with an action involving X-ray injuries.\textsuperscript{1218} Several courts have similarly rejected \textit{res ipsa loquitur} on the broad theory that the doctrine, which frequently in effect makes the physician an insurer against bad results, should have no application in malpractice actions.\textsuperscript{1219} One of the more articulate courts of this group has stated its reasoning thus:

To put upon the medical profession . . . such a burden as financial responsibility for damages, if injury or death results, without proof of specific negligence, would drive from the profession many of the very men who should remain in it. . . .\textsuperscript{1220}

However one evaluates the validity of this argument (and many have disputed it),\textsuperscript{1221} it is embraced by several courts and has not been limited to actions involving X-ray machines.\textsuperscript{1222} It has potential, therefore, in any malpractice action.

The third and perhaps most significant justification for refusal to apply \textit{res ipsa loquitur} in X-ray cases,—\textit{i.e.}, that this is not the type of accident which would occur only if there were negligence—appears in several decisions.\textsuperscript{1223} The basis of this objection is that a number of expert medical witnesses have stated that, because of the peculiar sensitivity of some persons to X-rays, radiation injury can take place during diagnostic or therapeutic treatment without neglect on the part of the administering doctor or technician.\textsuperscript{1224} This is because sensitivity is not a characteristic which can be determined before administration of X-ray, but only becomes apparent from the patient's reaction to early

\begin{itemize}
  \item \textsuperscript{1218} E.g., Barnes v. Mitchell, \textit{supra} note 1216.
  \item \textsuperscript{1219} E.g., Streett v. Hodgson, \textit{supra} note 1216, Cooper v. McMurry, \textit{supra} note 1216.
  \item \textsuperscript{1220} Stemons v. Turner, \textit{supra} note 1216 at 233.
  \item \textsuperscript{1221} It may be questioned whether professional medical men, who universally carry insurance against public liability, are deterred in great measure by legal doctrines (such as \textit{res ipsa loquitur}) from attempting the more risky cures. For a protestation of contrary opinion, however, see \textit{e.g.}, Morris, "'Res Ipsa Loquitur'—Liability Without Fault," 25 Ins. C.J. 97, 112-13 (1958).
  \item \textsuperscript{1222} See generally Morris, \textit{supra} note 1221; Regan, Doctor and Patient and the Law \textsection 30 (2d ed. 1949).
  \item \textsuperscript{1223} Normally such a conclusion is limited to the facts of the particular case. Refusing application of the doctrine on these grounds, therefore, does not necessarily mean that the court would reject it if faced with more appropriate facts. \textit{E.g.}, Nance v. Hitch, \textit{supra} note 1216; Antowill v. Friedmann, \textit{supra} note 1216.
  \item \textsuperscript{1224} See \textit{e.g.}, testimony of experts in Nance v. Hitch, \textit{supra} note 1216. See also Gray, \textit{1 Attorneys' Textbook of Medicine}, \textsection 71.37 (3d ed. 1958). But see Dunlap, \textit{supra} note 1148.
\end{itemize}
exposures. Thus, while continuing applications of X-ray, after knowledge of super-sensitivity has been or should have been obtained, may constitute a specific act of negligence, it is possible to argue that a physician in many instances might be said to act with due care in administering treatment initially in small doses. In cases involving this latter type of fact situation, courts have been reluctant to apply the *res ipsa loquitur* assumption, *i.e.*, that the accident is one which ordinarily would not occur without negligence.\(^{1225}\)

On the other hand, there are experts who discount the hypersensitivity argument and argue for application of *res ipsa loquitur* in the majority of cases involving diagnostic use of X-rays and even in some therapeutic use cases.

It seems that diagnostic films properly made, considering the low voltage of the rays and the transient exposure required, should never result in burns; injury of the patient therefore raises an inference of negligence and the doctrine of *res ipsa loquitur* should be uniformly applied. . . . In case of therapeutic burns, on the other hand, one cannot say so confidently that production of a burn always proves negligence. . . .

The factor of hypersensitivity of the patient is . . . much overstressed; furthermore, the exposure required in making diagnostic films ordinarily should not burn a sensitive individual and lastly, in cases requiring prolonged treatment, there is no reason why the physician should not determine for himself, by initial small dosage of irradiation, whether the patient is hypersensitive or not.\(^{1228}\)

Even if a physician determines that a person is hypersensitive, the patient's disease may be so grave that the possibility of its cure or arrestment could warrant taking the chance of radiation burns. It would be difficult to argue that the physician, embarking upon this course of treatment, should be subjected to an inference that he was negligent, without more specific proof, should radiation injury result.

Courts approving application of *res ipsa loquitur* in X-ray injury cases have done so rather automatically. Decisions normally are limited to their facts, the court stating that under the circumstances, an inference or presumption of negligence is warranted.\(^{1227}\) Almost invariably these "circumstances" have included expert testimony to the effect that

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\(^{1225}\) Nance v. Hitch, *supra* note 1216, is perhaps the best example of this approach, although there is admittedly conflict in the expert testimony on many of the points in controversy.

\(^{1226}\) Dunlap, *supra* note 1148 at 150-51, n. 25.

this particular burn could not have been made without negligence on the part of someone. While no absolute factual pattern emerges, the majority of these decisions involve the treatment of milder maladies during which the patient has suffered third-degree burns.\(^{1228}\) These courts demonstrate a readiness to discount hypersensitivity as a source of plaintiff’s injury, particularly if there has been a continuing course of treatment permitting defendant to have ascertained the condition.\(^{1229}\)

The most recent decision of this variety is one which, while not applying *res ipsa loquitur* by name, applies a procedural theory of the same general cast. In the Louisiana decision of *Thomas v. Lobrano*,\(^{1230}\) the plaintiff over a three-year period received therapeutic X-ray treatment for boils. She eventually developed serious radiation burns in the general area of application. Commenting on the fact that one of plaintiff’s counts was predicated on *res ipsa loquitur*, the court indicated that it was incumbent on the defendant physician to show in a malpractice action that he possessed an ordinary degree of professional skill “and that in applying that skill to the given case he used reasonable care and diligence along with his best judgment.” This, the court stated, “related” to the *res ipsa loquitur* rule. The court then went on to say:

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\ldots [T]he burden in the instant case is upon the defendant physician to affirmatively establish his use of reasonable care and diligence, together with his best judgment, in his treatment of the plaintiff. \ldots \text{It follows as a corollary that the defendant is also under the burden of negativing the many specific charges of negligence or want of proper care.}^{1231}
\]

This doctrine, it may be suggested, if “related” to *res ipsa loquitur* also considerably exceeds it in effect if it should be applied to radiation treatment cases generally and is not limited solely to the rather peculiar facts of the *Lobrano* case. *Res ipsa loquitur* in theory is predicated on the assumption that, although the plaintiff cannot show specific acts of

\(^{1228}\) E.g., Emrie v. Tice, *supra* note 1214 (severe burns over large area resulting from removal of wart on ear); Thomas v. Lobrano, *supra* note 1200 (applying strong presumption of negligence where severe burns resulted from treatment of boils); Jones v. Tri-State Telephone & Telegraph Co., *supra* note 1214 (severe burns after diagnostic treatment); Waddle v. Sutherland, *supra* note 1214 (treatment for eczema caused burns so severe as to necessitate amputation of limb). But see Berg v. Willett, *supra* note 1217 (radiation burns from treatment for ringworm, doctrine not applied) and McCoy v. Buck, *supra* note 1216 (severe burns from treatment for eczema, doctrine not applied).

\(^{1229}\) Waddle v. Sutherland, *supra* note 1214; Lewis v. Casenburg, *supra* note 1214.

\(^{1230}\) *Supra* note 1200.

\(^{1231}\) *Id.* at 605. (Emphasis added.)
negligence, the probabilities of the situation, because of known circumstances of the accident, point to the fact that defendant has been negligent. The burden of proving negligence except in a very few states,\textsuperscript{1232} remains with the plaintiff. Under the broad language of the \textit{Lobrano} case, however, the burden of showing due care in a malpractice action in Louisiana is automatically on the defendant. The apparent assumption, without contrary proof, is that the defendant has been negligent. This is not an instrument of logic, but solely one of policy, made all the more dramatic by the Louisiana rule permitting direct action against the insurer as a named defendant.\textsuperscript{1233} If followed, the \textit{Lobrano} reasoning will mean that in Louisiana the physician in many cases will be held strictly liable for damaging results of his treatment.

\textit{Thomas v. Lobrano} is seemingly the furthest extension of pro-plaintiff sentiment in the X-ray field. It has been remarked that the case promises to be a leading one,\textsuperscript{1234} but such a conclusion is very questionable. Practically all courts show some deference to the awkward position of the physician, who works constantly with dangerous instrumentalities and must continually make hair-line decisions as to the best course of treatment. The courts are not likely to disregard this difficulty in future cases.

In addition, those courts which are willing to apply \textit{res ipsa loquitur} to the X-ray cases do so at best on an empiric basis, and one may doubt that this rather hesitant approach can form the foundation for the long jump to the Louisiana doctrine. As a precedent outside Louisiana, \textit{Thomas v. Lobrano} would appear to have little weight except perhaps as one more decision applying a doctrine similar to \textit{res ipsa loquitur} in the X-ray cases. One also should not ignore the fact that the way in which the doctor kept, or failed to keep, his treatment records rather clearly indicated to the court (and reasonably so if the facts stated in the opinion are taken at face value) that the defendant frequently was very careless and hence he probably was negligent in this instance as well.

More significant, perhaps, are some of the distinctions which have been drawn in the decisions to indicate those instances in which \textit{res ipsa loquitur} would or would not be applicable. Some courts are willing to apply the doctrine when X-rays are used purely for diagnostic purposes,

\textsuperscript{1232} See note \textit{1201 supra} and accompanying text.
but not in the case of therapy.\(^{1235}\) This is explained principally by the fact that there is a much greater likelihood that injuries resulting from diagnostic treatment are the product of negligence than is the case in therapeutic cases. Relatively low radiation exposure is required for X-ray diagnostic photography, and it is felt that even persons allegedly hypersensitive to radiation should not be affected by the rays if they are applied with ordinary care.

A further distinction is sometimes drawn between instances in which radiation burns are localized at the point of treatment and those in which injuries cover an area larger than necessary for treatment. Courts are more willing to apply \textit{res ipsa loquitur} in the latter case,\(^{1236}\) because the probabilities of negligence appear stronger than when radiation is localized. With known techniques, physicians are assumed generally to be able to localize the place of application.

Two restrictions on the use of \textit{res ipsa loquitur}—generally repudiated elsewhere—occasionally are voiced in the X-ray decisions. One recent California decision stated that \textit{res ipsa loquitur} could be applied only when, as a matter of common knowledge, the accident was one which would not happen \textit{ordinarily} without negligence.\(^{1237}\) The court construed this test to mean that expert testimony was not admissible on this issue of probability. Such a construction has seldom been followed, however, and indeed, the decisions as to the applicability or inapplicability of \textit{res ipsa loquitur} to X-ray treatment accidents almost invariably are based in part on expert testimony.

There also have been a few cases in which the courts have declined to consider the plaintiff’s \textit{res ipsa loquitur} count on another ground, i.e., that he pleaded and introduced evidence to prove specific acts of negligence.\(^{1238}\) Thus some decisions, which at first glance appear to repudiate \textit{res ipsa loquitur} in the X-ray context, are based only on this technical procedural point. The more liberal modern attitude toward permitting alternative pleading generally has spelled the decline of this argument, but it is still alive in some jurisdictions.\(^{1239}\) Practitioners seeking to invoke \textit{res ipsa loquitur} in radiation cases would do well, therefore, to

\(^{1235}\) Holt v. Ten Broeck, \textit{supra} note 1214; Bennett v. Los Angeles Tumor Institute, \textit{supra} note 1217.


\(^{1237}\) Bennett v. Los Angeles Tumor Institute, \textit{supra} note 1217. But see Costa v. Regents of University of California, \textit{supra} note 1163.

\(^{1238}\) E.g., King v. Dotto, 142 Ore. 207, 19 P.2d 1100 (1933); Hess v. Millsap, \textit{supra} note 1214.

\(^{1239}\) See generally Harper & James §19.10.
make a preliminary check of local precedent to avoid the possible embar-
ragmation of seeing their strongest argument rejected on a pleading
technicality.

Despite the divergent courses followed and theories advanced by the
courts in X-ray cases, it is possible to draw certain conclusions which
may form a basis for prediction as to future judicial action in radiation
cases. Of course some jurisdictions will continue to refuse recognition
to res ipsa loquitur, either in all cases or in malpractice actions. The
discussion which follows is predicated on the assumption that the court
is willing to apply res ipsa loquitur "under appropriate circumstances."

Even with this assumption, the first conclusion perhaps must be a
negative one: there is or should be a general presumption against the
applicability of res ipsa loquitur to radiation accidents resulting from
radiation treatment, particularly when radioactive isotopes are used.
There are three justifications for this statement. First, experts gener­
ally agree that untoward results may be produced, particularly in radia­
tion therapy when used for serious diseases such as cancer, without any
lack of care on the doctor's part. In part, this is because, as one expert
has stated:

This field of treatment is still in its infancy. A doctor must
proceed as best he can, and with the meager knowledge of
this field available. Unfortunate results are bound to occur in
spite of his best efforts. He cannot properly be held at fault
if he proceeded in accordance with the practice used by other
men of like ability in his community. 1240

Even those experts, who feel that the science of treatment by X-ray is
sufficiently developed so that the doctor knows what the possible results
will be, nevertheless agree that taking the chance of severe radiation in­
jury in the hope of arresting serious disease may be action commensu­
rate with due care and good practice. 1241 There is much that is unknown
about medical use of isotopes, but their use holds great promise and
must not be stultified.

Further, it has been pointed out that not even expert radiologists can
control with absolute certainty the amount of emitted radiation, so that
excessive radiation may not always be the product of human error. 1242

Finally, a number of experts point to hypersensitivity as a possible

1240 Gray, supra note 1224.
1241 See Dunlap, supra note 1148 at 153 et seq. See generally, Comment, 30 So. Cal.
L. Rev. 80 (1956).
1242 Gray, supra note 1224 at 171.31. See Berg. v. Willett, supra note 1217.
source of radiation injury, even though due care has been exercised.\textsuperscript{1243} There is a difference of opinion, of course, as to the validity of this last justification,\textsuperscript{1244} but the lack of unanimity among experts is all the more reason for rejecting the flat assumption that \textit{res ipsa loquitur} should apply to radiation injuries caused by the use of radioactive isotopes for medical purposes.

Given the case of diagnostic treatment, however, where proved good practice dictates the use of radiation which should not harm even the hypersensitive person, or given the therapeutic case in which the condition is mild but burns are severe, \textit{res ipsa loquitur} becomes easier to apply. Likewise, if the doctor subjects his patient to a long course of treatment, but fails to test for reaction following early treatment, or if he administers further radiation when first-degree burns are apparent, the doctrine is more inviting in all but the most advanced malignancy or similar cases.

In brief, the more serious the results of the exposure and the less grave the patient's condition, the less attractive theories of reasonable hope of cure, uncontrollable radiation error, or hypersensitivity become. Experts in radiology have shown marked willingness to evaluate these various sources of injury in a given case, and the courts have displayed equal receptiveness to such opinions.\textsuperscript{1245} This expert testimony, together with the lay reaction to defendant's conduct and plaintiff's condition, spell the ultimate fate of \textit{res ipsa loquitur} in those jurisdictions where the doctrine is considered acceptable under proper circumstances.

(3) Application of Principles in Other Radiation Cases

It would be impossible to chronicle here all the potential accidents in nuclear energy operations and processes and then predict the extent to which courts may be expected to apply \textit{res ipsa loquitur} in each situation. Such a study would require technical acumen beyond the scope of this discussion, since the all-important probability of negligence can be determined only through knowledge of the specific technical features of a particular operation. More valuable, perhaps, would be a brief summarization of the general considerations which are likely to influence a court faced with a radiation injury case. The court normally will be interested in the questions of probability of negligence and defendant's

\textsuperscript{1243} Ibid. See also testimony of expert witnesses in Nance v. Hitch, \textit{supra} note 1216.
\textsuperscript{1244} Dunlap, \textit{supra} note 1148.
\textsuperscript{1245} In practically all of the X-ray cases herein cited, expert testimony was received on the issue of probability of negligence.
responsibility. As indicated before, these will be affected not only by a strict evaluation of the probabilities involved, but also by broader considerations of policy which some courts allow to replace a strictly logical approach in a given case.

(a) Negligence Probability

With the modern dilution of the "exclusive control" condition precedent, the judicial evaluation of Wigmore's first res ipsa loquitur condition (i.e., probability of negligence) becomes the most significant obstacle to the attorney seeking to invoke the doctrine.

(i) Expert Testimony

Probability of negligence is likely to be most strongly influenced by the testimony of experts. As previously noted, at first courts were disinclined to accept expert opinion on whether or not a particular accident could have happened without negligence and was therefore appropriate for res ipsa loquitur. This hesitancy may be laid to the fact that in the beginning judges were willing to accept res ipsa loquitur only in the simple accident situation, e.g., the falling brick or scaffold. Situations began to arise, however, involving more complicated instrumentalities not understood by laymen, but occurring under circumstances, after explanation by the expert, strongly indicating negligence to the lay mind. It soon became evident that for accurate appraisal of the probable causation of an accident induced by such instrumentalities, testimony of someone familiar with their operation was indispensable. Thus a significant increase in judicial willingness to accept expert opinion became discernible.

The use of experts to determine whether or not res ipsa loquitur should be applied to radiation incidents often is imperative. In the nuclear field, however, there is no justification for a court's assuming that it knows enough to determine if the probabilities of negligence are great enough to justify using the doctrine without first hearing expert testimony. There may be situations which experts will agree probably could happen only if there has been negligence, but this should not be guessed at by the judge or the jury unaided by experts. As greater experience is gained in nuclear operations it may become generally recognized that in certain situations the probability of negligence is as great as in the "exploding bottle" cases, but this is surely not yet true for most cases.

1246 See text following note 1162 supra.
Assuming that strict liability will not be applied at least to certain types of small research reactors, particularly to low power and sub-critical assemblies, is this the type of case in which res ipsa loquitur should be applied? If a reactor "burns up" after operating safely for several months in compliance with all safety requirements established by the AEC and other expert consultants, should the law assume or allow the jury to conclude that someone has been negligent unless the defendant comes forth with proof of lack of negligence?

It is true that under AEC regulations extraordinary safety precautions must be used in operating a reactor with its potentiality for harm. In the light of the fact that there is much to be learned about the nature and properties of the atomic nucleus it clearly would be negligence to fail to use such precautions. The AEC makes a finding as to each reactor licensed to the effect that it can be operated without undue risk to public health and safety, and this determination is made only after careful study by competent scientists and engineers. Do these facts justify an assumption that if an incident occurs it probably resulted from negligence? Should res ipsa loquitur be available since present knowledge indicates that the safety precautions make it unlikely that an incident will occur? Or should we say that the requirement of so many safety precautions indicates that unless there is evidence that the safety devices were by-passed, mere human error in operation could not be a logical explanation, but instead the incident must have happened because of some scientific fact not heretofore known or at least not fully understood?

Unless res ipsa loquitur is to be used simply as camouflage for what actually is strict liability, there are some situations in which there is no possible justification for imposing liability on the basis of an assumption of negligence. If an airplane should crash into a reactor and cause a burn-up and subsequent release of radioactive material into the atmosphere under adverse weather conditions, it is not realistic to say that the release was the result of negligence. The same is true if it happened to be an unusually large meteorite or an enemy missile or bomb which pierced the reactor shell, or an earthquake of completely unpredictable magnitude which caused a burn-up. These possibilities have been recognized, but scientists for government and industry have decided that the chances of these events taking place are so small that they should be

1247 See generally Chapter II, Section A. 1., supra.
1248 See incidents described. infra. Chapter IV. See also report of a recent reactor incident at Idaho Falls, Idaho NY Times, Nov. 29, 1958, p. 2. col. 7.
ignored rather than to require the extreme precautions necessary to preclude them. This is not negligence but deliberate choice, approved by responsible persons including government officials. If liability is imposed for consequent injuries, this is application of strict liability, not negligence rules.

These, however, are not the difficult cases. If the burn-up occurs when no such obvious and non-negligent cause is known, should it then be assumed that negligence is responsible? This question cannot be answered generally; rather the answer should depend on the many variables for each installation, including the development of the art, particularly as to safety precautions, which will change from time to time as experience is gained. What is non-negligent procedure today may become negligent in the light of new knowledge. Likewise, the converse is possible. Surely, *res ipsa loquitur* should not be applied automatically but rather only when the facts of a particular installation as to a specific incident at a given time are considered. Types of reactors and incidents should not be catalogued either as calling for or not calling for an application of the doctrine. If any generalization has validity at all, it might be that, while a more complicated reactor increases the chance that some negligence in procedure is the cause, the chances are much greater that something unforeseeable or at least unpreventable caused an incident. Perhaps the same can be said for reactors using new and relatively untried designs. If liability is to be imposed, it should be an honest application of strict liability, not an assumption of negligence.

While in general similar conclusions may be drawn with respect to industrial and medical uses of radiation other than from reactors, there are differences. In the first place, the amount of damage including the number of persons that might possibly be hurt is very much less, even for high level radioactive material. Secondly, the variety of materials and their radiation characteristics is great and the possible uses cover a very wide range. Lastly, the possibilities for unforeseeable incidents are much less with radioisotopes—we know so much more about the injury potential and what might happen to cause trouble than we do about reactors and what happens when neutrons interact with material. Several conclusions concerning the use of *res ipsa loquitur* possibly can be drawn from these facts.

Laying aside medical therapy cases, the safety procedures are much more standardized and consequently there is a smaller number of possible explanations should something go wrong. Likewise, the proper
procedures may be learned readily, although it may be difficult to get personnel to follow them. Undoubtedly this will lead to greater willingness of courts to apply an assumption of negligence rule. On the other hand, it would be unrealistic to require the presence of a trained safety officer whenever a radioisotope is being used because this will impede greatly the more extensive use of such materials, a program the AEC is now promoting vigorously. In many cases at least the level of radiation and the difficulty of carrying out safety procedures would not call for such precautions, and the expense would be prohibitive. This conclusion probably is sound for many industrial uses, but it may not be a realistic one for the radiation laboratory where high level sources are present and where disposal problems may be so great that extreme care must be taken and only a properly trained specialist can provide it.

With sealed sources of radiation now being used in many industrial processes, there may be little to distinguish cases involving the handling of such sources, *e.g.*, a leaking thickness gage,\(^{1249}\) from normal product liability situations in which it is thought proper to assume that there was negligence if an accident happens.

It may be completely reasonable to apply *res ipsa loquitur* if someone is injured by a high-level cobalt 60 source in a research laboratory which is properly safeguarded. If there are electrical interlocks, special light signals, limited access by special keys available only to trained personnel, and requirements of maze-type construction and precautionary use of detection devices, it would seem almost impossible for accidental exposure to occur unless some human negligence intervened. Undoubtedly, there are other similar examples of cases in which it would be fair to adopt the *res ipsa loquitur* principle.

The necessity of offering expert testimony before applying the doctrine in isotope cases may not be nearly as great as in reactor cases; nevertheless in many cases conclusions should not be drawn without such testimony. The same probably is true of accidents arising during the transportation of radioactive materials. If the question of negligence turns on whether sufficient precautions were taken, including adequate warning signs, to advise an unsuspecting layman or even a professional rescuer of the danger, the jury would seem in an even better position than an expert to determine adequacy of precautions. If the

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1249 This does not necessarily mean, of course, that *res ipsa loquitur* can be applied. The requirements that defendant is probably responsible for any negligence connected with the accident and that plaintiff eliminate himself as a contributing cause still pose formidable obstacles.
question involves a determination of whether there was sufficient shielding or a strong enough container to withstand the impact of a crash or other accident, then it would be unrealistic to assume negligence without expert advice.

In connection with radioactive isotopes, as in the reactor cases, it is impossible to list those cases in which *res ipsa loquitur* should or should not be applied. Many judgments of social policy should be left to the layman; but when a technical question of probabilities is involved, expert evaluation should be sought. The court which errs on the side of caution and refuses to permit the unaided jury to decide such cases will do neither the parties nor justice a disservice.

(ii) Accident Experience in Operations

Taking account of developments in aircraft accident cases, there is yet another pertinent consideration in applying *res ipsa loquitur* in radiation cases. An improving safety record for an industry or operation may result in an increased willingness in the courts to apply the principle.\(^{1250}\) The logic behind this tendency is that, with increased technical knowledge and prevention procedures, the probability of an accident occurring without someone's having been negligent decreases considerably. It has been argued already that the fine safety record in reactor operations may serve as a "boomerang," opening the way for *res ipsa loquitur* with its concomitant decreased burden of proof for plaintiffs.\(^{1251}\) This argument is tenuous at best. Its basic thesis—that a rare accident means negligence—is valid only if it is assumed that design and operating procedures have been perfected, *i.e.*, that from a safety standpoint at least, there are no substantial vacuums of knowledge and that compliance with established procedures by operating personnel almost certainly will prevent any accident. This assumption simply is not applicable to many phases of nuclear energy operations, particularly reactors. Scientists, engineers, and medical researchers admittedly are only on the threshold of understanding nuclear energy and its many ramifications. In addition, the safety record thus far spans considerably less than two decades and is based on the operation of relatively few reactors. This would not seem sufficient, either as to comprehensiveness of knowledge or extensiveness of experience, to justify judging the probabilities as to cause with sufficient accuracy to

\(^{1250}\) See text accompanying, and authorities cited in, note 1167 supra.

permit general application of *res ipsa loquitur*. It is not even accurate to draw the conclusion that, because there have been so few injuries in past operations, this means that accidents are not likely to happen. As Dr. C. Rogers McCullough, chairman of the AEC Advisory Committee on Reactor Safety, stated at the Geneva conference, there is "serious doubt that our skill and care is sufficient to prevent all [reactor] accidents. . . . [W]e are convinced that the record is better than we have a right to expect. . . . [C]olleagues in other countries have been somewhat less fortunate than we and this emphasizes our own conviction that we cannot expect perfection in this regard."\(^{1252}\) In evaluating the likelihood of accidents, we must consider that the large reactors with which we hope to produce economical electrical energy will be much more complex and of less tested design than existing reactors.

(iii) Relationship of Parties

A third, and possibly more important, general consideration in dealing with *res ipsa loquitur* is the relationship of the parties. It has already been pointed out that a number of courts are reluctant to impose *res ipsa loquitur* in the physician-patient context.\(^{1258}\) This reluctance stems from judicial recognition that sound medical practice often may suggest more than one course of conduct.\(^{1254}\) Some treatments may carry with them great risk of untoward result yet perhaps also offer the only hope for complete cure or arrestment of the disease. Judicial doctrines which potentially second-guess a physician's reasoned choice among the courses open to him, without requiring specific showing of negligence, are certain to have a deterrent effect upon the progress of medical treatment techniques and knowledge. Thus, whenever courts are presented with cases involving the use of radioactive materials for the cure of human ills, this type of reasoning is likely to be utilized.

In a sense, the logic which emerges from the X-ray cases is likely to cut across the entire atomic energy industry when the question of *res ipsa loquitur* arises. There is reluctance to second-guess the physician who is faced with alternative courses of action, but more willingness to do so when it appears that the malady that he sought to cure was of a less dangerous nature. In other words, choosing the more dangerous, but also potentially more effective, course may more easily be termed negligence when a serious untoward result occurs from treatment for a


\(^{1258}\) See text following note 1218 *supra*.

\(^{1254}\) Dunlap, *supra* note 1148 at 153.
mild condition rather than a serious one. In essence, the process is one of weighing the possible end result against the personal health risk involved. Similarly when isotopes are being used commercially for an industrial purpose, e.g., to determine the thickness or purity of some material, an accident in which a non-employee is injured by radiation is likely to be classified as appropriate for *res ipsa loquitur*.\(^{1255}\) Commercial perfection of materials, the desired result, generally would be considered a less important end, certainly minor in significance when compared with the cure of disease in a human body, and thus would be less justifiable as a ground for risking radiation injury. Conversely, it might be less appropriate to apply *res ipsa loquitur* to an accident occurring during experimental nuclear energy studies undertaken to advance the art which is so important to national welfare—particularly if some exposure was unavoidable.\(^{1256}\)

This particular policy decision is probably an unconscious one, however, and can be exaggerated in importance. Often it may be much more difficult to weigh the end against the risk than in the cases suggested here. But it is a consideration which should not be ignored, for it often is basic to a court’s conclusion that an accident speaks for itself, although such considerations have no logical relationship to the statistical chance that certain accidents were caused by negligence rather than an unforeseen circumstance.

(iv) Dangerous Instrumentality

One final factor deserves mention. The statement has been made that courts tend to apply *res ipsa loquitur* more freely if the instrumentality is dangerous in nature.\(^{1257}\) While this conclusion has received some support in judicial dictum and has obvious significance for reactor operators, it should be viewed with skepticism. A review of cases involving explosions of dangerous materials, in which the plaintiff has attempted to apply *res ipsa loquitur*, indicates a strong tendency among

\(^{1255}\) If, of course, the local workmen’s compensation schedule applies to radiation injury, the question of *res ipsa loquitur* is obviated. At the present time, however, there is serious question whether many of these schedules are set up to cover radiation injury adequately. See Part II, *infra*.

\(^{1256}\) This would seem to be basis for refusing recovery under the Federal Tort Claims Act for damages arising out of the Texas City disaster; Dalehite v. United States, 346 U.S. 15, 73 S.Ct. 956 (1953). See discussion of disposal operation and vicarious liability, *supra* notes 297 ff.

courts to reject the doctrine. Indeed, one finds no greater willingness to ignore other hypotheses of cause in these “dangerous instrumentality” cases than appears in cases involving less dramatic occurrences. Harper and James argue, however, that the more complicated and dangerous a machine or process becomes, the more likely it is that the defendant’s negligence caused the accident. Apparently the logic of this argument is not nearly as irresistible as they believe. The mere fact that more parts, people, complications, or dangers are involved is significant in determining what precautions should be required; but it does not mean that the probability of negligence in a specific case is greater. If anything it could be argued that if the defendant is at all conscientious and sensible, probably he will be more careful than when the situation is more familiar, simpler, and less dangerous. Familiarity and low danger potential breed carelessness. While negligence may occur in more places or ways, there is an equally great if not greater increase in the chances that something not reasonably to be foreseen or prevented is the cause of an accident. The probabilities that an accident will occur have increased because of the number of people or parts. It does not follow that there is a greater chance that someone was negligent, except in the sense that the more people there are, the greater the possibility of negligence. This would be like concluding that, because there is a greater likelihood that a negligent collision will occur when there are 1,000 people driving cars than when there are only 100 doing so, this means that when a collision occurs while 1,000 are driving it follows that it was the result of negligence. The number of negligent collisions will increase, given enough chances for the rules of probability to work, but the probability that any one of the drivers will be negligent does not increase. If the precautions required by the standard of care in a particular setting are so high that normal persons cannot be expected to live up to them, then the standard, by hypothesis, is too high or the law is imposing absolute liability or a variation of it by making defendant show his lack of negligence. The situation does not speak for itself and res ipsa loquitur should not be applied. If the rule of liability is to be

1259 Harper & James §19.6, especially at 1084.
1260 See Id. at n. 21 for their cute but completely uninformative and therefore unpersuasive answer to Prosser’s difficulty in seeing the logic of the argument.
changed it should be done honestly and not camouflaged with a Latin phrase.

(b) Defendant's Control

The second condition precedent to application of *res ipsa loquitur*—that the defendant probably was responsible for the negligence connected with the accident—posed no difficulty in the X-ray cases. Treatment invariably was administered by the single named defendant or by a person for whom the named defendant was legally responsible. Seldom was there any difficulty in tracing the probable cause of the accident to the operation of the X-ray machine. As previously noted, usually the real question in these cases concerned the probabilities involved in Wigmore's first condition: Would the accident probably not have happened except for negligence? No case has been found in which the court's decision to accept *res ipsa loquitur* turned on a concept similar to the reasoning in *Ybarra* or *Litzmann*. Nor has any case been found in which *res ipsa loquitur* was applied against the manufacturer of the X-ray machine or a component part thereof.

The existing plethora of these latter complicating factors in the X-ray cases does not mean, however, that the atomic energy industry can ignore their obvious implications. As has been pointed out elsewhere, 1261 *res ipsa loquitur* has been invoked successfully against suppliers of chattels and their component parts, where there is some reasonable thesis upon which the court can discount possible causes-in-fact controlled by third persons. The willingness of the *Ybarra* and *Litzmann* courts to apply the doctrine against multiple defendants where there was no legal responsibility relationship *inter se*, 1262 is of significance to the industry. Indeed, in *Nichols v. Nold*, 1263 the Kansas Supreme Court permitted *res ipsa loquitur* to be applied against the manufacturer, distributor, and dealer of a bottled beverage. For the designer or manufacturer of a reactor or its component parts, for the medical researcher who develops new therapeutic uses of radioisotopes, for the packager or shipper of radioactive materials, these judicial tendencies are extremely important. If the second condition precedent to the application of *res ipsa loquitur*, i.e., control by the defendant, can be satisfied by fact situa-

1261 *Infra* Chapter V, discussion of product liability.
1262 This is at least one possible thesis for the result in Ybarra. See quotation accompanying note 1181 *supra*.
TORT LIABILITY

ations such as these, then the potential vistas of liability are broadened greatly.

One concrete example should serve adequately to illustrate the problem. Suppose that a reactor burn-up takes place, and the cause is traced to the fuel core of the reactor. The plaintiff may not be able to obtain evidence as to the preparation of the fuel by the processor, design of the core by the reactor designer, or operation by the reactor licensee. He is reasonably certain that one of these three persons, whom he names as defendants, is negligent, but he has no evidence to indicate which of the three. He can argue for application of res ipsa loquitur on two principal theories. First, he can claim joint enterprise or joint responsibility, thereby obviating the issue of specific causation-in-fact. Since, at least in some cases, each defendant will be held responsible for the errors of the others, the determination of which defendant is at fault becomes unnecessary.

Second, if this is not possible, he can fall back on the theory tacit in Ybarra and Litzmann. All the inducements for application of this doctrine are present: a totally innocent plaintiff, the probability of insurance, the knowledge that this insurance may stem from a single source, and the strong possibility that the defendants have superior knowledge. Faced with these facts, the California court almost certainly would be willing to throw the logic of traditional res ipsa loquitur to the winds and shift the burden of "explanation" to the defendants. The pull in this direction for other courts may be equally strong.

C. Insurance and Indemnity

I. Introduction

In the 1957 Anderson amendment to the Atomic Energy Act, Congress offered at least a partial solution to the gigantic third-party liability problem facing AEC licensees. In the worst imaginable case, property losses might run as high as $7 billion, with personal injury

1965 The government insurance and indemnity program is constructed on a framework that provides for the reactor operator to obtain insurance for other persons connected with operation of the reactor. See text accompanying notes 1306 ff. infra. The fact that one policy insures all the persons potentially liable can be a strong argument, of course, for eliminating the specific cause-in-fact question from the case. Whether it is a legitimate argument, in view of our traditional reluctance judicially to recognize the fact of insurance at all, is another question.

and wrongful death claims aggregating additional untold amounts.\textsuperscript{1266} Neither licensees nor domestic insurers were inclined or equipped to meet such a risk, and it soon became apparent that some form of government action was necessary.

\textbf{a. What the Amendment Does}

Several possible solutions were offered to Congress. One was to limit liability of a licensee or contractor to an amount equal to twice the original cost of the reactor or to an amount equaling the total private insurance available. Each of these limitations would have left the potential public claims largely unsatisfied, and the plans were rejected for that reason.\textsuperscript{1267} A second solution involved unlimited government indemnification for all liability, but this also was rejected for the reason that Congress was reluctant to undertake such an obligation with so little knowledge concerning the extent of its commitment.\textsuperscript{1268} The AEC suggested a third program, by which the government would sell (for a premium) indemnity coverage in excess of the amount of private insurance available on the open market. The purchase of indemnity under this plan was purely voluntary, however, and the fear that licensees might not purchase sufficient additional financial coverage to protect the public, led ultimately to the abandonment of this scheme as well.\textsuperscript{1269}

The insurance and indemnity plan finally enacted contains features drawn from all the suggested programs and closely parallels the idea embodied in the AEC program—government financial backing to supplement funds available from private sources. Private insurance, or "financial protection," is made mandatory in amounts prescribed by the AEC for all Section 103 and 104 licensees and may be required of all other licensees and AEC contractors up to the maximum amount of insurance offered by insurance companies.\textsuperscript{1270} For those licensees or contractors of whom financial protection is required, the amendment grants: (1) limitation of liability to the amount of financial protection required plus $500 million, and (2) governmental indemnity, for a nominal charge, of $500 million beyond the level of required financial

\textsuperscript{1266} Statement of Lewis L. Strauss at \textit{Hearings before the Joint Committee on Atomic Energy}, Governmental Indemnity and Reactor Safety, 85th Cong., 1st Sess., p. 11 (1957) [Hereinafter cited as "Indemnity Hearings"].


\textsuperscript{1268} H.R. 9701, 84th Cong., 2d Sess. (1956).


\textsuperscript{1270} Subsection 170a.
If damages aggregate more than the total of these two, third-party losses theoretically will lie where they fall and neither the indemnitee nor the federal government will be held to further liability.

b. What the Amendment Does Not Do

The general congressional intent is thus clear: to satisfy the interests of the nuclear entrepreneur and the general public, at a non-prohibitive price, through a combination of private insurance and indemnification by the federal government. Equally clear is the fact that, beside the limitation on liability and certain other less significant provisions to be discussed below, Congress in no way has attempted to affect substantive doctrines of liability as they have been and are to be developed by state courts for the atomic industry. The report of the Joint Committee on Atomic Energy accompanying the Anderson amendment states unequivocally:

I. Since the rights of third parties who are injured are established by State law, there is no interference with the State law until there is a likelihood that the damages exceed the amount of financial responsibility required together with the amount of indemnity. At that point the Federal interference is limited to the prohibition of making payments through the State courts and to prorating the proceeds available.1273

State courts, therefore, are left free, at least as to the usual tort damages, to impose upon licensees their own legal liability doctrines when adjudicating claims under the amendment, and federal district courts

1271 Subsections 170c, 170e. "A system of indemnification is established rather than an insurance system, since there is no way to establish any actuarial basis for the full protection required. The chance that a reactor will run away is too small and the foreseeable possible damages of the reactor are too great to allow the accumulation of a fund which would be adequate. If this unlikely event were to occur, the contributions of the companies protected are likely to be too small by far to protect the public, so Federal action is going to be required anyway. If the payments are made large enough to insure that there is an adequate fund available, the operation of reactors will be made even more uneconomic. On the other hand, if, as the Joint Committee anticipates, there never will be any call on the fund for payments, the funds will have been accumulated to no purpose. Hence, in this instance it seemed wisest to the Joint Committee not to treat this as an insurance problem but to treat it as an indemnification problem." S. Rep. 296, 85th Cong., 1st Sess., p. 9 (1957). This is the report of the Joint Committee on Atomic Energy written to accompany the Anderson legislation, and it will hereinafter be cited as "Joint Committee Report."

1272 Congress can probably be expected to augment the funds authorized by the amendment if a more serious nuclear incident develops. See Joint Committee Report 21, 22.

1273 Joint Committee Report 9. (Emphasis added.)
sitting in diversity cases will apply the law of the state in which they sit. The controversies, therefore, concerning the application and extension of doctrines of strict liability, *res ipsa loquitur*, and the duty of manufacturers and suppliers, continue to be extremely important and have received detailed treatment elsewhere in this volume.\textsuperscript{1214} It is only after the state laws establish legal responsibility under these and other relevant principles that the Anderson legislation comes into play as a framework for satisfying the defendant's liability.

It would be naive in the extreme, however, to fail to recognize that the *existence* of the Anderson amendment, as a practical matter, may have a profound effect on state liability doctrines. The simple knowledge that defendant-licensee is protected by a fund of perhaps $560 million is certain to affect the thinking of legislators, judges, and juries, whether or not we like this kind of reasoning.\textsuperscript{1275} But this tendency is not to be confused with a notion that the amendment imposes strict liability, authorizes the use of *res ipsa loquitur*, or establishes a manufacturer's duty to the ultimate person injured. Congress clearly did not intend this; and the states are at liberty to apply their own substantive, procedural, and conflicts rules without regard to the amendment, at least for most cases.\textsuperscript{1276}

There is no provision in the 1954 act or any of its amendments authorizing the AEC or any other federal agency to award damages for radiation injuries except for those arising from testing atomic weapons.\textsuperscript{1277} Therefore, under the reasoning of such cases as *United Automobile Workers v. Russell* (allowing state awards of damages arising from union unfair labor practices) it is clear that the states are not precluded in general from determining their own damage rules.\textsuperscript{1278}

\textsuperscript{1214} See B6 of this chapter and Chapters 4 and 5. See also, Becker & Huard, "Tort Liability and the Atomic Energy Industry," 44 Geo. L. J. 58 (1955).

\textsuperscript{1275} The problems of claim adjudication created by the Anderson amendment are discussed in Section C3 of this chapter.

\textsuperscript{1276} Congress' specification as to types of injuries which do not come within the protection of the amendment, together with the limitation of liability given thereby, is certain in some instances to have an effect on state liability doctrines. Thus, as we shall see, one who demonstrates mere depreciation in land values from the presence of the reactor, or one who is injured outside this country, may not be able to assert a claim under the amendment even though perhaps state law would accord him a valid cause of action. See the suggestion that psychological nuisance damages are precluded, *supra* text following note 716.

\textsuperscript{1277} See Section 167. See also discussion *infra* at notes 1290-92.

\textsuperscript{1278} See discussion of this problem *infra* Part III, Chapter V at note 311. (United Automobile Workers v. Russell, 356 U.S. 634, 78 S.Ct. 932 (1958). The related question of the impact on state tort rules of compliance with federal health and safety standards is discussed *supra* Section B2b(2).
On the other hand, Congress in a sense was restrictive as to the state-established liabilities for which financial protection and indemnity would be available. In general, the Anderson amendment extends only to domestic public liability arising from the hazardous properties of radioactive materials. This eliminates numerous potential causes of action. Injuries abroad, damage to property caused in a normal non-nuclear accident during construction of a reactor, or damage to the licensee's reactor itself, for example, are not covered by the amendment. These are broad areas which clearly have been excluded, and there are many other refined and complicated questions of exclusion. One who seeks to act or advise under this amendment must familiarize himself with these questions, or run a dangerous risk not necessarily apparent at first glance.

This discussion is devoted, therefore, to a scrutiny of the amendment. Several analyses of the general type of risks covered have already appeared in print, and references will be made to them and to the legislative history in the course of the discussion. Some of the most troublesome questions have not been commented on at all, or have only been mentioned casually. To understand these matters it is necessary first to define and explain the risks for which protection is provided. Then will follow discussions of the nature of the indemnity, the extent and nature of financial protection required and offered, and, briefly, the limitation of liability. Finally, discussion will be directed toward a consideration of the administrative problems inherent in the process of claim satisfaction under the amendment, a vital problem concerning which there must be some legislative changes.

2. The Program in Detail

a. Nuclear Incident and Public Liability

The risks against which insurance and indemnity are provided are circumscribed by several definitions which become terms of art, the most important of which for our immediate purposes are “nuclear incident” and “public liability.” Unless “public liability” arises from a

1279 Generalizations expressed here will be discussed in detail below.

“nuclear incident” there is no governmental indemnity and no federal limitation of liability.

(1) Nuclear Incident

As defined in the amendment, a “nuclear incident” is

...[A]ny occurrence within the United States causing bodily injury, sickness, disease, or death, or loss of or damage to property, or for loss of use of property, arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of source, special nuclear, or byproduct material.  

The report of the Joint Committee indicates that this definition “is designed to protect the public against any form of damage arising from the special dangerous properties of the materials used in the atomic energy program.” The rather broad terms of this statement and the definition itself make it clear that Congress intended that the scope of the statute should be delineated liberally; nevertheless there are a number of apparent limitations.

The first major exclusion is express in the definition. A nuclear incident can occur “within the United States” only. Where both a radioactive discharge and the resulting injury take place outside this country, as where materials have been exported to Europe, the answer is definite: no protection. The problem is more difficult, however, when one or the other of these conditions is changed. If, for example, a reactor “burns-up” near Detroit and a person living in Canada is injured, that person logically should be protected since the nuclear incident took place “within” the United States, albeit causing damage in Canada.

The joint Committee hedged on this question, however, saying that the problem would require further investigation when and if it should arise.
In the same category, according to the Joint Committee, is the situation in which "there is any activity abroad which causes further injury in the United States." Presumably, if American special nuclear material exported to Canada caused a reactor "burn-up" there, and persons in this country were injured, Congress would want to consider the possibility of extending coverage to such persons at that time. The report does not state whether "activity abroad" refers only to American activity, or also includes a reactor operated by foreigners with foreign materials. It can be argued that Congress did not intend to extend protection to any persons other than American licensees. On the other hand, part of the reason for the act was to protect the American public as a whole, which suffers no lesser injury because the radiation emanates from a foreign source than from a domestic one. Congress' reluctance to deal with this problem in the amendment again seems to indicate a desire to consider any such incident at the time it happens, rather than making advance provision for protection.

Obviously, the restrictive geographic definition placed upon "nuclear incident" constitutes a deterrent to our nuclear materials export program, and would pose an even more substantial threat to eventual widespread overseas activity by American licensees. Without protection similar to that offered in the Anderson legislation, entrepreneurs are not eager to expose themselves to the unprotected risks that foreign nuclear development would involve. Congressional leaders are aware of this problem, but display understandable hesitancy to enact an indemnification program that would cover non-nationals all over the world, when the benefits of such a program to the American people to a great extent would be quite indirect. Alternative means of establishing international protection are now under careful study. Perhaps the most covers "any legal liability" and therefore should encompass both cases. The Joint Committee Report indicates, however, that this phrase was included to remove time restrictions on claims, rather than for some other purpose. Joint Committee Report 16.

1286 Joint Committee Report 16.
1287 An excellent statement of the foreign problem was made by Stoddard M. Stevens of Sullivan & Cromwell at the Indemnity Hearings 191-202.
1288 See Atomic Industrial Forum, Financial Protection Against Atomic Hazards, The International Aspects, Preliminary Report (1958). This study, conducted under the auspices of the Harvard Law School, examines the various means available for affording financial protection to American nuclear entrepreneurs abroad. Among those methods which have been suggested are: (1) extension of the indemnity scheme of the Anderson amendment to foreign operations; (2) permitting only limited access to American courts by foreign claimants; (3) insulation of assets through formation of independent subsidiaries abroad; (4) contractual arrangements
promising, and yet an arrangement most difficult to achieve would appear to be an international convention limiting the liability of nuclear entrepreneurs.\textsuperscript{1289} There is precedent in the maritime and aviation areas for this type of international agreement, but obviously the problems of geographic scope and latent injuries offered by the dangers of a substantial reactor "burn-up" complicate the picture for a convention in the atomic energy field.

Accepting the fact that the Anderson amendment generally is limited to application in the United States, one must further consider some less well-defined limits on the statute's scope. These relate particularly to the types of injuries which are compensable. In its broadest terms, a "nuclear incident" involves a sickness or loss arising from the hazardous properties of nuclear materials. It may be asked whether this definition would cover damages for mental suffering caused by the apprehension of having a major power reactor operate nearby.\textsuperscript{1290} In a similar vein, what of the case of the well-established private school whose entrance applications fall off sharply the year after a minor nuclear incident occurs at a facility in the general neighborhood? Are claimants entitled to compensation for such "losses" arising from "hazardous properties"? Does the phrase "loss of use of property" include the profits lost by a manufacturer who is deprived of the commercial power supplied by a reactor when the reactor suddenly "burns-up"?\textsuperscript{1291}

These questions are not answered in the amendment, and one can only try to deduce congressional intention from the language of the "nuclear incident" definition and the general history of the legislation. The Joint Committee apparently contemplated one limitation: a mere

for indemnification by foreign purchasers; and (5) an international convention for limitation of liability. See also Hearings before the Joint Committee on Atomic Energy, Operation of AEC Indemnity Act, 85th Cong., 2d Sess., pp. 32 et seq. (1958).

\textsuperscript{1289} Atomic Industrial Forum, Financial Protection Against Atomic Hazards, The International Aspects, Preliminary Report, pp. 47 et seq. (1958). The study points out that an international convention limiting liability will be of little value to the general public unless there is also some government assumption of responsibility for damages exceeding the liability to which operators and suppliers are limited. Any such international commitment of government funds will certainly mean that the convention will require considerable time for ratification. It would probably be necessary, therefore, to negotiate bilateral agreements as interim devices.

\textsuperscript{1290} This question would become pertinent, of course, only if applicable state law also permitted recovery for such damage. This may often be a greater hurdle for claimants alleging mental suffering than is the "nuclear incident" definition itself. See discussion supra in text following note 716.

\textsuperscript{1291} It is probable that this would not be compensable under insurance policies presently available to the industry. See text accompanying note 1356 infra.
drop in land values caused by the presence of a reactor is not intended to be compensable.\textsuperscript{1292} From this clue and from a reading of the amendment as a whole, it perhaps is safe to say that coverage was intended for personal injury and property damage caused by actual radioactive contamination, rather than loss resulting indirectly from the presence or operation of a facility.\textsuperscript{1293} Indeed, compensation in a hypothetical case of a manufacturer probably would not turn upon a reading of the definition at all but would be provided for in the contract between his company and the power utility. Undoubtedly many interpretive questions can be obviated by contrast, and it is only in the cases where contractual protection is not feasible that courts must turn to close scrutiny of the amendment.

(2) Public Liability

The second crucial term of art is closely related to the first. The amendment’s requirement of financial protection and provisions for indemnification are against “public liability,” which is defined as:

\ldots [A]ny legal liability arising out of or resulting from a nuclear incident, except claims under State and Federal Workmen’s Compensation Acts of employees of persons indemnified who are employed at the site of and in connection with the activity where the nuclear incident occurs, and except for claims arising out of an act of war. “Public liability” also includes damage to property of persons indemnified: \textit{Provided}, That such property is covered under the terms of the financial protection required, except property which is located at the site of and used in connection with the activity where the nuclear incident occurs.\textsuperscript{1294}

Within this definition are limitations and exceptions which must be added to those suggested with respect to the “nuclear incident” definition. It is clear that the on-site property of an indemnitee used in connection with the activity is not protected by the amendment, but as pointed out later, independent insurance against such a hazard is avail-

\textsuperscript{1292} Joint Committee Report 16, 17. The Report also indicates that the Committee did not intend to include in the definition of “nuclear incident” any “similar causes of action which may occur, namely, from the location of an atomic energy facility at a particular site.” \textit{Id.} at 17.

\textsuperscript{1293} Such a limitation would appear to be a proper interpretation of the Joint Committee Report. \textit{Id.} at 17. It also generally coincides with the limitation written into the available nuclear energy insurance policies. See note 1356 \textit{infra} and accompanying text.

\textsuperscript{1294} Subsection 11u.
able from private sources. It also should be suggested parenthetically that the word "indemnitee" includes more than just the licensee who signs an indemnification agreement. While this feature will be discussed later,\(^\text{1295}\) it is mentioned here to emphasize the fact that everyone for whom indemnification exists under an agreement is denied a claim for damages for loss of his on-site property.

Off-site property belonging to indemnitees, however, is fully covered within the "public liability" definition, so long as the underlying insurance policy or other form of financial protection is equally extensive. The insurance policy currently approved for the nuclear industry provides such coverage.\(^\text{1296}\) Thus it is possible that one who is at fault in causing a nuclear incident nevertheless may proceed, with respect to his off-site property loss, against the insurance and indemnity fund on as favorable a basis as injured third parties. The Joint Committee has indicated that this provision was inserted to protect universities operating reactors on their campuses,\(^\text{1297}\) but the language of the definition does not limit protection to this type of situation. Whether a court would be willing to construe the statute more narrowly when faced with the case of a tortious indemnitee-licensee asserting a large (but credible) claim against the fund for lost profits from loss of use of off-site property on a par with innocent claimants is an open question. The question becomes a hard one when there are insufficient funds by way of insurance and indemnity to pay all valid claims. It is probable that the expression of congressional motive for insertion of the provision, together with the obvious equities, could open the door for a construction favoring claims of innocent third parties. In any event this would seem to control as against any contrary result under state law, if state law should call for no distinction between types of claims.

Two exclusions are explicitly stated in the definition. First, claims usually falling under workmen's compensation acts of employees of persons indemnified, who are employed at the site and in connection with the activity where a nuclear incident occurs, are not part of the public liability against which indemnity is offered. Congress felt that these claims could be satisfied adequately through existing legislation.\(^\text{1298}\)

That this may not always be the case is indicated in the discussion else-

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\(^{1295}\) See text following note 1306 infra.

\(^{1296}\) Approved Form of Nuclear Energy Liability Insurance, 23 Fed. Reg. 6684 et seq. (1958). Such persons are covered by the policy, and off-site property is not listed as an exclusion.

\(^{1297}\) Joint Committee Report 18.

\(^{1298}\) Id. at 18, 19.
where in this volume of problems under the present workmen's compensation statutes.

The second express exclusion involves war damage. The Joint Committee explained that in the event of war, "damages would be so great and the task of proving causation so difficult that further congressional study would be needed. . . . [However any] single act of sabotage would be covered by the indemnification provisions of the bill if it could not be proven to be an act of war." 1299

In both the "nuclear incident" and "public liability" definitions, there are such general phrases as "arising out of," "in connection with," and "at the site of," to delimit certain claims or losses which are intended to be either included or excluded from the protection of the act. These phrases, necessarily ambiguous in the final analysis, invite speculation as to their actual meaning, and one may be sure that they will pose difficulties on the outer fringes of intended coverage. 1300 It is doubtful, however, that the statute could have been drawn with greater specificity and still permit some liberality in construction to take care of the "hard case." Nevertheless, these broad phrases make the interpretive process extremely important to numerous claimants, and the potential problems inherent in a system which entrusts this process to myriad state and federal courts, permitting centralized control only at the enforcement of judgment level, are dramatically apparent. 1301

b. Indemnification

With this brief picture of the risks to which the Anderson amendment protection is applicable, what is the protection offered to licensees and contractors? As indicated in the introduction, coverage normally will consist of private financial protection (syndicate insurance in the usual case) and government indemnification. The coverage of the latter

1299 Id. at 18.
1300 "This language obviously includes any incident which occurs on the site of the licensed activity, and the Committee Report specifically includes any mishap that may arise while radioactive materials are being transported to or from that site. Does the phrase 'in connection with the licensed activity' embrace an incident which occurs at the plant of the fuel elements fabricator or re-processor? While such an inclusion appears reasonable, can the language be further extended to cover an accident occurring in one of these independent plants arising out of work done for another customer (which has no indemnity agreement) but which is aggravated by fissionable materials on hand for use in the indemnified reactor? To state such questions is to emphasize that they are a matter of degree and must be determined on their facts as they arise." Comment, 56 Mich. L. Rev. 752, 759-60 (1958).
1301 The problems created by this system are discussed in detail in Section 3a infra.
will coincide to a considerable extent with the terms of the proposed insurance policy approved by the AEC. In some instances, however, indemnity protection may be somewhat broader, and this state of affairs will pose problems as to the nature of actual coverage. To simplify consideration of these problems, it will be best to analyze first the more comprehensive protective device—government indemnification.

(1) Generally

The principal feature of the Anderson amendment without question is the government's offer of $500 million third-party liability protection as a stimulus to further activities in the nuclear energy industry. This protection, which takes the form of individual indemnification agreements, is available to all licensees and contractors who are required under the operation of the amendment to obtain private financial protection against a nuclear risk. It may even be available to those who are not so required. By the terms of these agreements, the government agrees to indemnify and hold harmless "the licensee and other persons indemnified, as their interest may appear, from public liability arising from nuclear incidents which is in excess of the level of financial protection required of the licensee." If, therefore, a particular licensee is required to obtain $60 million of private financial protection, the government will sign an agreement to protect him for another $500 million—or a backstop fund totalling $560 million public liability protection for third parties who may assert claims in the event of a nuclear incident.

As pointed out in the previous section, indemnification is provided against public liability only as that term is defined in the statute. Thus there is no coverage for on-site property losses to indemnitees, off-site property losses of indemnitees where private insurance does not also cover such losses, claims of employees properly covered under workmen's compensation plans, and war losses. Indemnity is provided only for "nuclear incident" injuries and damage, not for claims arising from some other type of activity at the atomic facility. Protection generally is limited to domestic incidents.

1802 Subsection 170c. The AEC has promulgated a proposed regulation containing a general form of indemnity agreement. This form rather closely parallels the specifications of the Anderson amendment. 23 Fed. Reg. 6681 et seq. (1958).
1803 The language of the amendment is not clear on the question of indemnity for contractors and materials licensees who are not required to obtain financial protection. See discussion in text following note 1311 infra.
1804 Subsection 170c requires this language.
1805 See Subsection 11u.
(2) Protective Scheme

Indemnification covers "the licensee and other persons indemni­fied." 1306 As previously indicated, only the prime licensee signs an indemnity agreement for a facility, 1307 but its protection extends to any other person who might be subject to public liability, including subcontractors, designers, independent contractors dealing with the prime licensee, and tortfeasors such as trespassers. This relatively unusual scheme of coverage was motivated primarily by the requests of insurers, who feared that any other system would lead to pyramiding of insurance at each facility. 1308 Rather than requiring insurance of each person potentially responsible for a nuclear incident, Congress permitted all but the prime facility licensee to gain protection from the agreement executed by the latter. Cost to the facility licensee of the additional cover­age probably will be passed along to the consumer of the facility's product, if any, just as it would if each sub-contractor were required to obtain protection for his own operations.

Foreign to this analysis, however, is the trespasser who causes a nuclear incident. Although he has no contractual dealings with the prime licensee, he is as fully protected by the licensee's indemnity agree­ment as is the licensee himself. Thus the operator of an aircraft who negligently crashes into a reactor, 1309 causing a nuclear incident, is af­forded $500 million indemnity. The reason for this particular feature of the statute is obvious. Congress had as one of its two primary object­ives in enacting indemnity legislation the protection of the general public, and an innocent third person is no less irradiated because the in­cident is caused by a tortious stranger than by the licensee himself.

(3) Indemnity for Contractors and Materials Licensees

Analysis thus far has been predicated on the assumption that some financial protection would be required of the licensee and that the gov­ernment indemnity would be given in addition thereto. For some licen-

1306 Subsection 170c.
1308 "Having the agreement run to the benefit of any other person who may be liable will parallel the policies which the insurance companies are planning to issue. They, too, will be entered into with the licensee or prime contractor and will run for the benefit of any other person who may be liable." Joint Committee Report 17.
1309 "This hypothetical case is specifically mentioned in the Joint Committee Report, ibid."
sees and for government contractors, however, private financial protection is not mandatory but rests on the discretion of the AEC. Only facility operators under Sections 103 and 104 of the Atomic Energy Act are required to obtain financial protection. Materials licensees under Sections 53, 63, and 81 and Commission contractors are not so required unless the AEC requires financial protection. Thus far, these latter individuals have not been asked to show private financial responsibility.

If this is so, then the question immediately arises as to whether a licensee or contractor having no private financial protection can demand and obtain government indemnity coverage of $500 million? As to AEC contractors, by Subsection 170d the Commission is “authorized” to enter into indemnity agreements in which the Commission “may” require financial protection and “shall indemnify the persons indemnified... above the amount of the financial protection required,” in the amount of $500 million. It would appear perfectly defensible to read this language either as authorizing the Commission to sign indemnity agreements only with contractors who have obtained financial protection or as authorizing indemnification of contractors, whether or not private financial protection is required. The Joint Committee Report is of no assistance in choosing the proper interpretation, and our only clue, for what it is worth, is the fact that the AEC signed indemnity agreements (without insurance) before the Anderson legislation was passed and has indicated its intention to do so under the new statute.

The statute is no more helpful with respect to materials licensees. Subsection 170a provides that financial protection “may” be required of such licensees in the discretion of the Commission, and that “whenever such financial protection is required, it shall be a further condition of the license that the licensee execute and maintain an indemnification agreement.” Subsection 170c then states that the Commission, with respect to licenses for which it requires financial protection, shall agree to indemnify. Nothing in the amendment specifically authorizes the Commission to sign indemnity agreements when financial protection is not required, but neither is there provision to the contrary.

1310 Subsection 170a.
Since the cost of indemnification under the amendment is nominal, an indemnity agreement without the cost of private insurance would be a real boon to contractors and materials licensees. During the hearings on the legislation, strong arguments were made in favor of mandatory financial protection for all contractors and licensees, and not just Sections 103 and 104 licensees. Thus far it appears that the Commission has not exercised its discretion to require financial protection of its contractors and materials licensees and, if it continues on this course, the question of whether it is nevertheless empowered to give indemnity becomes quite important. If the risks involved in the operations of AEC contractors and materials licensees are great enough to warrant the advocacy of their inclusion within the mandatory provisions of the amendment, they also would appear great enough to require that some form of protection be given the public immediately. In the case of contractors particularly, the Commission may be reluctant to impose the financial protection requirement since the cost of insurance undoubtedly would be passed along to the government, but this is no reason why the indemnity agreement should not be signed anyway, for the sake of the public and for the protection of the contractor or materials licensee. Since the statute can be fairly interpreted to permit such a practice, it is submitted that the more liberal construction should be applied and the AEC should follow the course it has already set with respect to contractors, thus providing indemnification for both materials licensees and contractors, even when no insurance is required.

c. Financial Protection

The $500 million government indemnity generally is designed to supplement third-party liability protection obtained from private resources in the form of “financial protection.” We thus far have used this term as if it were self-explanatory in the nuclear industry context. This is far from the case, as an examination of the requirements of the act will demonstrate.

1313 “The Commission is authorized to collect a fee from all persons with whom an indemnification agreement is executed under this section. This fee shall be $30 per year per thousand kilowatts of thermal energy capacity for facilities licensed under section 103. For facilities licensed under section 104, and for construction permits under section 185, the Commission is authorized to reduce the fee set forth above. . . . No fee under this subsection shall be less than $100 per year.” Subsection 170f.

1314 E.g., Indemnity Hearings 162-63, 185.


1316 Id. at 4 29.
(1) General Requirements

By Subsection 170a, each license for a production or utilization facility under Sections 103 or 104, and permits for the construction thereof under Section 185, must contain a condition that the licensee will obtain "financial protection" against public liability of such type and in such amount as the AEC may require. As indicated in the previous section, licenses for the handling and use of special nuclear, source, and byproduct materials also may contain such a condition, if the Commission deems it necessary.\textsuperscript{1317} Financial protection may take the form of private insurance, contractual indemnity, self-insurance, or other proof of financial responsibility, or a combination of such measures.\textsuperscript{1318} The Commission may not, however, require protection in excess of the amount available from private sources, currently some $60 million, and its discretion is further limited by a statutory provision that any facility capable of producing 100,000 electrical kilowatts or more must carry insurance in the maximum amount privately available.\textsuperscript{1319}

(2) Educational Institutions

Soon after passage of the Anderson amendment, the AEC promulgated temporary regulations implementing the legislative provisions.\textsuperscript{1320} Pursuant to its statutory authority, the Commission, \textit{inter alia},\textsuperscript{1321} initially set the minimum level of financial protection at $250,000.\textsuperscript{1322} Because it soon became apparent that this relatively low minimum figure would potentially force the AEC into the "small claims" business, the Commission thereupon proposed a draft amendment to the proposed

\textsuperscript{1317} Subsection 170a.

\textsuperscript{1318} Subsection 170b. The Commission recently reported that of 22 licensees required to file proof of financial protection, 12 have submitted insurance binders and one has elected to make a showing that he possesses adequate resources to provide the required amount of protection. Nine licensees claim immunity from tort liability and one is considering such a claim. Report by the Atomic Energy Commission to the Joint Committee on Atomic Energy on Operations under Section 170 of the Atomic Energy Act of 1954, March 28, 1958, reported at CCH, Atomic Energy Law Rep. ¶9571 (1958).

\textsuperscript{1319} Subsection 170b.

\textsuperscript{1320} Financial Protection Requirements and Indemnity Agreements, 10 C.F.R. Pt. 140 (Supp. 1958).

\textsuperscript{1321} Other sections of the regulations deal with such questions as the permissible types of financial protection, proof of financial protection, Commission review of such proof, reports by licensees asserting immunity from liability, indemnity agreements, and exemptions. \textit{Id.} at §§140.12-140.18.

\textsuperscript{1322} \textit{Id.} at §140.11. Financial protection was to be required at a rate of $150,000 per thousand kilowatts of thermal energy capacity authorized.
regulation by which the minimum level of protection required would be increased to $3 million. Criticism of this new figure immediately arose from reactor-operating educational institutions, who pointed out that a policy providing coverage for the required $3 million might cost as much as $24,000 annually, a sum too great for the operating budgets of most university reactors.

Many universities were at the same time faced with another related problem. Serious doubt was being expressed as to the authority of state universities to waive their immunity from suit as might be required under the terms of Subsection 170a of the Anderson amendment. Five out of six state universities claiming immunity for their reactor operations advised the AEC that they had neither the power to waive or modify such immunity nor authority to purchase public liability insurance. In some of these states, the prohibition against waiver was constitutional, so that mere legislation could not eliminate it were the Commission to so require.

To meet this awkward situation, and at the same time to relieve educational and research institutions from the prohibitive burdens of a $3 million financial protection requirement, the House in mid-1958 proposed the addition of a new Subsection 170k to the Atomic Energy Act. This provision stated that:

k. With respect to any license issued pursuant to section 53, 63, 81, 104a, or 104c. for the conduct of educational ac-

1323 See proposed amendment to 10 C.F.R. §140.11 (Supp. 1958), reported at BNA, Atomic Industry Rep. 54:31, 54:33 (1958). A further amendment has been more recently proposed, not affecting this particular provision but containing a draft indemnification agreement. See 23 Fed. Reg. 6681 (1958). Other provisions of the draft amendment revising §140.11 change the formula by which the required amount of financial protection would be determined. The level of protection between $3 million and $60 million would be determined by an empirical formula based primarily on the authorized power level of the reactor, the length of the fuel cycle, and the population density in the general area. For reactors having a rated capacity of 100,000 electrical kilowatts or more, of course, the maximum $60 million would be required, as specified in the Anderson amendment. Subsection 170b.

1324 Communication from Director, Michigan Memorial Phoenix Project, Ann Arbor, Michigan. This figure does not include the cost of property insurance on the facility itself, which would probably amount to another $8,000 annually. Ibid.

1325 It is probable that this type of activity would be held to fall under the aegis of sovereign immunity, absent legislative waiver, in the vast majority of our states. For a recent review of this question, see Comment, 42 Corn. L. Q. 540 (1957). See also Livingston v. Regents of New Mexico College of A. & M.A., 328 P.2d 78 (N. Mex. 1958).


1327 Ibid.
activities to a person found by the Commission to be a nonprofit educational institution, the Commission shall exempt such licensee from the financial protection requirement of Subsection 170a. With respect to licenses issued between August 30, 1954, and August 1, 1967, for which the Commission grants such exemption:

(1) The Commission shall agree to indemnify and hold harmless the licensee and other persons indemnified as their interests may appear, from public liability arising from nuclear incidents. The aggregate indemnity for all persons indemnified in connection with each nuclear incident shall not exceed $500,000,000, including the reasonable costs of investigating and settling claims and defending suits for damage.

* * *

(3) such contracts of indemnification, when entered into with a licensee having immunity from public liability because it is a State agency, shall provide also that the Commission shall make payments under the contract on account of activities of the licensee in the same manner and to the same extent as the Commission would be required to do if the licensee were not such a State agency.

This enactment, ostensibly providing indemnification by the federal government from the ground up for approved educational institutions, eliminated both the problem of large financial protection premiums and that of the inability of some institutions to waive their immunity and purchase insurance. No financial protection would be required for such facilities, and liability would fall only on the federal government under its $500 million indemnity provisions.

Objection was raised in the Senate, however, to federal assumption of indemnitor's liability from the first dollar up, the thesis being that this was too much like the federal government entering the business of private insurance. A compromise measure therefore was reached, whereby the House version remained untouched except for the insertion, in paragraph (1) of the subsection following the phrase "public

1828 This language, taken together with the preceding sentence, appears to indicate that such institutions will be exempted from the financial requirement indefinitely, whereas indemnity will be provided only under licenses issued until August 1, 1967. It is probable, however, that Congress intends to re-evaluate the exemption as well as the indemnification provisions by the 1967 date.


liability," of the words "in excess of $250,000." Exception from financial protection requirements is given while government indemnity still would be provided, but rather than beginning with the first dollar, indemnity would begin only at the $250,000 level. Up to that point the institution itself would be responsible. For private universities and state educational agencies not claiming immunity, the initial liability span would be covered by "private insurance, suppliers' liability insurance, or special State procedures." 1381 The compromise bill was passed in August 1958.1382

Congress' decision refusing to indemnify non-profit educational institutions from the ground up, while it preserves the indemnity program as a purely supplemental protective device, still leaves unsolved the waiver of immunity problem so neatly obviated by the House measure. As enacted, the legislation makes no provision for public liability claims up to the amount of $250,000 damages when the facility at which a nuclear incident occurs successfully invokes sovereign immunity. To satisfy damage claims beyond that level, the $500 million indemnity will operate "in the same manner and to the same extent as . . . if the licensee were not such a State agency." For the "first" $250,000 of claims, however, some or all third-party claimants are certain to find their judgments not fully satisfied. Congress does not indicate whether the loss will be borne only by the first claimants to obtain their judgments, or will be divided pro rata among all the claimants who ultimately win judgment. While the latter course obviously is more equitable, it also means that no final settlement of the amount to which each claimant is entitled can be determined until all judgments are rendered.1888

As indicated, liability beyond $250,000 of state agencies successfully invoking sovereign immunity will be covered by government indemnity just as if the agency were a private institution. One technical criticism of such a statutory scheme is in order. The new provision contemplates that payments under this indemnity provision will be made pursuant to a contract of indemnity signed by the Commission and the indemnitee. One may legitimately ask under what authority does an immune agency sign an agreement of indemnity? Indemnity protection for one who is immune is an anomaly, to say the least; there is no need to be indemni-

1382 104 Cong. Rec. 16076 (House of Representatives), 16207 (Senate) (1958).
1383 See the discussion of similar problems arising under Subsection 170e. Section 3b(3) of text infra.
fied from non-existent liability. And if the agency is immune, whom does the claimant sue in order to obtain judgment? Certainly he cannot name an immune person as defendant. While the over-all congressional intent as to these questions is clear, courts undoubtedly will be forced to read the statutory language liberally to overlook the technical defects of the congressional scheme. Probably courts will merely find an unwritten authorization that the government itself be named as defendant and be liable under its indemnity agreement for $500,000,000 worth of claims, although this will require some verbal, if not mental, gymnastics.

A final aspect of the new provision, dealing with the type of institution to which its coverage extends, should also be mentioned. While the terms of the amendment restrict its operation to "nonprofit educational institutions," Congress has indicated that this term includes "privately owned and sponsored nonprofit educational institutions" as well as those operated under state funds. The language of the provision thus encompasses reactors at private universities, and this is said to be true even though the facility is used for "incidental nonprofit research . . . for outside organization and industries." Apparently excluded by implication are licensees using radioactive materials purely for medical or other philanthropic purposes (but not educational), although the equities in favor of exemption for this type of operation would seem to be just as compelling as for those installations already covered by the amendment.

(3) Federal Facilities

With respect to the immunity of federal agencies operating reactors, the AEC has acknowledged that these bodies are without authority to make a more extensive waiver of sovereign immunity than that provided for in the Federal Tort Claims Act, and that they are without

1385 Ibid.
1386 Report by the Atomic Energy Commission to the Joint Committee on Atomic Energy on Operations under Section 170 of the Atomic Energy Act of 1954, March 28, 1958, reported at CCH, Atomic Energy Law Rep. ¶9571 (1958). The Federal Tort Claims Act permits suit in tort cases where a private person under the same circumstances would be liable, except that "an act or omission of an employee of the Government . . . in the execution of a statute or regulation . . . based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty . . . whether or not the discretion involved be abused" will not subject the federal government to liability. 62 Stat. 984 (1948), 28 U.S.C.A. §2680 (1950). This exception has been broadly construed, but the Supreme Court has distinguished the
authority to purchase policies for nuclear energy liability insurance.\textsuperscript{1337} No mention of federal facilities is made in H.R. 13455 or its accompanying report, but it is possible that certain government facilities could be classified as a "non-profit educational institution" by the Commission. Instead of legislation exempting federal agencies from the insurance requirements altogether, however, the Commission at one time was considering a bill which would waive government immunity from tort with respect to claims rising from a nuclear incident caused by federally-operated facilities.\textsuperscript{1338} The AEC recently has indicated, on the other hand, that it will enter into indemnity agreements with federal agencies without requiring them to obtain financial protection. These agreements, subject to the $500 million limitation on liability, will indemnify federal licensees and other persons who may be liable. The Commission concluded that requiring federal agencies to obtain financial protection "would not accomplish any useful purpose under section 170." \textsuperscript{1339}

(4) AEC Contractors

As previously indicated, financial protection for AEC contractors is authorized but not required by Section 170. No limitations are placed upon the discretion of the Commission as to the criteria for, or amount of, such financial protection to be obtained by its contractors, perhaps because Congress was aware that the cost of any insurance ultimately would be borne by the federal government and therefore there was no need of establishing an equitably-rated standard. For this same reason,


\textsuperscript{1339} \textit{Hearings before the Joint Committee on Atomic Energy, Operation of AEC Indemnity Act}, 85th Cong., 2d Sess., p. 4 (1958).
the Commission decided late in 1957 to omit the requirement of financial protection for contractors.\textsuperscript{1840} This decision presently is being reconsidered in light of the fact that services of insurance groups for the handling and investigation of claims arising from nuclear incidents probably would not be available in case of injuries caused by contractors due to the disinclination or lack of authority of insurers to engage in settlements when they had no pecuniary interest therein.\textsuperscript{1841} Subsection 170g imposes upon the AEC the duty to use private insurers’ services to the maximum extent possible, ostensibly to avoid building a claims-investigation branch within the Commission itself and also, of course, to take advantage of insurance company know-how in this area. Costs of such services normally would be charged to the indemnitee, but in the case of an AEC contractor, the federal government would bear the ultimate burden. The Commission has expressed hope, however, that nuclear insurance may be made available on a retrospective rating plan “‘that will permit AEC to require its contractors to obtain nuclear insurance for damages caused by AEC contractors’” without bearing the burden of a high annual premium.\textsuperscript{1842}

d. Financial Protection Available

Under the terms of Subsection 170b, the required financial protection may be furnished through private insurance, private contractual indemnities, self-insurance, or other proof of financial responsibility, or a combination of these means. While there are thus several alternative programs available to licensees, the vast majority of corporate and state licensees in fact have turned to private insurance for protection. In 1958 the AEC reported that only one licensee had elected to show that he himself possessed adequate resources to provide the required amount of protection.\textsuperscript{1843} For the remainder, the only practically available sources of insurance were the syndicates formed in 1956 to provide third-party liability coverage for the industry.

These syndicates or insurance pools came into existence in response to the need for a policy adequate to meet the unusual risks involved in

\textsuperscript{1841} Ibid.; Hearings before the Joint Committee on Atomic Energy, Operation of AEC Indemnity Act, 85th Cong., 2d Sess., pp. 21 et seq. (1958).
\textsuperscript{1842} Ibid.
reactor operation. While licensees could boast a nearly unmarred safety record, the mere possibility was a gigantic risk for which to provide protection. Insurers have little or no experience upon which to base rate tables, but it was rather clear that any rate which was reasonable from the standpoint of the insurer would be grossly too large if no incident took place and grossly too small if a real disaster should occur. No single private company was equipped financially or was inclined to provide coverage in the face of such problems at any level approximating the desired amount. The obvious solution, if the government was to adhere to its normal policy of offering indemnity only when no insurance was available from private sources, was to turn to the pooling of insurers’ resources. The insurance companies responded with three associations, two providing protection against the public liability hazard and the third against property damage to the licensee’s facility.

(i) NELIA-MAERP Policy

One of the liability syndicates is the Nuclear Energy Liability Insurance Association (NELIA), composed of more than 130 insurance stock companies, which eventually will offer third-party protection to the extent of $50 million per nuclear incident. Supplementing the policy offered by NELIA is the further protection available from the Mutual Atomic Energy Reinsurance Pool (MAERP), which is expected to develop a capacity for an additional $15 million insurance, including reinsurance.

A tentative draft of a combined NELIA-MAERP policy was first promulgated in 1957. Certain provisions of this draft came under criticism, and the insurance syndicates undertook to draw a more satisfactory policy. In August 1958, the AEC published an amendment

1344 See Chapter IV at summary following note 126 for a discussion of this record.
1346 Discussion of these pooling arrangements is found ibid., and in Thomas, “Can We Insure Against Liability from Nuclear Incidents?” 46 Calif. L. Rev. 14, 15 (1958). See also CCH, Atomic Energy Law Rep. §§4043, 4044 (1958).
1348 Snow, supra note 1345.
1349 Indemnity Hearings 100-107. The best discussion of this contract is found in Butler, “Liability Insurance for the Nuclear Energy Hazard,” 60 Public Utilities Fort. 913, 917 et seq. (1957). See also Thomas, supra note 1346 at 16.
1350 See, e.g., letter from Nuclear Energy Liability Insurance Association officer, included in Joint Committee Report 10.
to its regulations issued under the Anderson amendment, approving the second NELIA-MAERP policy as one by which the financial protection requirement could be satisfied.\textsuperscript{1351} Since undoubtedly this policy will be the most popular means by which licensees will insure against public liability, it warrants closer scrutiny.

It first should be noted that the approved policy extends only to the "nuclear energy hazard," \textit{i.e.}, "the radioactive, toxic, explosive or other hazardous properties" of source, special nuclear, or byproduct materials.\textsuperscript{1352} Injuries to which public liability coverage extends generally are the same as those specified in the "nuclear incident" definition of the amendment.\textsuperscript{1353} The terms of the policy state, however, that continuing discharges in the course of transportation or periodically over a long period of time from a single facility amount to only one nuclear incident.\textsuperscript{1354} This provision spells out the answer to a question which is left undecided by the Anderson amendment.\textsuperscript{1355}

Protection for loss of use of property is restricted to instances in which the property is "injured, destroyed or contaminated" or withdrawn from use because of real or potential contamination.\textsuperscript{1356} This limitation by its terms is narrower than the broad indemnity coverage for "loss of use of property," but as was indicated previously,\textsuperscript{1357} judicial construction of the indemnity provision probably would circumscribe the latter in just about the same terms as those included in the policy.

Persons insured under a policy include the named insured (the prime licensee) and other persons with whom the prime licensee has entered into contractual relations concerning the facility.\textsuperscript{1358} This clause is substantially the same as the "persons indemnified" concept written into

\textsuperscript{1351} See 23 Fed. Reg. 6684 \textit{et seq.} (1958). At the time of this writing, the AEC has issued a notice of proposed rule-making only. The proposed amendment includes the following statement: "The Commission will accept any other form of nuclear energy liability insurance as proof of financial protection, if it determines that the provisions of such insurance provide adequate financial protection. . . ." \textit{Ibid.}


\textsuperscript{1353} Subsections II o, II u.

\textsuperscript{1354} Approved Form of Nuclear Energy Liability Policy, Condition 4, 23 Fed. Reg. 6684, 6685 (1958).

\textsuperscript{1355} Subsection II o.


\textsuperscript{1357} See text accompanying note 1293 \textit{supra.}

the Anderson legislation, and it is to be doubted that coverage under the latter would be any broader than the insurance scope, as far as constructors, suppliers, and other contractors are concerned.

In the original tentative policy, there was no provision to include a trespasser or other non-contracting tortfeasor as a person indemnified. Thus presumably the owner of an aircraft crashing into a reactor would not have been able to claim insurance coverage under the NELIA-MAERP policy, although statutory indemnity protection would have extended to him.\textsuperscript{1359} Such a situation would have seriously endangered the public, since government indemnification is merely supplemental to insurance, beginning where the insurance coverage ends. This problem was raised with the insurance syndicates, and in the approved policy, the definition of persons insured includes, besides the named insured, "any other person or organization with respect to his legal responsibility for a nuclear incident."\textsuperscript{1360}

Exclusions under the approved policy, except for the limitation on the amount of insurance available, are not extensive.\textsuperscript{1361} It must be noted, however, that on-site property generally is not protected, and coverage does not extend to nuclear materials being transported, handled, or stored.\textsuperscript{1362} Off-site property of persons insured apparently is covered, and therefore off-site property will have insurance coverage and statutory indemnity coverage as well under the terms of the amendment.\textsuperscript{1363}

Further exclusion is made in the proposed policy for all operations and facilities outside the United States and its territories and possessions, so that, in general, exporters and prospective operators of foreign reactors at present cannot expect to obtain insurance for their activities.\textsuperscript{1364} On the other hand, it appears that persons in Canada or Mexico who might be injured by United States domestic incidents would be

\textsuperscript{1359} Note 1390 \textit{supra}.

\textsuperscript{1360} Approved Form of Nuclear Energy Liability Policy, §III, 23 Fed. Reg. 6684, 6685 (1958). By this provision, an agency of the United States cannot be an insured party.

\textsuperscript{1361} The principal exclusions to the standard policy are (1) for workmen's compensation; (2) for liability assumed under contract; (3) for the handling or use of any nuclear weapon; (4) war damage; (5) the reactor property itself; (6) damage to nuclear materials in the course of transport; and (7) damage arising from use of such materials outside the United States and its possessions. Approved Form of Nuclear Energy Liability Policy, Exclusions (a)-(h), 23 Fed. Reg. 6684, 6685 (1958).

\textsuperscript{1362} Id., Exclusions (f), (g).

\textsuperscript{1363} See text accompanying note 1296 \textit{supra}.

\textsuperscript{1364} Approved Form of Nuclear Energy Liability Policy, Exclusions (h)(1), 23 Fed. Reg. 6684, 6685 (1958).
able to claim under the policy.\textsuperscript{1365} This is broader coverage, of course, than Congress has been willing to acknowledge with respect to indemnity.\textsuperscript{1366} The insurers have further suggested that insurance may be available for foreign operations sometime in the future,\textsuperscript{1367} perhaps as soon as the domestic program begins to function smoothly.

Because of the risks involved, the absence of loss-experience tables, and the lack of a broad base of exposure to spread the risk,\textsuperscript{1368} the syndicates are demanding premiums which at first glance appear excessively high. For the maximum insurance of $60 million, the licensee may be forced to pay as much as $260,000 annually.\textsuperscript{1369} This rather staggering figure may be somewhat deceptive, however, because the syndicates have announced a plan of retrospective premium adjustment. By this program, if it develops after ten years that accumulations in the premium funds, as diminished by actual payments under the policy and other normal expenses and charges, indicate that the premium level is too high, pro rata adjustments may be made whereby considerable portions of the paid premium would be returned.\textsuperscript{1370}

Application of the proposed policy is limited to bodily injury and property damage resulting from nuclear incidents which occur within the policy period and for which a written claim is filed not more than two years following expiration of the policy period.\textsuperscript{1371} Either party

\textsuperscript{1365} See Joint Committee Report 10; Testimony of Charles J. Haugh, Nuclear Energy Liability Insurance Association, Indemnity Hearings 97.

\textsuperscript{1366} The Joint Committee has indicated that “further investigation” will be required on this question. See note 1284 supra and accompanying text.

\textsuperscript{1367} See Butler, supra note 1349 at 920; Atomic Industrial Forum, Financial Protection Against Atomic Hazards: The International Aspects, Preliminary Report 37 (1958).

\textsuperscript{1368} Thomas, supra note 1346 at 17.

\textsuperscript{1369} Butler, supra note 1349 at 922.

\textsuperscript{1370} “The premiums earned by the pools for the first ten years of operation will be accumulated. From these premiums will be deducted actual incurred losses and loss adjustment expense thereon. A specified provision for expenses and long-term reserves will also be deducted. The balance of the 10-year premiums will be accumulated in a special reserve. During the eleventh year of operation, a procedure of gradual refund of this reserve will begin. The portion of the reserve to be returned in the eleventh year will be that percentage of it which corresponds to the relationship of the first-year premium to the accumulated 10-year premiums. . . . This return will be made to the insureds who paid premium in the first year of operation and will be divided [pro rata]. . . . In the twelfth year, the process will be repeated. . . .” Id. at 924.

\textsuperscript{1371} Approved Form of Nuclear Energy Liability Policy, §IV, 23 Fed. Reg. 6684, 6685 (1958). The inadequacy of the policy’s coverage will be even more dramatic in some nuclear situations if a recent Arkansas modification of its statute of limitations should be adopted in other states. Act 140, Laws of 1959, reported at CCH, Advance Sess. Laws Rep. 139 (1959), provides that the statute is tolled “whenever the identity of
can terminate the policy by giving advance notice,\textsuperscript{1372} and if such a step is taken, then any claimant who does not or cannot discover his injuries and report them within two years after termination cannot claim under the policy. Potentially, therefore, the requirements of NELIA-MAERP are even stricter than the already-inadequate periods of limitations which presumably would be applied by our state courts to radiation injury claims growing out of a nuclear incident.

There is no mention in the contract as to when coverage first can be obtained by a facility operator. The Anderson amendment itself undoubtedly anticipates that financial protection may be required of construction permittees before the facility is in operation,\textsuperscript{1373} and any policy which would not be available as early in the process of construction as a radiation hazard is present, therefore, would appear inadequate.

The approved policy differs from the normal third-party liability insurance contracts available in that it is continuous, rather than for a fixed period such as a year. As indicated, however, it may be cancelled on notice.\textsuperscript{1374} The policy further provides that the limit of liability stated in the policy itself is the total aggregate liability of the insurers, and that each payment by the companies shall reduce by the amount of such payment the limit of the companies' liability under the policy.\textsuperscript{1375} When payments of claims have exhausted this total of liability, the policy terminates automatically and the insurer is discharged.\textsuperscript{1376} Thus presumably if a nuclear incident occurs at an insured facility, and the third-party claims exhaust the insurance fund, the policy terminates

\begin{itemize}
  \item the tortfeasor or tortfeasors be unknown," if an action against "John Doe" is filed. This might apply in the multiple defendant cases when it is not known which one of several possible defendants caused the injury, discussed \textit{supra} in text beginning at note 875. It also might apply to situations in which a person suffering from radiation injury cannot determine the source until more than two years after his symptoms appear. If he can use the Arkansas statute to extend the period for bringing his cause of action this will be another claim not covered by the insurance policy. Under such a statute the plaintiff's attorney should file a "John Doe" as soon as he knows the injuries are caused by radiation, and then he can investigate possible defendants at his leisure. The Arkansas statute is too concise and leaves many important uncertainties.
  \item\textsuperscript{1372} Approved Form of Nuclear Energy Liability Policy, Condition 12, 23 Fed. Reg. 6684, 6686 (1958).
  \item\textsuperscript{1373} Subsection 170a specifically requires that construction permits under Section 185 shall contain a financial protection provision. The Joint Committee indicates that use of the term "license" throughout the Anderson bill is intended to include the construction permittee. Joint Committee Report 20.
  \item\textsuperscript{1374} Note 1372 \textit{supra}.
  \item\textsuperscript{1375} Approved Form of Nuclear Energy Liability Policy, Condition 3, 23 Fed. Reg. 6684, 6685 (1958).
  \item\textsuperscript{1376} \textit{Ibid}.
\end{itemize}
and the facility operator is without financial protection until he can obtain another insurance contract. Even if the insurance fund is not exhausted, it is reduced by the amounts paid out. One may speculate whether the requirement of financial protection under the Anderson amendment would prevent a reactor operator in such a position from conducting further activities. It could be argued that if NELIA-MAERP refused him another policy, then the maximum amount of financial protection would be zero, and he therefore should be granted indemnification from the ground up. On the other hand, the insurance group probably would offer further coverage for another premium.

It is anticipated that the larger facility operators will obtain policies from both NELIA and MAERP, each containing very similar provisions. In the event of a nuclear incident, the two syndicates will be proportionately liable on all claims. The ratio normally should be between four and five to one, with NELIA of course assuming the greater burden.

(2) Potential Gaps in Protection

Of the NELIA-MAERP policy, one legitimately may observe that in general its coverage is co-extensive with that of the government indemnity. There are, however, exceptions to the rule. Claims arising from a nuclear incident might be asserted more than two years after termination of the policy and thus fall beyond the policy’s discovery period, yet still be within the period of limitations for government contractual liability. Some types of injury, such as lost profits, may be construed to be covered by the indemnity, but not by the private insurance. A clause of the insurance contract gives the insurer the right to suspend the contract for unsafe operations; if an incident should occur after such suspension but before the AEC closed down operations at the reactor, presumably the indemnity would apply but the insurance would not. Remote as these possibilities may be, they pose funda-

1377 Article II, ¶2 of the AEC indemnity agreement says the licensee “will make all reasonable efforts to obtain such reinstatements” in case the insurance policies fall below the figure set for financial protection. 23 Fed. Reg. 6682 (1958).

1378 The policies issued by NELIA and MAERP will be identical in terms and conditions. Thomas, supra note 1346 at 20. For this reason, available insurance is frequently referred to as “NELIA-MAERP” in this chapter.

1379 Approved Form of Nuclear Energy Liability Policy, Condition 2, 23 Fed. Reg. 6684, 6685 (1958). This contingency was suggested in Note, 71 Harv. L. Rev. 750, 753 (1958). The new approved policy lessens the likelihood of this happening by requiring twelve hours advance notice to the AEC prior to suspension. Approved Form of Nuclear Energy Liability Policy, Condition 2. Presumably the same question could arise if the insured failed to pay the annual premium, although no express power of suspension is included in the policy for this breach.
mental questions concerning the government indemnity: Is it intended to operate as an extension of financial coverage beyond the level of required insurance, or is it also intended to reinsure the risk covered by the policy, e.g., the first $60 million? If it is the latter, then an exclusion operating under the policy will merely mean that only a total of $500 million will be available for payment of claims within the excluded area, and that the government will pay from the ground up for such claims. This of course would be ideal for facility operators who could be assured always of full protection of their own assets from the attachment of creditors. It does not appear, however, that Congress has chosen this interpretation. The Joint Committee Report indicates that if, for some reason, the policy does not apply to the incident or to the claim, the burden must be borne by the insured himself, to the level of the required financial protection. From the latter point only will government indemnity operate. The remote but distinct possibility exists, therefore, that in spite of the insurance and indemnity program, a licensee may himself be ruined financially or seriously injured by a nuclear incident, and third parties may go substantially uncompensated.

(3) NEPIA Policy

Loss to the licensee, however, may be prevented at least in part under the third insurance policy offered to the atomic energy industry—protecting against property damage to the nuclear facility itself. This is not the "financial protection" against public liability required by the statute, and therefore it is not a condition precedent to obtaining government indemnity. Coverage is expressly limited to on-site property, thereby avoiding duplication with the NELIA-MAERP policy, and such property may be owned either by the insured or by other persons with whom the insured prior to loss has agreed to provide protection.

This policy is offered by the Nuclear Energy Property Insurance As-

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1380 "The protection of indemnification afforded by the Government under the agreement of indemnification is intended only to start when the damages exceed the face sum or the level of the financial protection required by the Commission. This means that if there are any exceptions in the scope of coverage of the underlying financial protection which may be applicable to a particular incident the indemnification does not pick up from the ground up but still picks up only after the amount of damage reaches the level of the financial protection required of the licensee." Joint Committee Report 21.

1381 On-site property of indemnitees is, of course, not covered by the Anderson amendment. Section 11u.

1382 NEPIA, Specimen of Policy, reported at CCH, Atomic Energy Law Rep. ¶4047 (1958)
sociation (NEPIA), another syndicate of stock companies, and is expected to provide facility operators protection up to $56 million. At the time the amendment was passed, such an amount was believed sufficient to cover the value of even the most expensive reactor, but this estimate may prove to be incorrect. In any event, it is to be doubted that Congress will be interested in providing supplementary protection by way of indemnity.

NEPIA insurance is not limited to damages arising from the nuclear energy hazard, but extends to all risks to the property of the insured by any peril. Of the numerous specified exceptions, however, the most important would appear to be gradual accumulation of radioactive contamination, neglect of the insured to use reasonable means to save and preserve the property when it is in danger of physical damage, theft losses, injuries to land, war damage, business interruption costs, and property removed from the premises for purposes other than preservation from danger. Considering the "all risk" nature of the policy, one can deduce that there is certain to be some overlapping with other already-existing types of property insurance offered by individual syndicate members, and no doubt endorsements similar to those anticipated in the liability area will be common provisions of normal property insurance contracts, excluding therefrom the nuclear risk.

e. Limitation of Liability

The last of the three essential protective features of the Anderson legislation is the limitation of liability of persons indemnified to an aggregate of $500 million plus the amount of financial protection required. As we shall see below, if claims arising from a nuclear

1383 Thomas, supra note 1346 at 20.
1384 The AEC has estimated that the cost of the entire reactor plant at Shippingport, Pennsylvania, including the fuel element fabricator, will be about $72.5 million. See AEC Twenty-Third Semi-annual Report, Progress in Peaceful Uses of Atomic Energy 436-37 (1957).
1385 Thomas, supra note 1346 at 20.
1388 Subsection 170c.
1389 Section 3c infra deals with problems of claim administration.
incident exceed these combined amounts, the indemnitee or the Commission may petition the appropriate district court for limitation. This action would prevent claimants from satisfying claims by execution on other property of the indemnitee, and would force them to accept only partial payment if total claims did in fact exceed the funds. If, of course, the insurance policy for some reason is found not to apply to the nuclear incident, the limitation is for the most part illusory, since claimants presumably would satisfy their judgments out of other assets belonging to the indemnitee, up to the level of financial protection required. From that point on, government indemnity and limitation would take over.

In adopting the closed-end indemnification concept, Congress did not altogether shut the door on claimants when aggregate judgments exceeded the level of limitation. On the contrary, it was quite clear that Congress would be willing to consider the appropriation of further funds when and if a major disaster occurred, if all claims were not substantially compensated. The closed-end indemnity simply reflects the legislators' reluctance to promise unknown amounts of federal funds for an event, the probability of occurrence and extent of which are speculative.

Potentially, however, the limitation prevents full satisfaction of a valid state judgment, and the constitutionality of such federal action may eventually be questioned. In the present state of Supreme Court authority, it is extremely doubtful that this provision could be said to violate the Due Process Clause of the Fifth Amendment. Over forty years ago, the court upheld a limitation imposed on recovery under workmen's compensation acts, on the theory that in return for the limitation, a valuable right (absolute employer liability) was given by the legislation. The same reasoning has been applied with respect to the limitation given under the Warsaw Convention. It would appear to be equally applicable here, since the government's $500 million indemnity will in all but the most unusual case be a completely adequate substitute for the right to levy against all of the indemnitee's property.

There have been several cases in which limitation was imposed by Congress with no apparent substitute offered to claimants in return. Limitations in these cases also are upheld if the congressional action is found to be a reasonable and appropriate exercise of a substantive

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1890 Joint Committee Report 21, 22.
power. The substantive bases for the atomic energy program are several, and it is to be doubted that the Supreme Court would find the Anderson legislation an unreasonable restriction on claimants' rights (even ignoring the indemnity) in view of the need for protecting the nuclear industry.

Subsection 170e provides that for a single nuclear incident, the aggregate liability of persons indemnified, including the reasonable costs of investigating and settling claims and defending suits for damage, shall not exceed $500 million plus the financial protection required. Several special matters should be noted with respect to this provision. First, the limitation is available not only to the prime licensee, but also to any person indemnified, including a malicious trespasser. Although, from the public's point of view, there would appear to be justification for granting an indemnity to this latter class of persons, there seems to be no reason why they should also enjoy the limitations on liability. Protection against levies on the property of malicious or intentional trespassers really in no way fosters the atomic energy program. The statute well might be amended to provide that the government indemnity would operate only when insurance and leviable assets of such trespassers were exhausted. This should not include merely negligent trespassers, such as an airline whose plane crashes into a reactor.

A further question arises as to whether persons of whom no financial protection is required can obtain the benefit of the limitation. Obviously, this question turns upon the answer to our previous inquiry, whether such a person can sign an indemnity agreement under the terms of the Anderson amendment. The same policy considerations which would seem to dictate that these persons should be permitted to enjoy indemnity would operate equally to justify a limitation. Contractors and materials licensees deserve the same type of protection as operators of production and utilization facilities.

A very closely related but nevertheless distinct problem is whether the limitation on liability applies to all liability of the licensee or only to that liability for which the government provides indemnity, i.e., "public liability" arising out of a "nuclear incident." The whole act is keyed carefully to these two terms of art. If they are applied to the limitation of liability of the individual as well as that of the government, it means there will be no limitation in some circumstances, such as (1) damages

1394 Comment, 56 Mich. L. Rev. 752, 765 (1958). See also discussion supra at note 1276.
1395 Id. at 757.
1396 See text following note 1311 supra.
caused in foreign countries possibly either from a domestic facility or certainly from one sold or operated in a foreign country, and (2) property of some indemnitee not at the site of the accident and not covered under the terms of the financial protection required.

An argument can be made that the limitation applies to all liability and not as limited by the terms of art. The language of Section 170e is that the “aggregate liability” shall not exceed financial protection plus $500 million. Because the word “public” is not found here it can be argued that the limitation is not so restricted, since in most of the rest of the indemnity amendment provisions the term used is “public liability.” This certainly is true of Section 170a, c, d, and even of e. The difficulty with this argument is that “public” also is omitted when reference is made to liability in Section 53e(8), Section 170b, and in the last part of 170e itself. These would seem to indicate that the two phrases, “public liability” and “liability” were used synonymously. If this is the interpretation accepted by the courts, it will mean that some very substantial liability will not be limited by the Anderson amendment provision. It is true that this is not likely to exceed the amount of insurance available and Mexican and Canadian damages apparently are covered by the approved insurance policies, but in the event of a major reactor incident such liability might well exceed the amount of insurance coverage.

One final matter remains. If a nuclear incident takes place and it appears that two persons who have signed agreements of indemnity are found at fault and responsible, is government indemnity for the incident doubled? The language of Subsection 170c appears to give a negative answer. It says that the “aggregate indemnity for all persons indemnified in connection with each nuclear incident shall not exceed $500,000,000. . . .” This does not necessarily indicate, however, that where two licensees independently obtaining insurance under NELIA-MAERP are both responsible for an incident, the insurance fund available would not be the sum of the two policies. The terms of the NELIA-MAERP agreement do not state that the syndicates will only be liable to a certain extent for a single nuclear incident, but merely that they will be liable to that extent “under this policy.” In the rare case, then, indemnity would be available in the amount of $500 million, plus the sums of two insurance policies.

Even as to government responsibility to indemnify it is arguable that each release of harmful radiation which causes damage is a separate in-

cident, whether it comes at widely separated times from the same facility or at the same time from two widely separated installations. The language of Section 110, "any occurrence . . . causing" harm, might be read to mean each separate release of material which causes harm, no matter how many indemnified sources also contribute, rather than each occurrence of harm to a person or particular property. It would seem more consistent with the over-all policy of the indemnity scheme if the former interpretation were accepted. The general philosophy seems to be to limit the liability of the government for a single incident at a single installation to $500 million. There is no reason to limit the protection of the injured public to $500 million when the injury results from two separate installations merely because they happened to coincide in time of occurrence or effect. So long as each facility incident causes some of the injury and the government would have been liable up to $500 million for each incident if the other had not happened at the same time, the government should be liable as fully as if they had happened separately. Liability should not be limited because of a coincidence in time of occurrence or effect. To so interpret the act would be to subvert the theory of covering each installation up to $500 million for each harmful incident at that installation.

Where two installations contribute to a total injurious radiation dose, but the contribution of neither would have been enough alone to cause compensable harm, will the government be liable for an "incident"? Certainly it can be argued that unless discharge from a specific installation causes harm there is no "incident" within the terms of the act. If legal liability should be imposed on the owner, however, the whole theory of the indemnity legislation to protect both the operator and the public would be defeated. It could be argued that each installation caused some harm, though recovery is not allowed until the harm manifests itself in an observable manner when added to the radiation from another source. This type of situation is not likely to cause injury extensive enough to call for government indemnity, but it is not impossible.

3. Claim Satisfaction Under Subsection 170e.

One provision of the Anderson amendment which has drawn little comment or criticism is Subsection 170e, dealing with the procedural aspects of satisfying claims arising from a nuclear incident. In part, the subsection states:

The Commission or any person indemnified may apply to the appropriate district court of the United States having venue
in bankruptcy matters over the location of the nuclear incident, and upon a showing that the public liability from a single nuclear incident will probably exceed the limit of liability imposed by this section, shall be entitled to such orders as may be appropriate for enforcement of the provisions of this section, including an order limiting the liability of the persons indemnified, orders staying the payment of claims and the execution of court judgments, orders apportioning the payments to be made by claimants, orders permitting partial payments to be made before final determination of the total claims, and an order setting aside a part of the funds available for possible latent injuries not discovered until a later time.\textsuperscript{1398}

The relative dearth of commentary on this provision is somewhat remarkable when one considers the number of difficult problems either created or totally ignored under its terms. One explanation for this situation perhaps lies in the general attitude that a substantial nuclear incident is so unlikely that there is little point in worrying about the procedural problems until they arise. The Anderson amendment, however, was enacted on the assumption that a nuclear incident could happen\textsuperscript{1399} and that there should be federal legislation to cover such a possibility. Accepting this basic assumption, the procedural aspects of claim satisfaction become extremely important, and for that reason warrant careful analysis. Unless procedures are adequate, substantive benefits well may prove illusory.

In the report made by the Joint Committee to accompany the amendment, it was emphasized that Subsection 170e sets venue at the site of the nuclear incident giving rise to liability, not at the place where resulting damage might occur.\textsuperscript{1400} This specification of venue, however, is applicable only to petitions by the Commission or indemnitee for the various orders enumerated in the subsection. No restriction is placed upon venue for suits by claimants. Indeed, the report states that "the right of the State courts to establish the liability of the persons involved in the normal way is maintained, but the payment of those lia-

\textsuperscript{1398} Subsection 1703. The venue provision is somewhat similar to the admiralty rule setting venue for petitions to limit liability when no libel has as yet been filed. See 28 U.S.C.A., Admiralty Rule 54 (1950).

\textsuperscript{1399} For an interesting study of the possible effects of a reactor burn-up under "ideal" meteorological conditions, see University of Michigan Engineering Research Institute, Report on the Possible Effects on the Surrounding Population of an Assumed Release of Fission Products Into the Atmosphere from a 300-Megawatt Nuclear Reactor Located at Lagoona Beach, Michigan (1957).

\textsuperscript{1400} Joint Committee Report 22.
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bilities can be stayed.” 1401 Thus it is apparent that Congress intended a two-step process for satisfaction of claims: (1) determination by state courts, and federal courts sitting in diversity of citizenship cases, of the fact and extent of liability of the indemnitee, and (2) apportionment of the financial protection amount and indemnification fund to these judgments, presumably on a pro rata basis, by the federal district court having venue over the nuclear incident. The second step undoubtedly is included to prevent the discrimination which might otherwise result from the satisfaction of some judgments earlier than others, and from the “race of diligence” that could be expected if no such provisions were made.

It is important at this point to note one very substantial limitation upon the power of the local federal court to enter limitation and apportionment orders under Subsection 170e. Under its express terms, the provision restricts the court’s authority to those instances in which claims “will probably exceed” the available fund. In other words, the amendment makes absolutely no provision for centralized control of judgments or payment of claims as long as there appears to be sufficient monies available for satisfaction of all judgments. Thus when a “small” incident takes place (perhaps involving only $300 million worth of valid claims), the federal district court having venue is not vested with the power to set aside a fund for latent injuries, or to permit payments before judgment to claimants demonstrating immediate financial crisis, or to stay execution of court judgments against the indemnitee’s property. Any of these steps, if a district court takes them, could only be based upon a general equitable power to implement apparent congressional intent implied in the amendment.

In the situations most likely to happen, therefore, Subsection 170e is of no assistance whatsoever. On the other hand, it does purport to deal with incidents in which claims probably will exceed the fund—where the special problems of limitation and apportionment are presented. Our discussion deals primarily with this particular problem, but many of the considerations and suggestions which follow will relate equally to the case in which the fund is adequate to meet valid claims.

There is no express indication in the subsection that the district court, even in the instance where the fund is inadequate, is given the power to stay proceedings in state courts 1402 before their culmination in judg-

1401 Ibid. See also the general statement of purpose for the amendment made by the Joint Committee, text accompanying note 1273 supra.
1402 Reference to “state courts” will henceforward include federal courts sitting in diversity and therefore applying state substantive law.
ments or to consolidate all claims for trial before it. Any such power would have to be derived from an application of the doctrine of *ejusdem generis* to the phrase “such orders as may be appropriate for enforcement of the provisions of this section” and the enumerated authorized orders which follow.\(^{1403}\) The other orders seem more limited and this probably makes the use of *ejusdem generis* of little value. One of the permissible orders under the subsection is for the stay of execution of court judgments. Enumeration of such an order is clearly inconsistent, without explanation, with an intention that the district court should have the power to consolidate before a judgment is rendered by the state court. In addition, a finding of a power to consolidate is made extremely difficult by the statement quoted above from the congressional report accompanying the amendment which appears to contemplate “normal” state proceedings on the question of liability.

**a. Effect of Inability to Consolidate Claims**

While certainly the limited statutory grant of power to issue stay and apportionment orders will alleviate considerably the confusion and vexation engendered by prosecution of multiple claims against the indemnitee, the apparent failure of Congress expressly to empower the district court to take jurisdiction over all claimants’ suits is unfortunate. Potentially a nuclear incident may cause damage over a large area encompassing several states. It is more than probable that the indemnitee will be sued in each jurisdiction where injuries result, since a corporation in general today is amenable to process in any state where it does business or its property can be attached. Within each of these jurisdictions, actions sometimes may be brought in several different trial courts. Thus thousands of actions arising from a single incident may be brought and pursued in a vast number of courts. Each court of course will apply its own procedural rules; and, since the prevailing conflicts rule for substantive tort questions is “place of injury” rather than “place of defendant’s act,”\(^{1404}\) it will apply different substantive prin-

\(^{1403}\) This would actually be an inverse application of *ejusdem generis*, which normally comes into play when a list specifics is followed by a general descriptive phrase into which further specifics of like nature can logically be placed. Here the authorization for granting “such” orders as are “appropriate” invites a reading which would permit the court to make other orders to those subsequently listed in the subsection.

\(^{1404}\) Stumberg, Conflict of Laws, 182 et seq. (2d ed. 1951). Note also that in wrongful death actions, the law of the place of injury, rather than the place of death, controls the substantive questions of liability. *Id.* at 191. See also Goodrich, Conflict of Laws, 263 et seq. (3d ed. 1949). The best illustration of conflict of laws problems involved in a tort having multi-state impact is the case of the so-called “national libel,”
ciples depending upon the jurisdiction in which the plaintiff’s person or property was located at the time of injury. Thus one court may apply a one-year statute of limitations to a claim arising from the incident, whereas another will be bound by a two-year limitation period. Substantively, the defendant may be held only to a standard of due care or, on the other hand, to strict liability, depending upon the plaintiff’s location. Because of these differences, it is entirely possible that one claimant, whose injuries are no less serious than another’s, may be barred because of the vagaries of place of injury or place of suit. The equality of treatment for claimants apparently intended by Congress thus often may not be fully realized under the explicit terms of the subsection. Even if consolidation were possible, state substantive rules are applicable and this would cause the same unequal treatment.

Even if we ignore these vexing considerations, we are further struck by the profoundly difficult task facing any district court seeking to administer the fund under the terms of the subsection. Let us assume that the incident causes damages of over $500 million plus the amount of required insurance (although such a determination in itself may often be an enormous problem) and that an order has been granted limiting liability to that amount. Assuming the court has no power to consolidate claims, it apparently must wait until all judgments are entered before it can finally apportion the indemnity and insurance fund. In the interim, however, it is empowered to permit “partial payments to be made before final determination of the total claims.”

Does this mean that the court may authorize payments to persons who have not reduced their claims to judgments if defendant agrees to a

in which a defamatory statement is made to persons in numerous jurisdictions through the medium of a large-circulation magazine or newspaper. Even if the states are able to establish a “single-publication” rule by legislation or judicial decision, the courts are still confronted with the problem of what substantive law to apply to defendant’s act. Prosser lists ten possible rules for the choice of law—including the law of each place of impact, the law of the place of predominant impact, the law of the place of defendant’s act, the law of the place of plaintiff’s domicile, and the law of the forum—and concludes that possibly the last has been employed more frequently than any of the others. Prosser, “Interstate Publication,” 51 Mich. L. Rev. 959, 971-78 (1953). See also, “Developments in the Law—Defamation,” 69 Harv. L. Rev. 875, 950 et seq. (1956). The defamation rules are complicated in the context of the nuclear incident, however, by the traditional “place of injury” rule for the physical torts involving negligence or intentional conduct. It is probable that the latter test would prevail in the event of a nuclear incident.

Periods of limitation, with some exceptions, are considered procedural matters, and the law of the forum therefore controlling. Stumberg, supra note 1404 at 147 et seq.

Subsection 170e.
settlement, or does it merely mean that some judgments may be satisfied before all judgments are rendered? Either interpretation of the statutory language leads to confusion. If the former construction is correct, what happens if the state court ultimately determines that the claimant is not entitled to judgment, because the defendant's conduct is non-tortious or because the statute of limitations had run on the claim? Or if the latter interpretation is adopted, the question becomes: How much should be paid—what if the amount paid turns out to be more than the claimant's ultimate proportionate share? Too liberal payments early in the administration of the fund possibly will leave nothing for those obtaining judgments later. It has been suggested that in the event of serious mishap Congress can be expected to appropriate more monies for compensation of claimants. While this may be a reasonable assumption, it is no basis for accepting the ambiguity of the subsection. A clarifying amendment should be enacted.

Crucial to many of these problems is the fact that the touchstone of the district court's power is the preliminary state court judgment. It is entirely possible that the last valid judgment will not be finally rendered until years after the nuclear incident. Claims may not have been filed until shortly before the statute of limitations was to run; courts frequently find themselves two or more years behind their docket calendars, and appeal and retrial processes are likely to consume even more time. The district court, therefore, can look forward to a five to ten year period before the fund can be apportioned to the initially adjudicated claims.

Even when all state judgments have been rendered, the subsection poses yet another obstacle to complete claim satisfaction. The district court is permitted, upon petition, to set aside a portion of the fund "for possible latent injuries not discovered until a later time." While such a provision is admirable in its recognition of the fact that the damage picture is immensely more complex when radiation injury is involved, its terms also provide further problems for the district judge in requiring his continuing supervision for an even longer period. It is almost impossible for him to determine what a fair reserve should be. The subsection gives him no guide on this point, and indeed, there is no indication whether the judge should determine the amount based on his conception of what would be equitable in view of probabilities of latent injuries, or based on his estimate of what legal liabilities for latent injuries will be adjudicated by state courts. If the latter, then the size of

1407 Ibid.
the reserve fund will be exceedingly small, since there is little precedent in our state courts for delayed assessment of damages to compensate for later-appearing injuries.\textsuperscript{1408} Even if the district judge should decide on a figure, he is faced with the dilemma of how long he should keep the reserve open. Theoretically, at least, genetic damage may appear more than 100 years after the incident, and there is excellent indication that latent injuries such as bone damage and leukemia may appear as much as thirty years after harmful radiation.\textsuperscript{1409} Surely Congress did not intend that claimants demonstrating present injuries for which the insurance and indemnity fund (as reduced by the reserve fund) does not provide adequate compensation, should be forced to wait for such a period in order to obtain more adequate satisfaction of their judgments.

While these reserve fund matters are not problems peculiarly present when the district court finds itself unable to consolidate the numerous actions, they nevertheless are made more complicated if multitudinous state courts are permitted to take the initial action. In one state, a jury may include in its damage award an amount equated to the degree of possibility of future manifestation of radiation injury, whereas in another state a judge may direct the jury to disregard such a factor in assessing damages. How can the district court weigh such differences when petitioned for an order to permit payment from the reserve fund? And for that matter, who is to determine what later

\textsuperscript{1408} "There is also the matter of statutes of limitations. There is no uniformity among the states as to the length of the period during which they run. Further, and more importantly, these statutes are not well adapted to take care of radiation injuries. As presently worded, most of them, except those with reference to fraud and to occupational diseases, begin to run from the time of the harmful impact. The diseases which result from radioactive substances may not be discovered for years after the impact. In fact, until the disease becomes manifest its victim may have no realization of the radiation. I suggest that the federal statute should include a provision which would enable suit within a reasonable time after the disease or disability is discovered or should have been discovered in the exercise of reasonable care. Further, since the immediate consequence of radiation is frequently only apparently minor harm for which an action might or might not be brought, the statute should provide for a subsequently appearing but unpredictable harm. The present rules of res judicata prevent a subsequent action if judgment has been obtained in an action based on the impact, although at that time, the harm appeared to be minor. Perhaps it would be better to provide for installment payments, to be increased or diminished as subsequent events determine the extent of the total harm." Seavey, "Torts and Atoms," 46 Calif. L. Rev. 3, 12 (1958).

payments are to be made out of the reserve fund—the state court with
the approval of the district court or the district court alone?

These are a few of the immensely difficult questions that will con­
front any district judge called upon to administer the insurance and
indemnity fund and apportion it equitably to numerous state judg­
ments. One can conjure up further problems almost at will. Should
any distinction be made between claims based on personal injuries and
those involving property damage? Should the traditional notion that
the claim is merged in the state court judgment be followed? How can
the district court prevent juries in a given jurisdiction from inflating
damages for local claimants in order to assure them a greater share of
the funds?

The secondary and supervisory role apparently accorded the federal
district court by the subsection thus appears an exacting one indeed. It
can readily be seen that many of the suggested legal and administrative
problems would be alleviated if an effective means of consolidation
could be found. A single set of procedural rules would thereby be
applied to all actions. One tribunal only would decide the fact of lia­
bility and the monetary extent of injury. Administration of the in­
demnity fund, including the provision of reserves for latent injuries,
would be in the hands of the district judge alone, subject of course to
appellate supervision. Enormous administrative difficulties would no
doubt remain, but the fact that a district court could deal with them ab
initio, rather than after the picture has become confused by the actions
of numerous state courts, would surely lead to saner, more equitable
distribution of the indemnity fund.

b. Available Consolidation Devices

If the desirability of consolidation and the apparent omission of
Congress to include such a device in Subsection 170e is accepted, there
remains the question of whether the federal district court is not other­
wise vested with the power to consolidate without regard to the sub­
section. Several equitable devices have been employed with great suc­
cess in previous mass tort cases. Any attempt, however, to use one
of these devices always meets several serious obstacles which cannot be

1410 Without further federal legislation, however, the district court would still
apply that substantive law dictated by traditional conflicts rules. Thus the possibilities
of inequities among claimants would still exist, although perhaps to a lesser extent.
See the discussion of this problem in Seavey, supra note 1408 at 11.

1411 Instances of the use of such devices will be discussed in some detail below. See
generally, Comment, 63 Yale L. J. 493 (1954).
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dismissed lightly. Most formidable of these is the legislative limitation on range of process. With minor exceptions, a federal district court cannot render a valid and binding in personam judgment based on personal service of process beyond the territorial limits of the state in which the court sits.\textsuperscript{1412} Facts litigated in one action before the district court could therefore have no binding application to a foreign claimant who chooses not to appear.

A further problem which becomes immediately apparent is the very limited power of federal courts to enjoin concurrent state proceedings. The general rule is that a court of the United States “may not grant an injunction to stay proceedings in a State court except as expressly authorized by Act of Congress, or where necessary in aid of its jurisdiction, or to protect or effectuate its judgments.”\textsuperscript{1418} Of course, no express authorization is found in Subsection 170e for such an order, and the tendency has been to construe the latter two exceptions strictly against the injunctive power.\textsuperscript{1414} “Aid of its jurisdiction” refers to cases in which the jurisdiction of federal courts is exclusive, not where, as here, it is concurrent with that of the states.\textsuperscript{1416} Protection of judgments is valid as a basis for injunction only when the federal court has rendered a judgment; it is not construed as a ground for staying other proceedings while an action is pending or in progress in a federal court.\textsuperscript{1416} Thus when it is possible for claimants also to bring action in state courts, consolidation is of limited value since the court is without power to consolidate all claims before it by use of the injunction.

Still another obstacle to an equitable proceeding into which all claimants might be forced is the right to trial by jury. While in strict constitutional terms, an equitable action probably would not violate federal or state guarantees,\textsuperscript{1417} yet it is widely accepted in this country that tort

\textsuperscript{1412} “All process other than subpoena may be served anywhere within the territorial limits of the state in which the district court is held and, when a statute of the United States so provides, beyond the territorial limits of that state.” 28 U.S.C.A., Federal Rules of Civil Procedure 4(f) (1950). This is a legislative and not a constitutional restriction on the range of process. Howard v. United States, 126 F.2d 667, 668 (10th Cir. 1942), \textit{cert. dem.} 316 U.S. 699, 62 S.Ct. 1297 (1942). See 2 Moore, Federal Practice \textit{\$4.42} (2d ed. 1948).


\textsuperscript{1415} \textit{Id.} at 412.

\textsuperscript{1416} \textit{Id.} at 410-11.

\textsuperscript{1417} The federal and state constitutions generally preserve the right to jury trial as it existed at common law. There is evidence that equity courts took jurisdiction in this type of case at the time the constitutions were adopted. See Comment, 63 Yale L. J. 493, 508 (1954).
actions, and particularly negligence actions, should be tried by jury.\footnote{See Chafee, Some Problems of Equity 186 \textit{et seq.} (1950).} One writer has suggested that such a tradition will not be easily broken for the mere sake of convenience for the defendant and the court,\footnote{Comment, 63 Yale L. J. 493, 496 (1954).} especially in view of the fact that the claimant has an equally strong interest in having his grievance independently litigated before a jury.

Formidable though these objections may be, yet, as indicated, there is a growing body of precedent for the consolidation of mass tort claims before a single court, although none of the procedural devices thus far evolved can completely surmount the enumerated obstacles. Several of these devices have received extremely careful consideration in two recent law review comments,\footnote{Note, 60 Yale L. J. 1417 (1951); Comment, 63 Yale L. J. 493 (1954). See also, Molnar, "Equity Jurisdiction in Tort Actions" 10 Ga. B. J. 309 (1948).} and the discussion which immediately follows draws liberally on the factual background provided by their authors. It must be noted, however, that these comments were not written in contemplation of the nuclear incident. While many of the questions arising with respect to previous non-nuclear disasters may be related by analogy to the nuclear incident, yet obviously the problems peculiar to the latter merit special attention in the context of Subsection 170e. Particularly important are the probabilities that, should a nuclear incident occur, (1) there will be latent injuries whereas in all previous mass tort cases the injuries have been immediately or soon apparent and (2) injury or damage may be spread over a much larger area than previously considered by courts. Finally, it bears repeating that Congress may well have intended, by its failure to provide for consolidation in Subsection 170e, to preclude such proceedings altogether, in which case consolidation under an independent device is impossible. Our assumption must be either that Congress intended to permit consolidation, or in view of the ease in administration which it affords, will amend the subsection to include its use.

\textbf{(1) Bill of Peace}

This traditional remedy has been employed occasionally at the instance of the defendant in a mass tort situation to enjoin multiple suits in other courts and to bind all claimants to the decision of a single equity court.\footnote{Comment, 63 Yale L. J. 493, 501 \textit{et seq.} (1954).} There is little uniformity in the decisions to define the permissible limits for use of this device, but a safe general rule is that a bill of peace may be entertained in a federal district court only (1)
where the defendant shows that he will be subjected to multiple suits and (2) where a common or "general" interest binds the multiple claimants together. A recent court of appeals decision interprets the latter requirement to mean, not that there must be "privity" among claimants in the narrow sense of common title, but that there need only be a common and substantial question of law or fact involved in the general controversy. Thus construed, the equitable bill of peace would appear generally appropriate to the consolidation of claims arising from a single nuclear incident.

Use of the bill of peace, however, is severely limited by the problems of process, power to enjoin, and right to jury trial discussed above. As indicated, process of the federal court generally extends only to the borders of the state in which it sits. The power to enjoin state court proceedings already begun in the mass tort situation has been specifically denied in a recent district court case based on Section 2283 of the Federal Judicial Code quoted above. And an equity suit pursuant to a bill of peace in which the court decides questions of fact may well run contrary to traditional notions of the right to jury trial in negligence cases.

(2) Spurious Class Actions

Under the federal rules of civil procedure, a class action is authorized when, inter alia, the character of the right sought to be enforced for or against the class is "several, and there is a common question of law or fact affecting the several rights and a common relief is sought." This class action is known as the spurious type, in which the only relation of the claimants inter se need be one of related law or fact rather than common title.

In an action by one of the alleged tortfeasors in the recent South Amboy ammunition explosion causing injury to several thousand claimants,
the plaintiff sought to employ this device to bind all claimants to the findings made by the court in which the spurious class action was brought.\textsuperscript{1427} In addition to refusing to enjoin prosecution of the numerous state actions already initiated, the court refused to permit its decision to be binding on any claimant who had not expressly signified an intention to enter the suit.\textsuperscript{1428} Such a refusal appears to accord with previous interpretations of the meaning of a spurious class action judgment.\textsuperscript{1429} It is thus evident that such a device is of extremely limited efficacy in the context of a nuclear incident, where the claimants' normal disposition will be to refrain from entering the class suit and where it is probable that numerous claimants can be neither served nor notified of the action.

(3) Receivership

The use of receivership proceedings by a lower Connecticut court to handle the problem of multiple claims arising from the Ringling Brothers, Barnum and Bailey circus fire in Hartford several years ago has received detailed consideration in a recent law review article.\textsuperscript{1430} This procedural device was settled upon by agreement between defendant circus and the prospective plaintiffs as an effective means of assuring payment of the numerous claims asserted. The defendant waived all affirmative defenses, claims were submitted to arbitration, and the arbitrators' findings were made binding upon the parties. The receivership order placed all of the defendant's property under the court's control, abating previous attachments and barring subsequent attachments. Court permission was required for suits against the receiver. Within six years following the disaster, this procedure resulted in the arbitration or settlement of every claim.

Employment of a receiver in the mass tort context has little precedent in American law.\textsuperscript{1431} Two reasons are indicated for judicial reluctance to turn to this device. In the first place, the traditional but now gen-

\textsuperscript{1427} Pennsylvania R.R. v. United States, \textit{supra} note 1424, discussed at length in Comment, 63 Yale L. J. 493, 511 et seq. (1954).

\textsuperscript{1428} \textit{Supra} note 1424 at 90.

\textsuperscript{1429} See 3 Moore, Federal Practice ¶23.11[3] (2d ed. 1948). For the most recent case on this point, see Hurd v. Illinois Bell Telephone Co., 234 F.2d 942 (7th Cir. 1956).

\textsuperscript{1430} Note, 60 Yale L. J. 1417 (1951). The facts surrounding settlement of the claims are drawn from this note, at 1418-20.

\textsuperscript{1431} Receivership was permitted to handle tort claims arising from a hotel fire in Geele v. Willis, 203 Ga. 267, 46 S.E.2d 126 (1948). See Molner, \textit{supra} note 1420. So far as the authors have determined, receivership has never been used in this context in a federal court.
eraly discredited view that a non-judgment creditor has no standing to ask for a receiver normally would appear to prevent a mere tort claimant from doing so. Secondly, receiverships designed solely for moratorium purposes, abating the rights of creditors, are looked upon with disfavor. Receivership is normally considered a remedy ancillary to some other equitable proceeding, not an end in itself. The argument is made, however, that receivership may be peculiarly adapted to the solution of the mass tort problem, and that creditors would be aided rather than injured by the creation of a moratorium during which claims are adjusted by arbitration.

By application of *ejusdem generis* to the phrase in Subsection 170e granting power to issue orders "appropriate for enforcement of the provisions of this section," one could further argue that the subsection permits the use of this procedural device. Such an interpretation no doubt would circumvent the traditional objection that a non-judgment creditor cannot demand receivership since by Subsection 170e the Commission or the indemnitee could so petition. Whether it would also circumvent the objection to the use of receivership except as an ancillary device is an open question. But even if it be found that receivership was contemplated by Congress and that these problems are obviated, substantial judicial legislation would be necessary to impute sufficient powers to the district judge appointing the receiver to make the device effective. Receivership, by itself, does not accomplish consolidation. Without a power in the court to enjoin claimants from participating in actions against the receiver other than those brought in the federal district court having venue over the incident, the effectiveness of the device would be seriously curtailed. The Ringling Brothers receivership was created by common consent, and it was the accompanying arbitration provisions which gave real force to the centralized proceeding.

Moreover, it must be noted that the principal feature favoring receivership in the mass tort context is that it permits continued operation

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1432 1 Clark, Receivers 210 *et seq.* (2d ed. 1929). For a more recent discussion of the question with respect specifically to the power of a federal court, see Note, 10 Stan. L. Rev. 361 (1958).


1434 Note, 60 Yale L. J. 1417, 1422 (1951).

1435 This appears to be the tacit assumption of a comment writer, who states that the subsection "suggests as a solution to these [claim administration problems arising under section 170] the use of a device akin to the equity receivership." Comment, 56 Mich. L. Rev. 752, 768 (1958).

1436 See text following note 1466 infra.
of the defendant’s business, which in turn permits greater likelihood that claims will be more promptly and fully paid. This feature probably would be of little significance in the event of a nuclear incident. In the latter case, a fund for the payment of claims theoretically is already available in the form of compulsory insurance and the indemnity fund. The existence of these funds and the limitation of liability above such amounts mean there is little justification for receivership as a guarantee for continued operation of the business. The only possible exception would be when, because of some exclusionary clause in the policy covering the incident, the insurer is not liable, and the company must then meet claims from its own assets up to the point where indemnification begins.\textsuperscript{1437}

(4) Consolidation

The federal rules of civil procedure permit a federal court to order consolidation (in the technical sense)\textsuperscript{1438} or joint hearing or trial of actions pending before it involving a common question of law or fact. This device, coupled with the pre-trial conference, has been used with considerable effectiveness in the district court on at least two occasions, the most recent of which involved claims arising from the sinking of the Italian liner, \textit{Andrea Doria}.\textsuperscript{1439} But in both cases, the district court had exclusive jurisdiction over all of the multiple claims; in the \textit{Andrea Doria} case, because of federal admiralty jurisdiction;\textsuperscript{1440} in the other, because defendant was the federal government and could be sued only in the federal district court under the terms of the Federal Tort Claims

\textsuperscript{1437} See text following note 1379 \textit{supra}.

\textsuperscript{1438} The term "consolidation" up to this point has been used in the broad sense, encompassing all of the various devices by which a court can bring numerous claimants before it in one action or group of actions. In its narrow construction, "consolidation" means the procedural device authorized by Rule 42(a) of the Federal Rules. See 28 U.S.C.A., Federal Rules of Civil Procedure 42(a) (1958), which states: "When actions involving a common question of law or fact are pending before the court, it may order joint hearing or trial of any or all matters in issue in the actions; it may order all the actions consolidated; and it may make such orders concerning proceedings therein as may tend to avoid unnecessary costs or delay."

\textsuperscript{1439} Clark v. United States, (D.C. Ore. 1952 13 F.R.D. 342) discussed at length in Comment, 63 Yale L. J. 493, 517 et seq. (1954), involved some 3,000 damage claims for property loss from flooding for which the federal government was liable. Litigation ensuing from the sinking of the \textit{Andrea Doria} is progressively described in The New York Times, beginning on August 1, 1956. See particularly, N. Y. Times, Aug. 9, 1956, p. 49, col. 2.

\textsuperscript{1440} See Gilmore & Black, Admiralty §§10-16 to 10-18 (1957), describing the court's power over other proceedings once the owner has petitioned for limitation.
In neither, therefore, was the injunction against concurrent state court proceedings a problem. Thus it is relatively clear that the unwillingness or inability of federal district courts to enjoin state proceedings would render consolidation under the federal rules of little value in deciding claims arising from a nuclear incident, since potentially there is concurrent state court jurisdiction. Only those claims actually brought in federal courts would be subject to consolidation.

(5) Interpleader

Another device which appears to have pertinence in the mass tort context, but which clearly was not designed for such use, is the statutory bill in the nature of interpleader. Such a bill may be brought in any district court by a stakeholder having custody or possession of money or property of the value of $500 or more when there is diversity of citizenship between two or more adverse claimants and when these claimants threaten to subject the stakeholder to multiple liability. This is federal statutory interpleader. Each of the traditional obstacles to consolidation is in great measure overcome by this relatively new device. Process is expressly designed to run throughout the United States. The federal code provisions authorize the district court to enter an order restraining all claimants from initiating or prosecuting any proceedings in state or federal courts affecting the property. Interpleader is an equitable action, and while there may continue to exist the accepted notion that actions involving negligence or similar conduct should be tried before a jury, there is no constitutional prohibition to trial of the factual issues by a judge when interpleader is brought.

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1444 Ibid.
Interpleader in this statutory form would appear in general to provide an excellent foundation for settlement of claims arising from a nuclear incident. The minimum diversity requirement of the statute almost certainly would be met, and even less question should be anticipated with respect to the jurisdictional amount of $500. Interpleader claims need not be in privity nor of an identical nature. And a bill in the nature of interpleader under the statute does not carry with it a requirement, as in the traditional practice, that the stakeholder admit his liability and thus seek only a determination of the person or persons entitled to the fund. Thus the insurance group, who would be the most likely party to bring this type of bill, would be free to assert defenses to the indemnitee's liability, or to its own liability under the policy.

Two requisites for the maintenance of the statutory action appear troublesome if interpleader in its strict sense is to be used in this context. First, the adverse claims must expose the stakeholder to potential double or multiple liability, that is, the aggregate claims must appear to exceed that which will be available for their payment. If it appears that damage or injury is caused only in a sum less than that for which the indemnitee has financial protection, interpleader apparently is not available—a serious limitation on the effectiveness of the device. If on the other hand, claims exceed both the insurance and indemnity funds, the incident would clearly appear appropriate for a bill in the nature of interpleader, unless it should be argued that the limitation against any liability above financial protection requirements plus $500 million makes it impossible to be subjected to multiple claims.

In the case, however, where the claims total a sum more than the amount of financial protection carried, but less than the amount of total insurance plus indemnity, a second difficulty arises. It has been held (and probably quite properly) by a lower federal court that the United

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1447 3 Moore, Federal Practice ¶22.07 (2d ed. 1948).
1448 Id. at ¶22.08. The original use of statutory interpleader was to protect insurers who hold a fund being wholly claimed by two or more persons, as in Sanders v. Armour Fertilizer Works, 292 U.S. 190, 54 S.Ct. 677 (1934). It is recognized, however, that the requirement of multiple liability is also met if claims to only a part of the fund all total more than the fund itself. See 3 Moore, Federal Practice ¶22.08 (1948).
1449 Note also, however, that as Subsection 170e now reads, the district court having venue apparently has no power at all in the event of a nuclear incident unless claims exceed both the insurance and the indemnity fund. See paragraph of text following note 1268 supra.
States under the statutory language may not act as interpleader plain­tiff. If this is so, then it would be possible that in the normal case, the sole interpleader plaintiff would be the insurer, and that at best the United States would be an intervenor defendant. One might argue, therefore, that the sole amount of money for which interpleader is brought is the insurance fund alone, and that the claims need only ag­gregate an amount larger than this. On the other hand, the court might recognize that in substance, since the United States is a party to the action as intervenor, its judgment would have binding effect on the United States as well and therefore the presence of the indemnity fund also must be accepted. The court could thus conclude that the claims must aggregate more than both the insurance and the indemnity before interpleader could lie.

These complications surely arise in part because interpleader was never designed for this type of situation. Either interpretation of the requirements of the statute will still mean that the device is of limited value in dealing with nuclear incident claims. Indeed, the equitable bill of peace or even the declaratory judgment more closely resembles the desirable type of procedural device for the mass tort situation. But the liberalized aspects of interpleader—its broad range of process, the court's injunctive power, and the absence of a jury trial requirement—are all essential for a really effective consolidation proceeding and are common to none of the other devices discussed above.

(6) Federal Removal Power

One final device by which consolidation conceivably might be effected in the mass tort situation is the use of federal removal power and the federal statutory successor to the doctrine of forum non conveniens. The Federal Judicial Code provides that:

(a) Except as otherwise provided by Act of Congress, any civil action brought in a State court of which the district courts of the United States have original jurisdiction, may be removed by the defendant or defendants, to the district court of the United States for the district and division embracing the place where such action is pending.

The interpleader statute is available by its terms only to "any person, firm, or corporation, association, or society." In United States v. Coumantaros, 146 F. Supp. 51 (D.C. N.Y. 1956), the court held that the United States did not fall within this definition.

(b) Any civil action of which the district courts have original jurisdiction founded on a claim or right arising under the Constitution, treaties or laws of the United States shall be removable without regard to the citizenship or residence of the parties. Any other such action shall be removable only if none of the parties in interest properly joined and served as defendants is a citizen of the State in which such action is brought.\footnote{1452}

On the face of the statute, defendants in actions brought in state courts, if they can demonstrate a federal question or diversity of citizenship as a basis for original federal jurisdiction, are in a position to have the actions removed to the federal district court. Thereupon, the more liberal provisions of statutory \textit{forum non conveniens}\footnote{1453} in federal courts are potentially available, opening the way for drawing all actions into a single court.

Let us examine this possibility more closely, beginning with the provision for removal where original jurisdiction is not based on a federal question. The statute states that such actions shall be removable only if none of the defendants is a citizen of the state in which the action is brought. A recent change in the Judiciary Act expressly provides that for the purposes of this section, a corporation shall be deemed a citizen of any state by which it has been incorporated and of the state where it has its principal place of business.\footnote{1454} This being the case, even though there is original jurisdiction based upon complete diversity of citizenship among the parties to the action, if the defendant or any one of several defendants is a corporation which is either incorporated in or has its principal place of business in the state where the action is brought, removal to the federal district court is impossible. Often this will be the precise situation if there is a "burn-up." Many reactors will be operated under license issued to private domestic corporations. The chances would appear great that the plaintiff would be forced to sue in a state where the defendant was incorporated or had his principal place of business. If a nuclear incident took place in Michigan, for example, and the defendant was incorporated or had his principal place of business

\footnote{1453} §1404 (a) of the Federal Judicial Code provides: "For the convenience of parties and witnesses, in the interest of justice, a district court may transfer any civil action to any other district or division where it might have been brought." For thorough discussions of the pre-statutory federal \textit{forum non conveniens} doctrine and its limitations, see Barrett, "The Doctrine of Forum Non Conveniens," 35 Calif. L. Rev. 380 (1947); Braucher, "The Inconvenient Federal Forum," 60 Harv. L. Rev. 908 (1947); Comment, 56 Yale L. J. 1234 (1947).
in Michigan, undoubtedly many Michigan plaintiffs would sue in the courts of that state. Under such circumstances the defendant would be powerless to remove to the federal courts. As indicated previously, a device by which less than all of the actions can be brought into one court is defective in the mass tort context. It is to be doubted, therefore, that the non-federal question removal power is a practical basis for consolidation.

Still a possibility, of course, is the removal power where the basis of original jurisdiction is that the action is "founded on a claim or right arising under the Constitution, treaties, or laws of the United States..." Here, citizenship is irrelevant, so the basic question becomes whether an action brought in a state court against a defendant who is licensed, insured, and indemnified under the aegis of the indemnity amendment to the Atomic Energy Act of 1954 is one "founded on a claim or right arising under the... laws of the United States." The interpretation of this phrase, as to whether a given suit is "founded" on a federal law, forms a vast body of law in itself, and a study thereof is beyond the scope of this presentation. Certain basic principles are clear, however. First, the Supreme Court has decided that to be removable a suit must involve a real and substantial dispute or controversy, the resolution of which turns on the construction of a law of the United States. A cause cannot be removed merely because it may become necessary to construe the laws of the United States. Rather the cause must be one the decision of which depends on such construction, i.e., the plaintiff's right to recovery stands upon federal law. Finally, it is the federal nature of the right to be established that is important for removal purposes, not the source of the authority to establish it. The mere fact that a state establishes a right in an area which could be pre-empted by the federal government is no justification for saying the state-established right is "founded" on federal law.

The foregoing summarization of the federal-question removal jurisdiction is neither detailed nor specific; nevertheless it can serve as a general guide for our purposes here. It is safe to say that the basic right asserted by a plaintiff in the nuclear incident situation is a tort right created by state statutory or common law. A federal license in the

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1459 See discussion in text, supra at notes 1401 ff.
hands of the reactor operator and insurance purchased under the federal financial protection requirements, while required by federal statute, have no direct bearing on establishing the state-created right. At most, the insurance enhances the insured's ability to respond in damages. It has no effect in most cases on the fact of liability, because the plaintiff's right is substantively affected only by the existence of the federal limitation of liability provision. If total claims aggregate more than $560 million (assuming maximum financial protection required), each plaintiff potentially can be prevented from full collection of his state judgment. One could argue, of course, that this federal provision begins to operate only after the state right has been vindicated and judgment awarded, and therefore no federal question is raised before this time. Probably, however, a court would be willing to look through the form to the substance, saying that potentially each plaintiff's right is diminished substantively by the federal provision. Then, of course, the question of construction previously raised with respect to the exact operation of Section 170e comes into play—and one can argue that the extent of the plaintiff's right turns on a federal statute. To succeed with this argument, however, the defendant would have to induce the Supreme Court to overrule those cases that clearly hold that a federal question defense does not make the case one involving federal question jurisdiction. The federal question must be the basis for the plaintiff's claim. Even if successful, which seems unlikely, the argument is valid only when the total claims aggregate more than the limitation level. Frequently, indeed normally, this will not be the case. It is likely that a given court will refuse to look beyond the fundamental limitation of the indemnity provision—that it only affects state remedies at the judgment level. Likewise, removal jurisdiction is available only if the claim exceeds $10,000, and if a major reactor incident occurs it is likely that there will be thousands of claims for less than this amount.

Even assuming that all suits brought by injured plaintiffs in state courts could be removed to a federal court on the ground of diversity of citizenship or federal question, two difficulties of almost insurmountable proportions block effective consolidation of all claims. If the plaintiff brings his action where he was at the time of impact (the place of


injury), there would seem to be considerable doubt that a federal court would transfer the trial on the ground of a more convenient forum. This might be true also if the plaintiff shows nothing more than that he lives where he brought the action. Perhaps more important is the fact that an action cannot be removed to a federal court and then the place of trial transferred on the basis of more convenient forum until the plaintiff chooses to start a suit. There is no way to force all potential plaintiffs to bring their actions within a given time so they all can be removed to the court of the federal district where the incident occurred. For all of these reasons we can only conclude that the removal power will not be of service in connection with the mass tort litigation resulting from a nuclear incident.

One author has suggested the propriety and need for congressional legislation to deal with the mass tort problem, and we support the suggestion with particular reference to nuclear incidents and Subsection 170e. A statute is required which combines the best features of the bill of peace and the bill in the nature of interpleader, by which one who is threatened with suit by potentially numerous claimants can bring

1462 The general theory of the federal transfer provision is that it codifies the old forum non conveniens doctrine and was not intended to give plaintiffs a better hunting license in shopping for a desirable district for trial. Foster-Milburn Co. v. Knight, 181 F.2d 949 (2 Cir. 1950); noted 45 Ill. L. Rev. 676 (1950), 60 Yale L.J. 183 (1951). In accord, Shapiro v. Bonanza Hotel Co., 185 F.2d 777 (9th Cir. 1950). See also Kaufman, “Observations on Transfers under Sec. 1404(a) of the New Judicial Code,” 10 F.R.D. 595 (1951); Comment, “Limitations on the Transfer of Actions under the Judicial Code,” 64 Harv. L. Rev. 1347 (1951); Comment, “Change of Venue in Federal Courts under Section 1404-A of the New Judicial Code—Effect on Rights of the Parties,” 2 Hastings L. J. 29 (1950).

In Norwood v. Kirkpatrick, 349 U.S. 29, 75 S.Ct. 544 (1955), the Supreme Court held that the district courts in transfer cases could order transfer upon a lesser showing of inconvenience by a defendant than would be required for dismissal under the doctrine of forum non conveniens. Noted 55 Col. L. Rev. 1067 (1955); 36 Bost. U. L. Rev. 127 (1956); 41 Va. L. Rev. 813 (1955); 2 N.Y.L. For. 127 (1956). In this case the case was transferred to the place where the three employees suing under the F.E.L.A. had been injured. This is a more appealing case for transfer than when the plaintiff brings suit where the injurious impact took effect as would likely be the case if there were a reactor “burn-up.”

1468 This was the rule under the forum non conveniens doctrine prior to enactment of §1404 (a); Braucher, supra note 1453 at 919-20; Barrett, supra note 1453 at 413. But see Nicol v. Koscinski, 188 F.2d 537 (6th Cir. 1951). One of the plaintiffs in Norwood v. Kirkpatrick, supra note 1462, resided in the district in which the suit was brought. This fact brought forth a sharp dissent. In any event, the appeal courts refuse to upset the trial judges’ exercise of discretion unless a serious injustice results. Ford Motor Co. v. Ryan, 182 F.2d 329, 331-32 (2d Cir. 1950); Moore, Commentary on the U. S. Judicial Code 210 (1949).

1464 Comment, 63 Yale L.J. 493, 521-22 (1954).
a single action into which all claimants can be forced and by which they are all bound. It would appear that the desirability of individualized determinations of the liability relation between each claimant and the defendant is far outweighed by the factors of timeliness, equality, and efficiency that a centralized proceeding would bring. In short, Congress should modify Subsection 170e to provide for an original bill in the federal district court having venue over the incident, under which process would run throughout the United States, the court having the power to enjoin proceedings elsewhere, and the right to jury trial being discretionary with the judge, although this raises the problem of the constitutional right to jury trial in civil proceedings in federal courts.\textsuperscript{1465} It should not be necessary that claims exceed the fund available, but only that the defendant will be subjected to a multiplicity of suits and, in the opinion of the court, the ends of justice will be served by consolidation. Only when this or a similar provision is enacted into law will Subsection 170e provide an adequate basis for the satisfaction of nuclear incident claims.

c. Administrative Detail

Assume that the federal district court has discovered or been given a procedural device by which it can force substantially all of the injured parties to consolidate their claims. Although many administrative problems thus would be solved, others emerge. The court is confronted with the task of sorting out, evaluating, and satisfying the thousands of valid claims likely to arise from a nuclear disaster. The district judge, if possible, must seek further procedural tools at this stage to assist him in the administration of this enormous proceeding. Again there is some precedent in previous mass tort cases which may have application to an action resulting from a nuclear incident, and the judge may also find additional assistance in the federal rules of civil procedure.

(1) Arbitration

Arbitration was used with considerable success in the Ringling Brothers case, discussed above with respect to receivership.\textsuperscript{1466} The appointment of a receiver in that action was accompanied by an arbitration agreement, signed by the circus and most of the claimants, by the terms of which (1) the circus waived defenses of contributory negligence, absence of negligence, or the statute of limitations; (2) the


\textsuperscript{1466} Supra note 1430 and accompanying text.
assets of the circus were released to the receiver; and (3) with certain minor exceptions, the award of the arbitration panel was made final. Additional provision was made for direct settlement of claims, with the arbitration panel having the right to supervise settlement of any claim in excess of $200. It further was agreed that successful claimants were to be paid in periodic dividends from operational profits, income tax refunds, and proceeds of insurance policies.

While such a device would appear highly efficient as a means of processing claims, there are several serious limitations on its use in federal courts in the context of a nuclear incident. The first drawback is somewhat obvious; such arbitration agreements are by definition the product of consent. Local pressures, such as the obvious favor with which the Connecticut court and the local bar association looked upon arbitration in the Ringling Brothers case, strongly induced claimants to submit to arbitration. These pressures might be absent in the event of a nuclear incident, particularly since damages are certain to be of a less localized nature in many instances.

The probability, therefore, that a substantial majority of claimants would agree to arbitration is not great and is at best speculative. On the one hand, arbitration could be expected to insure more rapid settlement of claims; but on the other, the claimants would lose the advantage of jury trials. Wide geographical distribution of claimants and the fact that many potential claimants would not know at the time of recommended arbitration that they had sustained injuries or the extent of those injuries further lessen the effectiveness of the arbitration device. In the Hartford disaster and in all other mass tort cases herein discussed, injuries were of such a nature that all claims were asserted within a relatively short time. An arbitration agreement signed by less than all of the claimants has only limited value, and the fact that many claimants will not know of their injuries probably will mean that considerably fewer than all the claimants would be parties to the contract.

A final difficulty with arbitration of claims in federal courts is the fact that the United States Arbitration Act apparently is restricted in scope to "transactions involving commerce" and "maritime transactions." It is clear that a rather broad construction of the term

1467 Note, 60 Yale L. J. 1417, 1419, n. 12 (1951).

1468 61 Stat. 669 et seq. (1947); 9 U.S.C.A. §§1-14 (1953). The statute specifically empowers federal courts with respect to these transactions only, and it has been concluded that although Congress could constitutionally extend the statute further, it did not do so. See Sturges & Murphy, "Some Confusing Matters Relating to Arbitration under the United States Arbitration Act," 17 Law & Contemp. Prob. 580, 585 et seq. (1952).
“commerce” would be required before one could conclude that the district courts had the power under the statute to implement the arbitration process judicially. The authors have found no tort cases in which issues have been submitted to arbitration pursuant to the federal act. Further, it is to be doubted that a federal court would enforce an agreement to arbitrate tort claims solely on the basis of its inherent equity powers, in view of the traditional doctrine that arbitration agreements are both revocable and non-enforceable unless a statute dictates otherwise.1469

(2) Pre-Trial Conference

Advantageous use of this simplification device in mass tort litigation was illustrated in Clark v. United States,1470 a case in which consolidation of all claims was possible because all the actions were against the government under the Federal Tort Claims Act. The court insured complete claimant participation in the proceeding by waiting until the statute of limitations had run before beginning hearings. Under the close supervision of the district court, numerous pre-trial conferences were then held for the purpose of drafting a definitive pre-trial order as a basis for the simplification of the issues of liability. Twenty cases eventually were selected for trial at a final conference between the government and claimant’s attorneys, and at the same time a final pre-trial order was submitted to the court. Counsel for claimants whose causes were not selected for trial were directed to submit proposed definitive pre-trial orders of their own, or to agree of record to abide by the order for the selected cases. After careful review of its terms through the submission of briefs by the parties, the district court ultimately gave final approval to a binding pre-trial order framing all the issues of fact and law in the case.

So employed, the pre-trial conference with its resulting order is a powerful weapon for simplification of mass tort litigation. The real questions of fact and law at issue are brought out forcefully in the candid atmosphere that can characterize such a proceeding. Stipulations among parties as to agreed facts are encouraged, and without a doubt, the frank airing of issues provides an excellent opportunity for initiation of settlement discussions.1471 Particularly where the only real

1469 Id. at 587.
1470 Supra note 1439. For a discussion of the procedures followed, see Comment, 63 Yale L. J. 493, 517-18 (1954).
1471 See Murrah, “Pre-Trial Procedure, A Statement of Its Essentials,” 14 F.R.D. 417, 418 (1953). This paper was prepared for use by federal district judges seeking to work under Federal Rule 16. The rule states: “In any action, the court may in
controversy is over the extent of claimants' injuries, the pre-trial conference can easily become the most satisfactory forum for the satisfaction of claims. It was in this fashion that hundreds of claims arising from the sinking of the *Andrea Doria* were settled and paid in less than a year. A district court finding itself able to consolidate claims arising from a nuclear incident almost certainly would wish to make extensive use of this device for rapid, reasonable satisfaction of claims.

In this regard, however, Subsection 17oh of the Anderson amendment introduces a complication. There it is provided that, as a term of each indemnity agreement, when the AEC determines that the government probably will have to make payments under the indemnity agreement, the Commission "shall collaborate with any person indemnified and may approve the payment of any claim under the agreement of indemnification, appear through the Attorney General on behalf of the person indemnified, take charge of such action, and settle or defend any such action." The Commission is further given the authority "on behalf of the United States to settle or approve the settlement of any such claim on a fair and reasonable basis with due regard for the purposes of this Act." The Joint Committee report indicates that

its discretion direct the attorneys for the parties to appear before it for a conference to consider (1) The simplification of the issues; (2) The necessity or desirability of amendments to the pleadings; (3) The possibility of obtaining admissions of fact and of documents which will avoid unnecessary proof; (4) The limitation of the number of expert witnesses; (5) The advisability of a preliminary reference of issues to a master for findings to be used as evidence when the trial is to be by jury; (6) Such other matters as may aid in the disposition of the action. The court shall make an order which recites the action taken at the conference, the amendments allowed to the pleadings, and the agreements made by the parties as to any of the matters considered, and which limits the issues for trial to those not disposed of by admissions or agreements of counsel; and such order when entered controls the subsequent course of the action, unless modified at the trial to prevent manifest injustice . . . ."


1472 See reference to *Andrea Doria* settlements, note 1439 supra.

1473 The full text of Subsection 17oh is as follows: "The agreement of indemnification may contain such terms as the Commission deems appropriate to carry out the purposes of this section. Such agreement shall provide that, when the Commission makes a determination that the United States will probably be required to make indemnity payments under this section, the Commission shall collaborate with any person indemnified and may approve the payment of any claim under the agreement of indemnification, appear through the Attorney General on behalf of the person indemnified, take charge of such action, and settle or defend any such action. The Commission shall have final authority on behalf of the United States to settle or approve the settlement of any such claim on a fair and reasonable basis with due regard for the purposes of this Act. Such settlement may include reasonable expenses in connection with the claim incurred by the person indemnnified."

1474 *Ibid.* The indemnity agreement proposed by the AEC provides in this respect that the "Commission shall have the right . . . to require the prior approval of the
this latter authority is given the Commission so that it will not be bound by legal technicalities "such as rules of legal proof in a situation in which the courts have not yet had a chance to establish new rules for new problems arising from radiation." 1475

The problems that lurk in this rather remarkable provision are myriad. While the Commission's powers under the subsection are apparently restricted to settlement of claims against the indemnity fund, it would appear as a practical matter that separation of claims against the insurer and the indemnitee is impossible, particularly when Subsection 170e appears to contemplate apportionment of claims among the entire fund of insurance plus indemnity. Can it be that Congress intended two apportionments: first, payment by the insurer of those legal liabilities which are established against the insurance fund; and then second, payment through settlement or otherwise by the government of "fair and reasonable" claims out of the indemnity fund, whether or not the insurer's legal liability therefor has been established? This is certainly a curious, cumbersome process. But if this is not what Congress intended, then the insurers undoubtedly are laboring under the misapprehension that they will be liable for payment only when such liability is established in a court of record under legal rules, albeit "new," or in the alternative, when they themselves decide that settlement is the more intelligent course. If the Commission can tell the insurers when and for how much to settle, then really an insurance policy containing conditions and exclusions is little more than a pious gesture. Also illusory would be the hope that the insurer's liability would be based on legal doctrine, except to the extent that legal doctrine may accord with the Commission's notion of what is "fair and reasonable."

Commission for the settlement or payment of any claim ... and ... take charge of such action and settle or defend such action." Proposed 10 C.F.R. §140.76, 23 Fed. Reg. 6682, 6683 (1958).

1475 Joint Committee Report 23. The report also states that this authority is given to the Commission so that its settlements need not "wait for an action to go to final judgment but can be settled when it seems fair and reasonable." Ibid. One can easily see the dilemma that this provision brings to the district court judge having venue. He is empowered to limit liability and make the other orders specified in Subsection 170e only when it appears that claims will exceed the combined funds. With the government settling state actions even before they come to trial, it is almost impossible for him to know whether claims are actually "sufficient" to empower him. Assuming that the government does settle many claims before state judgments are rendered (even so, sufficient claims go to judgment that they aggregate more than the insurance and indemnity fund), does an apportionment by the district court require those with whom the government settled to refund part of their payment? Or is the amount of indemnity reduced by the settlements made, and therefore apportionment is only necessary among those claims which go to judgment?
Perhaps this interpretation would also result in significant changes being made in state substantive tort rules.

One possible interpretation of this subsection is that it is merely designed to place final authority in the Commission, among government agencies, to establish the government's position on each claim. This would not necessarily mean that the Commission's authority was final with respect to the insurer or indemnitee. So restricted, the subsection would pose less of a problem, although certainly in any case in which the decision as to settlement is to be made by more than one agency, there will always be differences of opinion. But so to restrict the subsection is to ignore much of its language and much of the language of the Joint Committee report. Clarification of Congress' position in this respect is certainly in order, for undoubtedly the settlement process will be extremely important in the event of a nuclear disaster.

(3) Reference to a Master

One of the appropriate issues for discussion at a pre-trial conference under the federal rules is the advisability of preliminary reference to a master for findings to be used in evidence when trial is to be by jury. The purpose of such reference is the simplification of complex evidence for the jurors, and the master's report, while not conclusive, appears as strong and impartial evidence for them to weigh with whatever testimony is introduced by the parties at the trial. Good practice would seem to support the use of a master in a jury case where it is necessary to introduce technical, scientific, and medical data in order to show the fact and extent of indemnitee's liability to various claimants allegedly suffering radiation injury.

If, however, the proceeding in which claims are to be satisfied is of a non-jury variety, the possibility of reference to a master is considerably less. Rule 53 of the federal rules provides that in these cases a reference is to be made "only upon a showing that some exceptional condition requires it." It is clear that the mere fact of a crowded docket is not sufficient ground for reference. The court may be able

1477 "A reference to a master shall be the exception and not the rule. In actions to be tried by a jury, reference shall be made only when the issues are complicated; in actions to be tried without a jury, save in matters of account, a reference shall be made only upon a showing that some exceptional condition requires it." 28 U.S.C.A., Federal Rules of Civil Procedure, 53(b) (1950). "Complicated" jury cases in which reference has been allowed are listed in 5 Moore, Federal Practice ¶53.05[2] (2d ed. 1948).
1478 See Federal Rule 53(b), supra note 1477.
1479 McCullough v. Cosgrave, 309 U.S. 634, 60 S.Ct. 703 (1940).
to show, on the other hand, that specialized training on the part of the master in the field of radiation injury makes him peculiarly suited for a preliminary hearing of claims arising from a nuclear incident. If such a justification is possible, then, of course, the court will be spared the task of holding full individual hearings on each claim. Perhaps the most desirable procedure that a court could follow would be to appoint a master to hear matters of damage or injury after pre-trial conferences have been held on the issue of liability. The chance of rapid settlement for just amounts would appear excellent should such a course be followed.

As with the question of possible consolidation, there is little guidance in Subsection 170e for a federal district court called upon to deal with these basic problems of administration. While undoubtedly considerably more latitude should be left to the judge in these matters than in the issue of deciding upon a consolidation device, yet the Atomic Energy Act or regulations promulgated thereunder at least should provide a framework for a claims proceeding. As Subsection 170e now reads, there is no indication of the nature of the action in which the enumerated orders are to be granted, or the manner in which adjudicated claims actually are to be paid. Such procedural details are easily specified and should not be left to judicial invention.

4. Conclusion

The government indemnity provisions found in the 1957 enactment badly need some clarifying amendments. This should be done immediately, before more reactors are put into operation, since a reactor incident, should it occur, could cause enough damage to bring the indemnity provisions into play.

The form of insurance policy as approved by the AEC should be changed in at least one respect; liability from all operations during the time the policy is in effect should be covered so as to give protection commensurate with the applicable statute of limitations, and not be arbitrarily limited to two years after the policy is cancelled. This means that most radiation injuries will not be covered because they often are delayed more than two years after irradiation. The only alternative is to allow the possibility of immediate recovery for future injuries. As pointed out in the previous discussion of such damages, this is far from

\[1480 \text{ See 5 Moore, Federal Practice §§53.05[2] (2d ed. 1948) for cases in which reference has been made when trial was to be before the court without a jury. See also Kaufman, "Masters in the Federal Courts," 58 Col. L. Rev. 452, 455 (1958).} \]
satisfactory so long as present compensation methods are used.\textsuperscript{1481} If the approved policy is not changed, the question then is posed as to whether legal liability will be indemnified by the government for the whole amount beginning with the first dollar not covered by the approved policy or whether the indemnitee will have to stand the losses. It can be argued that the indemnitee will have satisfied the financial protection requirement by taking out insurance under an approved policy and that the government must step in where the insurance policy ceases to protect. This will mean that much of the private insurance coverage is illusory even though very high premiums have been paid for it. Congress should answer this question specifically.

\textsuperscript{1481} Supra discussion at Section B 5 c (4) (a).