Chapter IV

STRICT LIABILITY FOR RADIATION INJURIES*

A. Introduction and Historical Background

Strict liability for all damages inflicted by one person upon another was anciently the rule of the common law. Every man was held responsible for the consequences of his acts, however reasonable he may have been and however carefully he may have performed his tasks.

In the beginning this doctrine was apparently applied by the courts principally if not exclusively to trespasses committed by the defendant’s domesticated animals upon the adjoining land of a neighbor. Strict liability was imposed in such instances on the ground that owners of adjoining land owed the mutual obligation to save each other’s property from harm caused by such incursions upon it. Even today, apart from statutory provisions to the contrary, such strict liability is the rule in most of the courts of the United States as regards animals that are likely to stray and do damage to others. Some of the western states have rejected the idea because of their range grazing needs, and statutes now very generally cover the field.

Likewise something approaching strict liability was imposed by the early common law for injuries caused by fire escaping from the premises of a landholder to those of his neighbors. This harsh result was, however, mitigated in England by a statutory provision enacted in 1707,1 to the effect that no action should be maintained against one whose building or estate caught fire accidentally, although liability was imposed for negligence and for intentional acts. This early English statute was carried to this country as part of the common law and was taken over by the courts on this side of the Atlantic. Our courts have consistently held in the absence of legislation that there is no liability for the escape of fire if the defendant was not negligent or guilty of an intentional wrong.2

These early doctrines of strict liability and those related to them ap-

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1 6 Anne c. 31, §§, as amended by 10 Anne c. 14, §§, and 14 Geo. 3, c. 78, §§.

2 See Prosser, Torts 327 (2d ed. 1955).
plied in other areas of the law did not derive from deep moral principle; instead the law was occupied principally with the very practical problem of keeping peace between individuals. To that end it provided a judicial remedy that would be accepted by the people in place of self help or private vengeance. Moral bases of the law were a later development.

With the lapse of time and by the process of evolution, as growing moral consciousness in the community made itself felt, the courts moved away from the cruder methods of early complete liability toward the more discriminating rule of equating legal liability in tort with conduct which would not be expected of a worthy member of the community. Accordingly, two types of conduct were in general found to involve such a degree of moral or social fault as to make the actions unworthy in the eyes of the law; first, conduct *intended* to invade the legally protected interests of others and, second, conduct which created an *unreasonable risk* to such interest, *i.e.*, negligence.

As Lord McMillan stated it in the recent and important English case, *Read v. The Lyons Company, Ltd.*:

> The process of evolution has been from the principle that every man acts at his peril and is liable for all the consequences of his acts to the principle that a man's freedom of action is subject only to the obligation not to infringe any duty of care which he owes to others. The emphasis formerly was on the injury sustained and the question was whether the case fell within one of the accepted classes of common law actions; the emphasis now is on the conduct of the person whose act has occasioned the injury and the question is whether it can be characterised as negligent. I do not overlook the fact that there is at least one instance in the present law in which the primitive rule survives, namely, in the case of animals *ferae naturae* or animals *mansuetae naturae* which have shown dangerous proclivities. The owner or keeper of such an animal has an absolute duty to confine or control it so that it shall not do injury to others and no proof of care on his part will absolve him from responsibility.⁸

Accordingly the law became so shaped that unless a man were guilty of "a fault" in the sense indicated he would not be compelled to respond in damages for injuries resulting from his acts.

There has, however, developed in the latter part of the nineteenth and twentieth centuries still a new direction in the law of civil liability; that is, a limited though more sophisticated return to "liability without

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fault,” at least without fault in the ordinary sense, unless the term be broadly defined to include ultrahazardous activities.

Following the lead of an 1868 English decision in the case of *Rylands v. Fletcher* 4 a modern doctrine of strict liability has been enunciated and applied to certain types of activities which may, in general, be loosely characterized by the phrase “ultrahazardous in nature.” The application of this doctrine to particular fact situations is quite unclear for it depends not only upon potentialities for harm, but also upon such vague and intangible considerations as social utility, the nature of the location, common usage within the area, and other related factors.

The twentieth century development of the *Rylands v. Fletcher* doctrine is of substantial concern to the atomic energy industry, for it would seem that certain segments of that industry will in all probability become subject to its financial burdens although certain other segments may be dealt with under conventional negligence doctrines. Or, on the other hand, some parts of the new industry may follow the course developed in connection with damages occasioned by fire, for in many respects fire is a predecessor of atomic energy. If this parallelism should prove to be appealing, atomic energy may in the initial stages of its use be held subject to absolute liability, in some of its applications at least, although social utility and community needs may, in the more distant future, bring about through statutory means a change in the theory of liability to one less drastic in nature.

At all events we shall find ourselves, in discussing the question of tort liability of atomic enterprise, facing the full circle of historical development starting from ancient strict liability, continuing through the Victorian doctrines of negligence, and now back again to strict liability. 5

B. Current Common Law Principles in General

As the peaceful uses of atomic energy become more and more commonplace, we shall find it necessary to deal increasingly with the problems of civil liability for the very simple reason that, notwithstanding all of the care that will be exercised, injuries due to overexposure to radiation will occur in ever increasing numbers. For practical purposes there are three principal theories of liability demanding consideration in this connection: negligence, nuisance, and strict liability, the latter sometimes called liability without fault.

4 3 Hurl. and C. 774 (1865); L. R. 1 Exch. 265 (1866); L. R. 3 H. L. 330 (1868).

5 For further development of the historical background of strict liability, see Prosser, Torts 315 (2d ed. 1955), and 2 Harper & James, Torts 785 (1956).
Negligence has been defined as conduct which involves an unreasonably great risk of causing harm to others, or, in different words, conduct which falls below the standard established by law for the protection of others against unreasonably great risk of harm. Conduct falls short of this standard when the individual against whom the charge is advanced has failed to act as the reasonable man of ordinary prudence would act under similar circumstances. The standard is an objective one rather than one based upon the individual judgment of any particular person. Negligence, as a legal basis for imposing liability, emerged as a judicial doctrine after the Industrial Revolution. It constituted a departure from the more primitive concepts of the earlier common law. Over the last century or more it has developed into a widespread and omnipresent theory of liability applicable to most forms of human activity and enterprise.

Nuisance, or at least "private nuisance," according to Dean Prosser is "a term applied to unreasonable interference with the interest of an individual in the use or enjoyment of land." He further states that the interference "may be intentional, or negligent, or may result from an abnormally dangerous activity for which strict liability is imposed. It must result from conduct of the defendant which is found to be unreasonable in the light of its utility and the harm or risk which results." 6

Not all authorities in the law of torts agree with Dean Prosser in his definition of nuisance. For example, Professor Warren Seavey argues that the term "nuisance" should not be deemed to refer to the fact of interference with the land of another but to the nature of the defendant's conduct which causes the interference. He places emphasis not only upon the conduct of the defendant but also he would require unlawfulness; that is, to be a nuisance there must be a tortious or criminal act interfering with the use of the land of another. 7

However, regardless of definitions given by commentators, the term "nuisance" is in fact widely used by the courts in rendering judgments for damages in situations not too far removed from those which may and probably will in due course arise out of peaceful utilization of atomic energy. Nuisance, therefore, must be taken into account as a possible theory of liability applicable to this new field.

The third theory demanding consideration is so-called strict liability,

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7 See Seavey, "Nuisance, Contributory Negligence, and Other Mysteries," 65 Harv. L. Rev. 984 (1952). The Restatement of Torts follows Prosser rather than Seavey; see 4 Restatement, Torts, Scope Note to Ch. 40 (1939). We shall deal more fully with this matter later in this chapter.
sometimes referred to as liability without fault. As previously noted there is a new direction in the evolution of the law, a change from the course of development which limited liability in tort to acts involving fault of the defendant, and a movement, in certain areas in any event, toward developing a policy of imposing liability without regard to such fault. This is particularly the case when injuries arise out of activities involving unusual danger to persons and property in the community. It is possible to argue, in support of strict liability as a mere extension of negligence, that the actor who carries on a dangerous activity in a community under such circumstances that harm is likely to be inflicted upon other persons is by virtue of that fact alone guilty of committing a fault. Or, on the other hand, one can say, as courts have frequently said, that the person who carries on such activities should be obliged to pay (as a matter of proper social distribution of the loss) the damages resulting therefrom, that is, to “pay his way.” The social expediency of this development in the law has been favorably commented upon by certain authorities writing recently on the law of torts. Professors Fowler Harper and Fleming James, Jr., have written:

There is a growing belief, however, that in this mechanical age the victims of accidents can, as a class, ill afford to bear the loss; that the social consequences of uncompensated loss are of far greater importance than the amount of the loss itself; and that better results will come from distributing such losses among all the beneficiaries of the mechanical process than by letting compensation turn upon an inquiry into fault.  

In specific reference to atomic energy injuries, Dean Prosser, writing in 1955, offered this observation:

The first case involving damage from the escape of radiation from the use of atomic energy has yet to reach the courts. When it does, it is not difficult to predict that there is no court which will refuse to apply to it the principle of strict liability found in the cases which follow Rylands v. Fletcher.

In this chapter we shall explore with considerable detail the doctrines to which Professors Harper, James, and Prosser refer, namely, the doctrines stemming from Rylands v. Fletcher and involving this modern trend toward liability without fault. It is this trend and these doctrines with which atomic energy users and their insurance carriers will be chiefly concerned. We shall also concern ourselves with the possible ap-

9 Prosser, Torts 336 (2d ed. 1955).
lications of nuisance doctrines to activities involving peaceful utilization of atomic science. In other words, in this chapter all phases of liability imposed upon operators of equipment containing radiation sources except liability founded upon negligence, will be discussed.

C. Strict Liability Under the Doctrine of *Rylands v. Fletcher*—The English Decisions

We will now proceed to examine the current theory of strict liability employed in common law jurisdictions as derived from the English case of *Rylands v. Fletcher*. The case was decided by the House of Lords in 1868, and, although it is now ninety years of age, its value as a precedent seems to grow with time. It is a part of a modern trend toward strict liability. In the United States especially, it has become a very broadly ranging and even severe doctrine in some of its applications.

In *Rylands v. Fletcher* a mill owner built a water reservoir on his own land over an abandoned mine shaft that, unknown to him, connected with a mine located on the plaintiff’s adjoining premises. The water accumulated in the reservoir and thereafter escaped into and through the abandoned shaft and thence into the plaintiff’s workings. Damage resulted and the plaintiff brought suit. Neither negligence, nuisance, nor trespass was claimed or found to exist.

In the lower court (Exchequer Chamber) Justice Blackburn found the defendant liable though without fault. He stated the rule of the case in these often quoted words:

> We think that the true rule of law is, that the person who for his own purposes brings on his lands and collects and keeps there anything likely to do mischief if it escapes, must keep it in at his peril, and, if he does not do so, he is prima facie answerable for all the damage which is the natural consequence of its escape. He can excuse himself by showing that the escape was owing to the plaintiff’s fault; or perhaps that the escape was the consequence of a vis major, or the act of God. ¹⁰

This decision was affirmed on appeal to the House of Lords, but some important limiting qualifications were added to the doctrine of the case as stated by Justice Blackburn. Specifically a requirement of “non-natural user” of the defendant’s land was added. The court, Lord Cairns speaking, said:

> [I]f, in what I may term the natural user of that land, there had been any accumulation of water, . . . and if, by the

¹⁰ *Rylands v. Fletcher*, L. R., 1 Exch. 265, 279-280 (1866).
operation of the laws of nature, that accumulation of water had passed off into the close occupied by the Plaintiff, the Plaintiff could not have complained.

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On the other hand if the Defendants, not stopping at the natural use of their close, had desired to use it for any purpose which I may term a non-natural use . . . and if in consequence . . . the water came to escape and to pass off into the close of the Plaintiff, then it appears to me that that which the Defendants were doing they were doing at their own peril.11

The court did not specifically limit the rule of the case to damage inflicted on adjoining land but, on the contrary, as it was stated, it could readily be made applicable to personal injuries as well. That aspect of the decision has subsequently been given judicial consideration in England with results that we shall presently note.

In accordance with these pronouncements, therefore, three important limitations appear in respect to the application of the Rylands doctrine; namely, (1) liability is imposed only in case of bringing and maintaining on to the land a dangerous substance likely to cause mischief if it escapes, (2) this activity must constitute a "non-natural use" of the land, and (3) there must be an "escape" that causes damage. These limitations create great uncertainty in the application of the doctrine to other situations.

In regard to the first point, i.e., the dangerous quality of the substance or instrumentality, Dr. Stallybrass reached the conclusion, after an extensive examination of all of the English decisions down to the time of writing in 1929, that the application of the doctrine rests upon a principle of relativity. He wrote that "just as there is nothing which is at all times and in all circumstances dangerous so it seems that there is scarcely anything which is in all circumstances safe." 12 He elaborates the principle in the following language:

The principle of law behind all these cases is, it is submitted, that if a man takes a risk, which he ought not to take without also taking upon his shoulders the consequences of that risk, he shall pay for any damage that ensues.

In every case the question really is: Was the risk one which the defendant was entitled to take only on condition of paying compensation to those injured thereby irrespective of any negligence on his part? And the answer to that question will

11 Rylands v. Fletcher, L. R., 3 H. L. 330, 338-339 (1868).
not depend upon whether the thing in question was dangerous per se, but upon whether it was dangerous in the circumstances of the particular case.\textsuperscript{13}

In short, if the defendant brings a substance on his land which involves an unreasonable risk of harm to persons or property in the vicinity, he falls within the doctrine of the \textit{Rylands} case. It is obvious that application to specific situations will present difficulties.

Moreover, there is serious uncertainty in connection with the application of the term "non-natural user." The court's opinion in the \textit{Rylands} case offered no assistance, and the problem of determining when a given user is non-natural persists to this day. The words have now become "terms of art," and the courts have indicated that they are susceptible to change as the world becomes more crowded, and as industry becomes more complex. The doctrine has been said to be confined to activities which are "extraordinary" or "abnormal." It does not apply to "usual," "ordinary," and "normal" types of activity. It has also been said that "the reasonable use of property in the way most beneficial to the community" is not deemed to be a "non-natural use" so as to render the actor subject to strict liability.\textsuperscript{14}

Forty-five years after \textit{Rylands v. Fletcher} was decided the case of \textit{Rickards v. Lothian} came before the English courts. That case, somewhat like \textit{Rylands}, involved an overflow of water on an upper floor damaging plaintiff's stock in trade stored below. Recovery, sought on the basis of the \textit{Rylands} case, was denied, however. The court said:

The provision of a proper supply of water to the various parts of a house is not only reasonable, but has become, in accordance with modern sanitary views, an almost necessary feature of town life. . . . in some form or another it is usually made obligatory in civilized countries. Such a supply cannot be installed without causing some concurrent danger of leakage or overflow. It would be unreasonable for the law to regard those who instal or maintain such a system of supply as doing so at their own peril.

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It is not every use to which land is put that brings into play that principle [namely the principle of \textit{Rylands v. Fletcher}]. It must be some special use bringing with it increased danger to others, and must not merely be the ordinary use of the land or such a use as is proper for the general benefit of the community.\textsuperscript{16}

\textsuperscript{13} \textit{Id.} at 387, 388.
\textsuperscript{14} Bramwell, J., in \textit{Nichols v. Marsland}, L. R. 10 Exch. 255, 259 (1875).
It is clear, then, that not only the character of the activity but also the place and manner in which it is carried on are pertinent to the classification of the function as a non-natural user or otherwise.

In accordance with the foregoing principles, the English courts have applied the strict liability doctrine in a considerable variety of cases involved in some seventy English decisions. They have applied it against defendants who collected water in large quantity in hydraulic power mains; who operated a plant for washing film in close proximity to the plaintiff's land; who stored illuminating gas in quantity; who conducted high voltage electricity in the public streets; who operated a traction engine with the fire under its boiler shooting out sparks along the highway; who operated a ten-ton traction engine too heavy for the highway; who stored large quantities of explosives, or inflammable liquids; who engaged in blasting or accumulating sewage; who maintained a facility involving the emission of creosote fumes; or who operated a pile driver which caused excessive vibration. All of these have been deemed "non-natural users" for which strict liability ensued. On the other hand, maintaining water in a cistern, or in household pipes, or household gas or electricity supply, or fire in a fireplace, or driving automobiles on the highways are customary uses for which strict liability does not apply.18

In respect to the requirement of "escape" of a dangerous substance from the defendant's premises, the recent English case of Read v. The Lyons Company, Ltd.17 may well exert considerable influence upon American courts in further evolution of the American doctrines of strict liability. The cause of action arose during World War II as a result of an accident in defendant's ordnance factory. The plaintiff, an employee of the Ministry of Supply, was on the premises as a shell inspector, and she was injured by the explosion of a shell. The issue was briefly summarized by Lord Porter who asked:

Are the occupiers of a munitions factory liable to one of those working in that factory who is injured in the factory itself by an explosion occurring there without any negligence on the part of the occupiers or their servants?18

A claim of strict liability was advanced by the plaintiff but without success. Said Viscount Simon, one of the judges:

The fact that the work that was being carried on was of a kind which requires special care is a reason why the standard of

16 For a citation of the many English cases, see Prosser, Torts 329, 330 (2d ed. 1955).
17 Supra note 3.
18 Id. at 478.
care should be high, but it is no reason for saying that the occupier is liable for resulting damage to an invitee without any proof of negligence at all.\textsuperscript{19}

On the question of "escape" Viscount Simon commented:

The first essential condition of "escape" does not seem to me to be present at all. "Escape," for the purpose of applying the proposition in \textit{Rylands v. Fletcher} means escape from a place which the defendant has occupation of, or control over, to a place which is outside his occupation or control.\textsuperscript{20}

Lord McMillan also participated in the court's opinion. He commented both on "escape" and also on "non-natural user" as follows:

The doctrine of \textit{Rylands v. Fletcher}, as I understand it, derives from a conception of the mutual duties of adjoining or neighboring landowners. . . . The two prerequisites of the doctrine are that there must be the escape of something from one man's close to another man's close and that that which escapes must have been brought on the land from which it escapes in consequence of some non-natural use of that land whatever precisely that may mean. Neither of these features exists in the present case. I have already pointed out that nothing escaped from the defendant's premises, and, were it necessary to decide the point, I should hesitate to hold that in these days and in an industrial community it was a non-natural use of land to build a factory on it and conduct there the manufacture of explosives. I could conceive it being said that to carry on the manufacture of explosives in a crowded urban area was evidence of negligence, but there is no such case here.\textsuperscript{21}

Lord Simonds who also wrote an opinion mentioned the rule set forth in the American Law Institute Restatement of Torts, reference to which will be made later in this chapter, to the effect that "ultra-hazardous activities" should carry with them the doctrine of strict liability. He rejected both the Restatement rule and other American strict liability doctrines in the following language:

Somewhere the line must be drawn unless full rein be given to the doctrine that a man acts always at his peril. . . . I speak with all deference of modern American textbooks and judicial decisions, but I think little guidance can be obtained from the way in which this part of the common law has developed on the other side of the ocean.\textsuperscript{22}

\textsuperscript{19} \textit{Id.} at 473.
\textsuperscript{20} \textit{Id.} at 474.
\textsuperscript{21} \textit{Id.} at 477.
\textsuperscript{22} \textit{Id.} at 481.
In regard to liability of persons on the defendant's premises, Lord Simonds concluded:

I would reject the idea [of the Restatement] that, if a man carries on a so-called ultra-hazardous activity on his premises, the line must be drawn so as to bring him within the limit of strict liability for its consequences to all men everywhere. On the contrary, I would say that his obligation to those lawfully on his premises is to be ultra-cautious in carrying on his ultra-hazardous activity, but that it will still be the task of the injured person to show that the defendant owed him a duty of care and did not fulfil it. It may well be that in the discharge of that task he will sometimes be able to call in aid the maxim res ipsa loquitur.  

It should not be assumed, however, from the above quotations that the English courts apply the doctrine of Rylands v. Fletcher only to injuries to land. It is true that most of the seventy decisions involve such injuries, and, in English law, landed interests are for historical reasons highly regarded—perhaps considerably more so than are personal interests. However, there are cases imposing strict liability for purely personal injuries such as the Jennings Brothers case concerning an amusement park with its centrifugal whirling chair device which went awry and injured the plaintiff.

Moreover, there are certain exceptions to the doctrine of strict liability that may be gleaned from the British decisions. Strict liability is not applicable:

1. When the defendant is able to "... excuse himself by showing that the escape was owing to the plaintiff's default";  
2. When the damage is caused by the intervention of an Act of God;  
3. When the harm results from the deliberate act of a third party stranger; or  
4. When the defendant is acting under and in accordance with statutory authority, a subject to be more fully developed later in this chapter.

In short, the views of the British courts as reflected in the cases, including the significant Read v. Lyons Company, Ltd., may be summarized as follows: (1) strict liability under the Rylands rule is founded

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23 Id. at 481-482.  
25 L. R. 1 Exch. 265, 279 (Ex. 1866).  
26 Nichols v. Marsland, L. R. 10 Exch. 255 (1875).  
historically upon a mutual obligation of adjoining or neighboring landowners, a fact which to no small degree affects its interpretation; and (2) in order to apply the Rylands doctrine the court must find: first, a dangerous substance or instrumentality; second, non-natural user of the land under defendant's control; third, an escape of the dangerous substance or instrumentality from the defendant's premises; fourth, harm caused to the owner of adjacent or neighboring premises, or to persons in the vicinity; and, fifth, that none of the named exceptions is applicable.

In considering the future application of the British cases to injuries occasioned by escaping radioactive substances it would seem that the principal difficulty will arise from the necessity of applying the concept of "non-natural user." Because radioactive particles migrate with distressing ease, there will be little question but that in the years to come untoward incidents will result in the escape of radioactivity into the surrounding countryside, and the question will be raised whether or not the source from which the escape takes place does or does not amount to a "non-natural user" of the land. The determination of this issue will depend upon a considerable number of factors, including location of the source with respect to outside persons and property, the character of the utilization device with respect to its dangerous propensities, and the social utility expected to be derived from the location of the particular activity in the community where the incident occurred.

D. The Doctrine of Rylands v. Fletcher Under American Decisions

We will now consider the American cases which are obviously of greater significance than are the English cases in connection with an appraisal of the possibility of strict liability for radiation injuries being imposed upon nuclear industry in the United States. In this country Rylands v. Fletcher has been accepted by some courts and rejected by others.

At a very early date the Supreme Courts of Massachusetts and Minnesota approved the doctrine. Soon afterward, however, the doctrine was repudiated in New York, New Hampshire, and New Jersey.

29 Ball v. Nye, 99 Mass. 582 (1868), involving the escape of filthy water from the defendant's premises; Cahill v. Eastman, 18 Minn. 324 (1871), involving damage to property caused by escape of water onto plaintiff's premises through a tunnel constructed by the defendant.

30 Losee v. Buchanan, 51 N.Y. 476 (1873), a steam boiler case.
31 Brown v. Collins, 53 N.H. 442 (1873), a traffic situation.
In subsequent litigation the doctrine has been repudiated by name, at least, in seven additional states—Kentucky, Maine, Oklahoma, Pennsylvania, Rhode Island, Texas, and Washington. On the other hand, an even greater number of American courts have accepted the doctrine and applied it in one way or another. In addition to Massachusetts and Minnesota, decisions to this effect have been rendered in Arkansas, California, Colorado, District of Columbia, Indiana, Iowa, Kansas, Maryland, Missouri, Ohio, Oregon, South Carolina, and West Virginia.\(^8\)

Accordingly it would appear that the doctrine has met with substantial favor in the United States and the extent of the approbation is increasing. The doctrine has been applied to many and varied cases involving such situations as the impounding of water, the storage of explosives and inflammable liquids, blasting, fumigation, crop dusting, oil well operations, and the emission of smoke, dust, or noxious gases. Like the courts in Great Britain, the United States courts have declined to apply the doctrine to so-called "natural uses" of land, and for this reason they have declined to apply it to such activities as carrying water in pipes for household use, conducting gas in ordinary household supply devices, installing electric wiring, storing gasoline in filling stations, coal mining operations, and other affairs that are deemed normal and natural in relation to the community where they are carried on.

In view of the importance of the American cases in connection with possible strict liability of the atomic industry, it will be desirable to survey a number of the leading cases. For this purpose, we shall divide the cases into three categories: first, cases in which the doctrine has been repudiated altogether and the plaintiffs have been referred for redress to the doctrines of negligence; second, cases in which the doctrine has been recognized and applied; and third, cases in which the doctrine has been recognized but the courts have declined to hold the defendant in the particular situation to a rule of strict liability.

1. **Rylands v. Fletcher** Repudiated

As has already been stated, in the United States the doctrine of *Rylands v. Fletcher* was early repudiated by several of the leading state courts, and there is today a substantial body of judicial authority to the effect that it will not be applied, at least under the conditions and circumstances involved in the cases in which the question has been raised. Although the trend of modern decisions may be in the direction of accept-

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\(^{8}\) Dean Prosser in his volume Selected Topics on the Law of Torts (1953) has assembled a most complete listing of citations. See pp. 152-157.
ance rather than rejection of the doctrine, these cases nevertheless possess considerable current authority.

In Losee v. Buchanan,\(^{34}\) decided by the New York Court of Appeals shortly after the English courts handed down their decision in Rylands v. Fletcher, action was brought to recover damages occasioned by the explosion of a steam boiler as a result of which parts were projected onto the plaintiff's premises and through several of his buildings, damaging the same and destroying personal property therein. The plaintiff urged the court to apply the principle of liability without fault apart from considerations of negligence. The court declined to do so, not because the operation of a steam boiler was a "natural use" of the premises, but because the doctrine of strict liability was generally distasteful. A quotation from the opinion reveals the theory.

By becoming a member of civilized society, I am compelled to give up many of my natural rights, but I receive more than a compensation from the surrender by every other man of the same rights, and the security, advantage and protection which the laws give me. So, too, the general rules that I may have the exclusive and undisturbed use and possession of my real estate, and that I must so use my real estate as not to injure my neighbor, are much modified by the exigencies of the social state. We must have factories, machinery, dams, canals and railroads. They are demanded by the manifold wants of mankind and lay at the basis of all our civilization. If I have any of these upon my lands, and they are not a nuisance and are not so managed as to become such, I am not responsible for any damage they accidentally and unavoidably do my neighbor. He receives his compensation for such damage by the general good, in which he shares, and the right which he has to place the same things upon his lands. I may not place or keep a nuisance upon my land to the damage of my neighbor, and I have my compensation for the surrender of this right to use my own as I will by the similar restriction imposed upon my neighbor for my benefit. I hold my property subject to the risk that it may be unavoidably or accidentally injured by those who live near me; and as I move about upon the public highways and in all places where other persons may lawfully be, I take the risk of being accidentally injured in my person by them without fault on their part. Most of the rights of property, as well as of person, in the social state, are not absolute but relative, and they must be so arranged and modified, not unnecessarily infringing upon natural rights, as upon the whole to promote the general welfare.\(^{35}\)

\(^{34}\) Supra note 30.

\(^{35}\) Id. at 484, 485.
In a more recent Oklahoma case, *Gulf Pipe Line Company et al v. Sims*, the plaintiff claimed that absolute liability should rest upon the defendant for injuries occasioned to the plaintiff while he was riding as a passenger in an automobile driven along a public highway. As he approached a bridge over a small ravine, gas which had collected near and around the bridge was ignited causing an explosion and fire as a result of which the plaintiff was severely burned. The gas came from crude oil leaking from the defendant's pipelines. The plaintiff contended that the defendant should be held liable regardless of negligence, relying upon the doctrine of *Rylands v. Fletcher*. Yet the court refused to apply the doctrine to the circumstances as they existed in Oklahoma. Said the court:

We think that case, (i.e., *Rylands v. Fletcher*) is not in point here upon the facts. And we conclude that the rule there announced, and here contended for the plaintiff, Sims, cannot be sustained in this jurisdiction in this character of action, and that our conclusion that it should not be followed is justified both by the trend of modern decisions, and by modern economic and industrial developments.

The business engaged in by the defendants, that of transportation and storage of crude oil, is one of the basic industries of the state; that business is not only legal, necessary, and proper, but has an outstanding part in the development of the natural resources of the state. When that business is conducted in the recognized manner, with all diligence, and with the use of standard equipment, materials and appliances, and without negligence, then the persons engaged in such business should not, under the rule in *Rylands v. Fletcher*, be held to be insurers that in no event would it be possible that damage or injury could result from such operation.

In later cases the Oklahoma Supreme Court has pointed out that the *Sims* case has no application in cases of injuries to real property which is protected by Section 23, Article 2 of the state constitution providing that no private property shall be "taken or damaged" for private use without compensation.

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86 Okla. 209, 32 P.2d 902 (1934).
87 Id. at 213.
88 See Phillips Petroleum Company v. Vandergriff, 190 Okla. 280, 122 P. 2d 1020 (1942), and British-American Oil Producing Co. v. McClain, 191 Okla. 40, 126 P.2d 530 (1942). See Comment on the Oklahoma cases in Foster and Keeton, "Liability Without Fault in Oklahoma," 3 Okla. L. Rev. 38-41 (1950), where the authors criticize the Sims case, referring to the fact that, in the later British-American case, the court had stated that the views expressed in the Sims case were largely dictum. They add "It would appear that there is substantial doubt as to the present vitality and future application of the Sims case." However, it still stands as the law of Oklahoma.
A similar question has arisen in the neighboring state of Texas in *Turner v. Big Lake Oil Company*.\(^89\) This case also involved oil producing operations. In a state in which such operations form a very large part of the economy, Turner brought suit against the oil company for damages for alleged pollution of the plaintiff's land and his water holes resulting from the defendants' permitting the escape of salt water from oil producing operations on its property. The jury found that the defendants were not guilty of negligence. The plaintiffs on appeal contended for a doctrine of strict liability, referring for authority to the rule of *Rylands v. Fletcher* and American cases in accord with it. The Texas court declined to apply the rule stating that "in Texas we have conditions very different from those which obtain in England" and that it had "long since repudiated the general rule announced in *Rylands v. Fletcher*." The court referred with approval to another Texas Supreme Court opinion, in *Gulf, C. & S.F. Ry. Co. v. Oakes*, in which case the court criticized the rule of the *Rylands* case stating:

The rule laid down was largely deduced from prior rulings establishing absolute liability for damages caused by fires kindled on one's premises and spreading to those of another; by injuries inflicted by one, in his lawful self-defense against another, upon an innocent bystander; and by animals straying from the lands of their owners upon those of others. The law has become settled, in this country at least, that there is no liability in the first two instances without negligence on the part of the person permitting the fire to spread or inflicting the injury; and in the case of animals, the law is entirely different in this and other states.\(^40\)

Accordingly, the court in the *Turner* case concluded:

Since we have repudiated the bases of the rule announced in *Rylands v. Fletcher*, it follows as a necessary corollary that we should not apply the rule in cases such as the one before us.\(^41\)

Although the Texas court declined to apply the rule of *Rylands v. Fletcher* in the *Turner* case, it did at several points in its opinion refer to the possibility of imposing an equivalent of liability without fault by reference to nuisance doctrines, if a nuisance were in fact created by the defendant.\(^42\)

\(^{89}\) 128 Tex. 155, 96 S.W.2d 221 (1936).

\(^{40}\) Gulf, C. & S. F. Ry. Co. v. Oakes, 94 Tex. 155 at 158, 159, 58 S.W. 999 (1900).

\(^{41}\) Supra note 39 at 162.

\(^{42}\) See Prosser, "Nuisance Without Fault," 20 Tex. L. Rev. 399 (1942), criticizing the Turner case and indicating that the effect of strict liability might perhaps be achieved in Texas by pleading and urging a nuisance doctrine.
These cases make it clear that there is at least some authority in the United States to the effect that the doctrines of strict liability should not be applied indiscriminately. The vitality and extent of this opposition are open to question in view of current trends in thinking about tort liability, and, in any event, there is still left open the question as to whether or not the doctrine should be applied to damages occasioned by radioactive substances.

2. *Rylands v. Fletcher* Accepted and Applied.

We have already mentioned the fact that more state supreme courts have accepted and approved the doctrine of *Rylands v. Fletcher* than have refused to give it recognition. It is now desirable to review a number of the better reasoned opinions rendered in cases approving and applying the doctrine, or its American equivalent, and thus to attempt to derive a theory which will permit us to predict the likelihood of strict liability being invoked against those who inflict radiation injuries on others. We shall not be able to derive the same clearcut pattern of theory as that which can be derived from the opinions of the English courts. However, by examining a selection of six leading cases, we can obtain a fairly adequate understanding of the extent of the doctrine as it is applied in those states that have accepted it, and thus place ourselves in a position to make a projection into the atomic age.

The Kansas case of *Berry v. Shell Petroleum Company* involved a claim for damages caused to real property by the seepage of salt water, thereby ruining the water supply on the plaintiff's premises. The defendant owned and operated an oil producing field. The oil, as it came from the ground, was mixed with salt water. Separation was achieved by storage in tanks, drawing the oil off the top and the water off the bottom. The salt water was discharged through pipes which connected with a drainage ditch in the city of Wichita, Kansas. This was done pursuant to and in accordance with a city ordinance. It was understood that the salt water would be carried through the sanitary sewer system except in case of emergency or when it was found necessary to divert it into a drainage canal for the purpose of flushing the drainage canal system. During the course of a flushing operation salt water apparently seeped through the sand bottom of the canal and into the wells used by the plaintiff. The water was rendered unfit for use. The plaintiff made no allegation of negligence; reliance was placed squarely upon the doctrine of absolute liability. The defendant not only denied the applicabil-

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ity of strict liability rules but also contended that when it delivered its water, impregnated with salt, to the city, all duties resting upon it came to an end. The court nevertheless held the defendant strictly liable.

The court first spoke in terms of nuisance, saying:

The rule is well settled that an individual who sustains an injury peculiar to himself may have relief against a public nuisance and is entitled to maintain an action at law for damages on account of the special injury which he has sustained.44

The court did not, however, rest its decision exclusively on the ground of nuisance. It also turned to the doctrine of *Rylands* v. *Fletcher*, referring to it with approval and stating:

It is well settled in this state that when a water supply is damaged by salt water percolating through the soil and impregnating it with salt so that the water is rendered unfit for use, the owner of the land may maintain an action for damages against the owner of the land from whose land the salt water escaped.45

It must be remembered that negligence is not a necessary element of the right of recovery in a case like this. The right to recover results from the company having the harmful substance on its land and permitting it to escape to the damage of plaintiff.46

It should be noted that the facts in the *Berry* case are in interesting contrast to those in the *Turner* case, referred to in the preceding section, decided by the Texas Supreme Court only two years later. The fact that the economy of the state of Texas is so largely dependent upon the production of oil, whereas that of Kansas depends more on agricultural and industrial pursuits, can no doubt be regarded as at least a partial explanation of the difference in the attitude of the two courts concerning the applicability of the doctrines of strict liability to the business of oil production. It should be noted that in the *Berry* case the Kansas Supreme Court made no mention whatsoever of the *Rylands* requirement of "non-natural use of the land." The court simply stated that "the liability . . . springs from the fact that the companies had salt water on their property and permitted it to escape."47 Furthermore, the court said: "We are aware of the fact that such a ruling places a great burden on the oil industry. It is, however, no new principle which we are an-

44 *Id.* at 99.
45 *Id.* at 100.
46 *Id.* at 101.
47 *Id.* at 102.
nouncing. It is as old as the industry of man. We consider that the water supply of the people is of greater importance than the operation of a business at a reduced cost." Thus the court enunciated a doctrine of relative social utility which is more nearly akin to nuisance doctrines originating in equity.

In *Berger v. Minneapolis Gaslight Company* the defendant, a gas manufacturer and distributor, maintained a reservoir containing crude petroleum. The petroleum escaped and percolated through the ground to the plaintiff's premises where it caused damage. The defendant contended that the case should be dismissed since there was a failure to show negligence. Nevertheless the trial court instructed the jury that the defendant was liable without proof of negligence. The Supreme Court, citing *Rylands v. Fletcher* with approval, agreed with the instruction and sustained the verdict and judgment for the plaintiff, saying that the proofs showed that the defendant fell within the limits of strict liability, and that

The essential condition of liability, without proof of negligence on the part of the owner, for injury to others by the escape of things kept by him on his own premises, is that the natural tendency of the things kept is to become a nuisance or to do mischief, if they escape.

Thus the Minnesota court, like the Kansas court in the *Berry* case, apparently ignores the question of "non-natural use" of the land, but concentrates simply and solely upon the question as to whether or not something of dangerous potentialities has been permitted to escape. Thus the decision is rested upon only one of the principal requirements imposed by the English courts in connection with *Rylands v. Fletcher*. The fact is that the doctrine of strict liability is developing in this country on an even broader base than in the country of its origin. If, for example, the defendant's crude petroleum tank had been located far away from centers of population and in a location in which such storage in tanks was a common practice, the defendant would still have been held liable according to the language used by the court.

Another case worthy of attention in this connection is *Frost v. Berkeley Phosphate Co.* This was an action for damages inflicted upon the plaintiff and his property by the defendant who operated a mill in which he manufactured sulphuric acid and commercial fertilizers. In

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49 60 Minn. 206, 62 N.W. 336 (1895).
50 *Id.* at 301.
51 42 S.C. 402, 20 S.E. 280 (1894).
the process of producing sulphuric acid certain gases and fumes were produced which had injurious effects upon vegetable and animal life. The plaintiff charged that gases escaping from the defendant's mill injured and destroyed his crops and other vegetation growing upon his land, and proved so detrimental to health as to render his premises unfit for habitation. Under the instructions of the trial court a verdict was returned by the jury for the defendant, and the plaintiff appealed. The Supreme Court of South Carolina found the instructions of the trial court objectionable for the reason that they propounded a doctrine of non-negligent liability based solely upon nuisance (i.e., unlawful action) and leaving no room for strict liability in cases of lawful conduct of business. The Supreme Court disagreed with so limited a doctrine and in so doing laid down its views concerning strict liability as follows:

The second objection to this charge is, as it seems to us, that it unwarrantably limits the operation of the maxim, *Sic utere tuo ut alienum non lادات*, so as to allow the owner of a tract of land to so use his own land in the prosecution of any lawful business as would necessarily or probably injure his neighbor, provided he takes all reasonable care to prevent such injury. This we do not understand to be the law. On the contrary, we think if one uses his own land for the prosecution of some business from which injury to his neighbor would either necessarily or probably ensue, he is liable if such injury does result, even though he may have used reasonable care in the prosecution of such business. This doctrine is supported not only by reason, but by the weight of authority . . . .

*Rylands v. Fletcher* was referred to with approval. Here again we find no limitation to "non-natural user" but instead a very broad enunciation of a doctrine of strict liability, far broader than the principles initially derived by the English courts from *Rylands v. Fletcher*.

A Maryland case, *Susquehanna Fertilizer Co. v. Malone*, also involving a fertilizer plant producing sulphuric acid fumes, affords a somewhat similar broad theoretical base for the doctrine. In this case the plaintiff was the owner of several dwelling houses in one of the suburbs of Baltimore. On the adjoining lot was the defendant's large fertilizer factory from which, so the plaintiff charged, noxious gases escaped, not only to the great physical discomfort of his tenants and himself, but also to cause material injury to the property itself. The court, in its opinion, specifically negated the possibility of submitting

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52 Id. at 409.
53 73 Md. 268, 20 Atl. 900 (1890).
to the jury the question as to whether or not the factory was located in a convenient and proper place for carrying on such business, i.e., whether, under all of the circumstances it was a "natural use" of the land. Citing *Rylands v. Fletcher* among other authorities the court expressed itself as follows:

No principle is better settled than that where a trade or business is carried on in such a manner as to interfere with the reasonable and comfortable enjoyment by another of his property, or which occasions material injury to the property itself, a wrong is done to the neighboring owner, for which an action will lie. And this, too, without regard to the locality where such business is carried on; and this, too, although the business may be a lawful business, and one useful to the public, and although the best and most approved appliances and methods may be used in the conduct and management of the business.  

And further quoting from the opinion:

We cannot agree with the appellant that the Court ought to have directed the jury to find whether the place where this factory was located was a convenient and proper place for the carrying on of the appellant's business, and whether such a use of his property was a reasonable use, and if they should so find the verdict must be for the defendant. It may be convenient to the defendant, and it may be convenient to the public, but, in the eye of the law, no place can be convenient for the carrying on of a business which is a nuisance, and which causes substantial injury to the property of another. Nor can any use of one's own land be said to be a reasonable use, which deprives an adjoining owner of the lawful use and enjoyment of his property.

We must not fail to note the breadth of the doctrine thus enunciated and further, we should note the continual reference to "nuisance." In the opinions of many of the state supreme courts in the United States the doctrine of *Rylands v. Fletcher* becomes inextricably involved with doctrines of nuisance. The two are often used interchangeably to impose strict liability in those cases in which they are invoked. "Nuisance" is at best a vague concept of uncertain dimensions used in different ways by different courts. The breadth of the views enunciated by the Maryland court in the *Susquehanna* case are in part at least attributable to this fusion of doctrines, and results in a principle that runs far beyond.

54 Id. at 276.

55 Id. at 276, 277.
that of *Rylands v. Fletcher* which is rather precisely limited to “non-natural” user resulting in an “escape” of substances “likely to do mischief.”

A very recent case of significance is *Gotreaux v. Gary*. This was an action against a farmer who employed a certain flying service to spray his rice crop with the chemical 2, 4-D. Unfortunately the chemical was carried by the wind to the plaintiff’s premises three and one-half miles away, and there it served to destroy some thirteen acres of cotton and three acres of peas under cultivation. The Louisiana Code contained a provision reading as follows:

> Although a proprietor may do with his estate whatever he pleases, still he cannot make any work on it, which may deprive his neighbor of the liberty of enjoying his own, or which may be the cause of any damage to him.

However, the legislature of Louisiana had adopted regulations concerning the use of 2, 4-D and permitting its use during periods of wind velocity of less than six miles per hour. With this limitation the defendant had complied. The defendant pleaded that fact and lack of negligence. The court, however, declared that it was unwilling to follow any rule which rejected the doctrine of absolute liability in cases of this nature. The court stated that nuisance was not involved but based its holding for the plaintiff upon the principle that in such circumstances negligence or fault is not a requisite to liability, but that liability should follow irrespective of the fact that the activities resulting in the damages were conducted with reasonable care and in accordance with modern and accepted methods. Said the court without mentioning *Rylands v. Fletcher* but reaching a like result:

> . . . [I]t is true that the Legislature consented to the use of herbicides, but this did not entitle the defendants to injure plaintiff’s crops. Although the use of the spraying operation was lawful, it was carried out in such a manner as to unreasonably inconvenience plaintiff and deprive him of the liberty of enjoying his farm.

One other case should be given consideration in this discussion of the *Rylands* doctrine in United States courts. In *Green v. The General Petroleum Corporation* the plaintiff instituted an action to recover damages for injuries to his property occasioned by the defendant’s oil

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56 232 La. 373, 94 S.2d 293 (1957).
58 *Supra* note 56 at 378.
59 205 Cal. 328, 270 Pac. 952 (1928).
drilling operations. It appeared that in the process of drilling for oil, although the defendant had exercised ordinary care and was not guilty of negligence in any particular, a stream of oil, gas, mud, and rocks was shot into the air and onto the plaintiff’s property located about two hundred feet from the well. The defendant denied liability, asserting that under the California decisions there was no such thing as liability without negligence. The court, outlining the California law on the subject, indicated that, quite apart from negligence or the commission of a nuisance per se, neither of which existed in this case, and notwithstanding the fact that the production of oil is a legitimate and lawful business, nevertheless, a doctrine of strict liability should be applied. Without referring to Rylands v. Fletcher the court stated the rule in California to be as follows:

Where one in the conduct and maintenance of an enterprise lawful and proper in itself, deliberately does an act under known conditions, and, with knowledge that the injury may result to another, proceeds, and injury is done to the other as the direct and proximate consequence of the act, however carefully done, the one who does the act and causes the injury should, in all fairness, be required to compensate the other for the damage done. The instant case offers a most excellent example of an actual invasion of the property of one person through the act of another. 80

Thereupon the court after emphasizing the fact that there was here an actual invasion of the plaintiff’s property, i.e., a trespass upon his premises, said in holding the defendant to strict liability:

Any other construction would permit one owner, under like circumstances, to use the land of another for his own purpose and benefit without making compensation for such use. We do not conceive that to be the law. 81

We can note in this case another type of extension of the principle of Rylands v. Fletcher, which was limited on its facts to substances brought on to the defendant’s land. In the Green case the substances were already on or under the land in extraordinary quantity, but the defendant by his activity put them in such a position as to make their escape possible. In other words the defendant did not bring onto his land a dangerous substance, but he used his land in such a way as to release a substance already there.

Many more cases could be discussed but those which have been here

80 Id. at 333, 334.
81 Id. at 334.
set forth are illustrative of the breadth of the doctrine of strict liability as it has been applied by some of the state supreme courts to certain highly useful activities in this country. As we have already several times noted, those courts that are applying the doctrine do so in a manner which gives it greater coverage than that indicated for *Rylands v. Fletcher*. The purport of this for the operator of a nuclear reactor is apparent.

3. *Rylands v. Fletcher* Accepted but Not Applied, in View of the Circumstances of the Particular Case

From the standpoint of atomic enterprise the cases outlined in the preceding subsection would seem to leave but little room for the application of any less rigorous doctrine of liability in the case of radiation injuries than that of *Rylands v. Fletcher*. Indeed an even more severe doctrine may, and in all probability will, in many jurisdictions emerge and be applied in appropriate circumstances. Nevertheless, we should not immediately conclude that all cases of radiation overexposure will result in the imposition of the doctrine. We should now view briefly certain of the rather numerous cases arising in jurisdictions which accept the doctrine of *Rylands v. Fletcher*, but which have declined to apply it in the particular circumstances of the cases at hand. We shall see that in some of the states at least there is developing, as in England, a requirement of “naturalness of use,” or “reasonableness under the circumstances,” or “appropriateness in view of the public benefit derived,” which may serve to mitigate the harshness of strict liability in connection with certain uses of atomic energy.

An illustration of this type of case is *McCord Rubber Company v. St. Joseph Water Company*, an action for damages for the flooding of plaintiff’s cellar with water, thereby destroying the value of a large quantity of merchandise stored therein. The defendant water company supplied water to the plaintiff’s premises and also to the premises of a co-defendant who occupied quarters adjacent to the plaintiff’s. The water pipes entering the co-defendant’s premises were frozen and ruptured filling the co-defendant’s cellar with water which then overflowed into the plaintiff’s cellar ruining his stock of goods. The trial court instructed the jury on a negligence theory. A verdict was rendered for defendant. The plaintiff on appeal contended that the defendant should be held liable regardless of negligence and that the jury should have been so instructed. The plaintiff rested its contention upon *Rylands*

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62 181 Mo. 678, 81 S.W. 189 (1904).
v. Fletcher. However, the court declined to agree. It distinguished the case from Rylands v. Fletcher saying:

There is a wide difference between a great volume of water collected in a reservoir (Rylands v. Fletcher) in dangerous proximity to the premises of another and water brought into a house through pipes in the manner usual in all cities, for the ordinary use of the occupants of the house. Whilst water so brought into a house cannot literally be said to have come in in the course of what might be called in the language . . . of the Lord Chancellor "natural user" of the premises, yet it is brought in by the method universally in use in cities and is not to be treated as an unnatural gathering of a dangerous agent. The law applicable to the caging of ferocious animals is not applicable to water brought into a house by pipes in the usual manner.

The learned counsel for the plaintiff tried their case on the theory that the defendants were negligent, and that is the only theory on which they could have tried it.83

In short, the Missouri court accepted the distinction stated in Rylands v. Fletcher between natural and non-natural uses, regarding only the latter as subject to the application of the doctrine of strict liability.

Two cases involving the coal industry of Pennsylvania, both with exceptionally well-reasoned opinions, illustrate the lines of division which properly can be drawn in the application of the doctrines of strict liability. In the first of these two cases, Pennsylvania Coal Company v. Sanderson,64 it appeared that the plaintiff, Mrs. Sanderson, had bought a tract of land in the city of Scranton bordering on Meadow Brook. The existence of the stream, the purity of its water, and its utility for domestic and other purposes were inducements leading to the purchase. She erected a home and built dams across the brook to form a fish and ice pond and to supply a cistern. Thereafter the defendant, Pennsylvania Coal Company, opened coal veins upstream, and as a result of these operations a large volume of mine water was accumulated and was pumped into Meadow Brook, corrupting the stream to such an extent as to render it totally unfit for domestic use, destroying the fish, corroding pipes and apparatus, and rendering Mrs. Sanderson's equipment useless. A suit was brought to recover damages. The trial court entered a nonsuit on the ground of failure to show negligence. On writ of error

63 Id. at 694, 695.
64 113 Pa. 126, 6 Atl. 453 (1886).
the plaintiff contended that a doctrine of strict liability should be applied. The Supreme Court of Pennsylvania disagreed, stating:

It will be observed that the defendants have done nothing to change the character of the water, or to diminish its purity, save what results from the natural use and enjoyment of their own property. They have brought nothing on to the land artificially. The water as it is poured into Meadow Brook, is the water which the mine naturally discharges; its impurity arises from natural, not artificial causes. The mine cannot, of course, be operated elsewhere than where the coal is naturally found, and the discharge is a necessary incident to the mining of it.

It must be conceded, we think, that every man is entitled to the ordinary and natural use and enjoyment of his property; he may cut down the forest trees, clear and cultivate his land, although in so doing he may dry up the sources of his neighbor's springs, or remove the natural barriers against wind and storm. . . .

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The defendants were engaged in a perfectly lawful business, in which they had made large expenditures, and in which the interests of the entire community were concerned; they were at liberty to carry on that business in the ordinary way, and were not, while so doing, accountable for consequences which they could not control. . . .

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It may be said that . . . when the flow of water is increased artificially or is greater than would result from gravitation alone, the mine owner who causes it is liable for the increased injury; that this may be termed a non-natural use of the land, and the mine owner would be held for any injury, which would be sustained in consequence of this artificial increase in the amount. . . .

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But the defendants, in the case at bar, brought nothing upon the land; they accumulated nothing there; the water was there without any act of theirs, and it was the accumulation of it which they sought to prevent. They were in the natural user of their lands for a lawful purpose, and the discharge of the mine water was an absolute necessity in order to that use of the land. The distinction is obvious, and we cannot see how Fletcher v. Rylands can be supposed to have any application in the consideration of this case.

65 Id. at 145.
66 Id. at 147.
67 Id. at 151.
Then follows a significant sentence from one of the opinions filed in a previous review of the case, as follows:

The trifling inconvenience to particular persons must sometimes give way to the necessities of a great community. Especially is this true where the leading industrial interest of the state is involved, the prosperity of which affects every household in the Commonwealth. 68

We should not fail to take note of the fact that in this last sentence above quoted the court adds to the fact of “natural use” the idea that the balance of convenience for the community is a significant factor in determining whether or not the doctrine of strict liability shall be applied. This doctrine of balance of convenience appears also in other connections, and it may well be that, on balance, certain activities, even though somewhat hazardous, will be permitted in our modern technological age in view of the fact that the best interests of the entire community will be served thereby, notwithstanding the potentialities of the hazardous conditions. The chemical business is illustrative of this aspect of the law in an industrial age. Perhaps some aspects of the atomic business will furnish another illustration.

The second Pennsylvania case presents the other side of the coin. In Robb v. Carnegie Brothers & Company 69 Robb brought an action against Carnegie Brothers to recover damages for injuries to his land arising from the operation of certain coke ovens owned and operated by the defendants. In the course of such operations large volumes of smoke and gas were emitted from the defendants' ovens and carried over to the plaintiff's land. In consequence of this, the plaintiff contended, his timber and fruit trees were killed, and the productiveness of the greater part of his land was diminished to a point of almost total destruction. The earlier Sanderson case was argued by the defendant in support of its claim that, apart from negligence, there would be no liability. With this argument the court disagreed, holding the defendant strictly liable, distinguishing from the Sanderson case on its facts and using the following language:

The coal company (in the Sanderson case) was using its own land in the only manner practicable to it. The harm done thereby to others was the least in amount consistent with the natural and lawful use of it own. . . . But the defendants are not developing the minerals in their land, or cultivating its surface. They have erected coke ovens upon it, and are en-

68 Id. at 162.

gaged in the manufacture of coke. Their selection of this site, rather than some other, is due to its location and to their convenience, and has no relation to the character of the soil, or to the presence or absence of underlying minerals. The selection was no doubt a wise one, quite secluded, and quite convenient to the several mines from which the material was to be obtained for the making of coke; but it was the selection of a manufacturing site, and is subject to the same considerations as though glass, or lumber, or iron had been the commodity produced, instead of coke. The rule in Sanderson's case has therefore no application to the facts of this case. The injury, if any, resulting from the manufacture of coke at this site, is in no sense the natural and necessary consequence of the exercise of the legal right of the owner to develop the resources of his property, but is the consequence of his election to devote his land to the establishment of a particular sort of manufacturing, having no natural connection with the soil or the subjacent strata. 70

Accordingly, the court held that the plaintiff was entitled to damages without proving negligence, but at the same time he was held not entitled to an injunction to preclude the operation of a great industry important to the economy of the region. *Rylands v. Fletcher* was not mentioned by the court although it was cited and relied upon by the plaintiff.

The atomic industry also will be bringing something dangerous upon its premises and the analogy to the *Rylands* case is apparent. Yet at the same time the balance of interests and considerations related to general prosperity and welfare are significant in seeking an answer to the question of the extent of liability to be imposed upon peaceful uses of atomic energy. We are entitled to regard this new form of energy as something that, in due course, will have a pronounced effect upon the welfare of the nation. It must be encouraged so far as it can be done consistently with justice and equity.

Reference may now be made briefly to cases involving damage occasioned by fire. As we have already noted, the basic principles of liability for such damage, brought to this country from England, required proof of negligence, but, nevertheless, from time to time attempts have been made to impose strict liability in connection with such injuries. Two cases decided by the Minnesota Supreme Court are worthy of note. In the earlier case, *Day v. H. C. Akeley Lumber Company*, 71 it appeared

70 *Id.* at 338, 339.
71 54 Minn. 522, 56 N.W. 243 (1893).
that fire had escaped in the form of sparks and cinders from large stacks used in connection with burning sawdust and refuse in the defendant's sawmill. The plaintiff requested an instruction for the jury based upon strict liability. Refusing it the court said:

This request eliminated from the case any consideration by the jury of defendant's alleged negligence, and planted the plaintiffs' right to recover upon grounds independent of such negligence. The fire used by defendant was for manufacturing purposes, and, if used with proper safeguards and without negligence, no liability attached for damages caused by its escape. Any other rule would make the person who uses fire for manufacturing or mechanical or propelling purposes, or even for heating, an insurer against accidents. . . . Doubtless, one who employs the element of fire for manufacturing or mechanical or propelling purposes, or who employs it for any purpose under circumstances which render it especially dangerous to others, is held to the exercise of more care and caution than is one who employs the same element for a less dangerous purpose. Yet the degree of care is the same, for in either case reasonable care, or, what is the same thing, ordinary care, only is required.12

In short, the court declined to apply the doctrine of strict liability to this useful instrumentality.

In the second Minnesota case, *August Berger v. Minneapolis Gaslight Company,*13 to which reference has hitherto been made, the Supreme Court of Minnesota did apply a doctrine of strict liability to the defendant from whose premises quantities of crude petroleum were discharged through the soil to the plaintiff's premises where the damage was caused. The earlier *Day* case was relied upon by the defendant, but the court disposed of it using the following language:

The case of *Day v. Akeley Lumber Company* . . . relied upon by defendant's counsel, is . . . not in point, for it was a case where fire escaped from the defendant's premises, and destroyed the plaintiffs' property, and it was correctly held that there could be no recovery without proof of negligence on the part of the defendant. Fire is, and has been ever since the statute of 6 Anne, c. 31, an exception to the rule that, where a person receives and keeps upon his premises anything not naturally there, the natural tendency of which is, if it escapes, to injure others, he is liable, without reference to any considerations of care and skill on his part. It is difficult to see

12 *Id.* at 527, 528.  
13 *Supra* note 49.
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why fire should have ever been included in the rule, for fire is one of the most beneficent servants of man,—an absolute necessity,—and, from its own nature, does not necessarily injure surrounding persons and things.74

This is strictly in line with American case law dealing with liability for fires occasioned by industrial operations,75 although in most states there are special statutes imposing more or less strict liability upon railroads and sometimes other activities in cases of fire damage.

The foregoing cases are illustrative of the special limitations that are imposed upon strict liability in some of the courts in this country. They reveal a thoroughly reasonable approach—one that may prove to be of interest in connection with problems of radiation liability that are likely to arise in the future. We shall discuss their possible application later in this chapter.

4. Special Cases—Blasting and X-Rays

Blasting cases. The courts may, when required to determine the liability of a reactor operator, look for precedent to cases of handling explosives and blasting operations. In a recent article,76 Harley J. McNeal of the Cleveland Bar notes that the majority of the current decisions result in absolute liability, but he calls attention to the confused state of the law in connection with such cases. He finds that questions of negligence, nuisance, and absolute liability are thoroughly intermingled, that Rylands v. Fletcher is applied in some states in blasting cases, but not in others, that fine spun distinctions are being based upon differences between direct and indirect trespasses to adjoining property, that some courts refuse absolute liability for considerations related to the social utility of blasting as an agency used for the benefit of mankind, and that liability is often dependent upon the location of the blasting and the foreseeability of damage with respect to other persons and property. He points out that the balance of equities as revealed in current case law tips towards the blaster in direct proportion to the distance of his activity from the major population centers, and hence in inverse ratio to the likelihood of causing serious harm should a mishap occur.

Mr. McNeal divides the cases into three categories: (1) those in which strict liability is enforced for all foreseeable harm, (2) those in

74 Id. at 300, 301.
75 See 2 Harper & James, Torts §14.15 (1956); see also Prosser, Torts 326-328 (2d ed. 1955).
which no liability is imposed except for negligence, and (3) a rather indefensible intermediate position that blasters are to be held strictly liable for their activities if the explosions cause direct trespass to adjacent land by casting rocks or other debris upon it, but not if the same explosions cause harm by vibration or percussion. The latter are deemed indirect in their effect and not trespasses in the historical sense. The principal purport of the blasting cases so far as the atomic energy problem is concerned is to place emphasis upon the location of the activity and its relationship to foreseeable harm on the one hand, and direct trespasses to valuable property on the other.

Certain courts in blasting cases have reached a result of absolute liability through application of the doctrine of nuisance. This is true, for example, in New York state where in fact the doctrine of Rylands v. Fletcher has been disapproved. In Vincent v. Hercules Powder Company the defendant, a munitions plant, suffered a devastating explosion which damaged the plaintiff's home situated at a considerable distance. The defendant contended that it should be protected from strict liability because of the provisions of a state statute which fixed the relative locations of powder magazines, the quantity which each might contain, and their distances from the buildings, railroads, and highways. The defendant had complied with this statute and argued that an act which the law sanctions and authorizes cannot be deemed a nuisance, although it may cause damage to individual rights on private property. The analogy to the licensed atomic reactor is apparent. Notwithstanding the argument of the defendant, however, the court held the defendant strictly liable on a theory of nuisance and, in addition, citing Richards v. Washington Terminal Company, declared that under the Due Process Clause of the Constitution, the legislature, although it might legalize what otherwise would be a public nuisance could not confer immunity from suit on the theory of private nuisance such as to amount, in effect, to a taking of private property for public use.

So far as atomic operations are concerned we can draw some general conclusions from the blasting and explosive cases which in fact indicate a clear leaning and trend toward strict liability in most of the state courts in this country. Conclusions that may be stated with assurance are as follows:

1. The trend of the more recent decisions reveals an increasing number of courts moving in the direction of absolute liability for damages resulting from blasting.

2. Even in those jurisdictions where negligence must be proved, it would appear that the degree of negligence required to be proved in such cases is slight; or, in reverse, that the standard of due care is correspondingly high,—more so than in situations involving less hazardous activities.

3. There are a few courts, possibly seven or eight in number, that continue to adhere to the distinction between direct and indirect trespasses, imposing absolute liability in blasting cases only for the former.79

4. It is generally held that no recovery of damages can be expected for injuries so remote that they cannot reasonably be foreseen or anticipated.80

5. As distinguished from the blasting cases, the storage of explosives in quantity in places adjacent to crowded areas, if followed by an explosion, is quite likely to result in the individuals involved being held absolutely liable for all injuries inflicted upon others, regardless of negligence or failure to exercise due care.81

One cannot avoid a feeling that, in view of the current trend in the blasting and explosive cases, they are certain to be used in support of strict liability in the event of a reactor burn-up, which although not an explosion in a technical sense would have many similar characteristics. **X-ray cases.** Before leaving the subject of liability under the doctrine of *Rylands v. Fletcher* we should also take account of the numerous cases involving injuries by overexposure to X-rays. X-ray machines subject persons engaged in operating them, as well as persons undergoing treatment or examination by means of them, to two primary dangers, namely, the possibility of harm from the X-rays themselves and also from the powerful electric currents necessary to the production of the X-rays. It is generally held that the principles of law normally applicable to physicians and surgeons, *i.e.*, that a medical practitioner is subject to no more severe requirement than the duty of exercising reasonable skill and care in his patient's behalf, is also applicable to an action against a physician for X-ray injuries to patients.82

The same result has been reached in connection with injuries resulting from industrial uses of X-ray machines. For example, in *Rakowski v.*

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79 See cases cited in Prosser, Selected Topics on the Law of Torts 161, n. 175 (1953).
80 See cases cited in McNeal, *supra* note 75 at 132, n. 4.
81 See Exner v. Sherman Power Construction Company, 54 Fed. 2d 510 (1931), and many cases cited in Anno., 80 A.L.R. 692. Judge Augustus Hand in the Exner case said of those who store explosives or engage in blasting "When a person engages in such a dangerous activity, useful though it be, he becomes an insurer."
82 See many cases cited in 41 A.L.R. 2d pp. 329 et seq.
Ray-Bestos-Manhattan, Inc.\textsuperscript{83} the court, speaking of the duty of an industrial employer toward an employee engaged in making X-ray examinations to disclose defects in manufactured products, pointed out that liability must be based upon negligence as distinguished from strict liability, but that a high degree of care, higher than in the ordinary affairs of life, must be exercised. A more extensive and inclusive measure of liability is achieved by enlarging the duty to exercise reasonable care, rather than by applying a doctrine of absolute liability.

The negligence doctrine as distinguished from strict liability has been applied to the use of X-rays by beauty specialists. \textit{Greenberg v. Post} \textsuperscript{84} was an action for X-ray burns sustained by the plaintiff while undergoing treatment by a beauty specialist for the removal of superfluous hair from her face. The court ruled that the specialist owed the plaintiff only a duty to exercise due care. She was liable only if the plaintiff proved negligence.

It is true that in most of these X-ray cases there was a contractual relationship between the operator of the machine and the victim, and this may constitute a partial distinguishing fact based upon a claim of assumption of risk by the injured party. This fact, however, by no means precludes the courts from imposing a doctrine of strict liability if they should deem the social pressures or other considerations to be sufficiently compelling. Indeed, patients do not intend to assume the burden of injuries whether accidental or otherwise, and hence the contractual relationship should not be of significance.

In actions involving X-ray machines it is conventionally held that the burden of proof rests upon the plaintiff, and that he must not only show the defendant's negligence, but also that the negligence proximately caused the harm. On the side of the plaintiff, applicability of the doctrine of \textit{res ipsa loquitur} is frequently urged. The courts are in disagreement on the point, but there have been many decisions in which the doctrine has been held available to the plaintiff, thus making it necessary only for him to prove that he received an injury from overexposure to the X-ray apparatus, placing upon the defendant the burden of going forward with proof that he exercised due care under the circumstances. On the other hand, the defendant can be aided by proof of contributory negligence or by establishing an unusual susceptibility of the plaintiff to injury from X-ray.

From the standpoint of users of radioactive substances the important


\textsuperscript{84} 155 Fla. 135, 19 S.2d 714 (1944).
conclusion to be gleaned from the X-ray cases is the fact that the doctrine of absolute liability is not applied, coupled with the further fact of similarity of X-rays to other radioactive emanations so far as injury to man is concerned. Whatever may be the applicability of the doctrine of *Rylands v. Fletcher* to reactor operators and others who make use of the more highly dangerous fissionable materials, one can properly urge, on the basis of analogy, that the theory of liability imposed in the X-ray cases, namely, the requirement of the proof of negligence, should also be applied to the numerous medical, biological, agricultural, and industrial uses of radioisotopes. These are, after all, merely utilization of sources of ionizing radiation, varying in intensity and often even less hazardous than the X-rays given out by high voltage X-ray machines.

5. Concluding Observations with Respect to the Doctrine of *Rylands v. Fletcher*

Before we proceed to the next phase of the subject matter, we may ask ourselves what conclusions should be drawn from our examination of the cases discussing the doctrine of *Rylands v. Fletcher*, particularly insofar as they may apply to injuries caused by radioactive substances. The first impression that one receives is that the English decisions present a reasonably precise and satisfactory pattern, but that there is utter confusion in the principles developed by the American courts. Under the English decisions there must ordinarily be a "dangerous substance" brought by the defendant to his premises or at least brought under his control, the activity must involve a "non-natural use," and there must be "an escape," not caused by an "act of God," or a "third party," or the plaintiff himself, which results "proximately" in damage to the plaintiff or to his property.

We in the United States inherit these specifications of the doctrine and apply them variously in different parts of the country. Moreover, we interject in varying degrees in different courts at least three significant corollaries to the English rule as above stated. Each of these corollaries involves a vague standard not easily applied.

*First*, the utility of the enterprise, in relation to the economy or general welfare of the community, has an important bearing upon whether or not the doctrine of strict liability shall be applied. This may be nothing more than a different approach to "non-natural user," but, in effect, it brings forth a "balance of convenience" doctrine under which many courts resort to equity principles originating in private nuisance cases to resolve strict liability problems.
Second, in a not inconsiderable number of cases the escaping substances, though somewhat "dangerous," create a relatively minor degree of hazard and, accordingly, the courts require proof of negligence rather than apply strict liability. Thus, in connection with fire which escapes, explosions which result in damage by concussion or vibration, X-rays which over-irradiate the victims in medical, industrial, or commercial applications, and other "lesser danger" instances, courts in general adhere rather consistently to conventional negligence doctrines.

Third, the rule of strict liability can be and sometimes is approached by the courts by using and extending the techniques of the law of negligence rather than by resort to Rylands v. Fletcher. The standard of care is raised to require "a very high degree of care" or even "the highest degree of care." Thus, the defendant, though he is not made an absolute insurer, is obliged to exercise such a high degree of care that the applicable principles do not fall far short of ultimate liability without fault.

This third point merits further elaboration for it has implications of especial concern to those who engage in atomic activities. By way of illustration consider the rather unique and striking circumstances in Chase v. Washington Water Power Company.\(^8\) In this case an accident that was almost fantastic resulted in the burning of plaintiff's barn and wheat fields. Two chicken hawks, fighting while in flight, struck and short circuited the defendant's high tension wire, completing contact through a guy wire attached to one of the supporting towers. In addition, the weight of the hawks on the guy wire caused it to sag enough to contact a barbed wire fence connected with the plaintiff's barn and the accident resulted. The court, holding the electric company liable, said that was bound to exercise "a very high degree of care, indeed the highest that human prudence is equal to." This comes very close indeed to strict liability under the Rylands doctrine, reached by a different route—one that well merits attention in connection with our discussion of radiation injuries.

From all of the foregoing it becomes abundantly clear there is no single or simple formula of liability that will dispose of all of the cases from all of the states or even the majority of the cases from a majority of the states. Moreover, it would be a completely unacceptable oversimplification to attempt to set forth in summary form on the basis of existing case law what the effect of the Rylands doctrine is likely to be when atomic energy cases come before the courts and plaintiffs seek to impose strict liability. Finally, if certainty in the law is to be obtained,

\(^8\) 62 Idaho 298, 111 P.2d 872 (1941).
it must be reached in some other way than through common law methods of evolution of the *Rylands* doctrine by judicial decision.

E. Strict Liability Under the American Law Institute Doctrine

The Restatement of the Law of Torts, published in 1938 under the auspices of the American Law Institute, purports to present a comprehensive and orderly statement of the common law of the United States, including not only the law developed by judicial decision, but also that which has grown from the application by the courts of generally accepted statutes that have been enforced for long enough periods to have become thoroughly imbedded in the law of the land. Since the Restatement may be resorted to by some courts in this country in deciding cases arising from radiation injuries, we must examine its scope and effect.

With respect to ultrahazardous activities in the law of torts, the Restatement expresses its principles in six short sections, which for the sake of complete understanding will be quoted in full as follows:

§519. *Miscarriage of Ultrahazardous Activities Carefully Carried On.* Except as stated in §§521-4, one who carries on an ultrahazardous activity is liable to another whose person, land or chattels the actor should recognize as likely to be harmed by the unpreventable miscarrying of the activity for harm resulting thereto from that which makes the activity ultrahazardous, although the utmost care is exercised to prevent the harm.

§520. *Definition of Ultrahazardous Activity.* An activity is ultrahazardous if it

(a) necessarily involves a risk of serious harm to the person, land or chattels of others which cannot be eliminated by the exercise of the utmost care, and

(b) is not a matter of common usage.

§521. *Ultrahazardous Activity Carried On in Pursuance of a Public Duty.* The rule stated in §519 does not apply if the activity is carried on in pursuance of a public duty imposed upon the actor as a public officer or employee or as common carrier.

§522. *Contributing Actions of Third Persons, Animals and Forces of Nature.* One carrying on an ultrahazardous activity is liable for harm under the rule stated in §519, although the harm is caused by the unexpectable

(a) innocent, negligent or reckless conduct of a third person, or
(b) action of an animal, or

(c) operation of a force of nature.

§523. Participants in Ultrahazardous Activities. The rule stated in §519 does not apply where the person harmed by the unpreventable miscarriage of an ultrahazardous activity has reason to know of the risk which makes the activity ultrahazardous and

(a) takes part in it, or

(b) brings himself within the area which will be endangered by its miscarriage

(i) without a privilege, or

(ii) in the exercise of a privilege derived from the consent of the person carrying on the activity, or

(iii) as a member of the public entitled to the services of a public utility carrying on the activity.

§524. Effect of Contributory Fault.

(I) A plaintiff is not barred from recovery for harm done by the miscarriage of an ultrahazardous activity caused by his failure to exercise reasonable care to observe the fact that the activity is being carried on or by intentionally coming into the area which would be endangered by its miscarriage.

(2) A plaintiff is barred from recovery for harm caused by the miscarriage of an ultrahazardous activity if, but only if,

(a) he intentionally or negligently causes the activity to miscarry, or

(b) after knowledge that it has miscarried or is about to miscarry, he fails to exercise reasonable care to avoid harm threatened thereby. 88

In an accompanying commentary the authors of the Restatement point out by way of illustration that the term “ultrahazardous” includes such items as the operation of airplanes, the storage and transportation of explosive substances, and the drilling of oil wells. They also include blasting for clearing woodlands and otherwise. On the other hand, they do not include the ordinary automobile because of the fact that it is a matter of “common usage” and thus is excluded by reason of Section 520(b).

The question which confronts us is whether or not under the Restatement doctrine any or all phases of atomic enterprise will be included within the range of strict liability. Should we conclude that all uses of atomic energy “necessarily involve a risk of serious harm which cannot

88 See 3 Restatement, Torts, ch. 21, pp. 41-53.
be eliminated by the exercise of the utmost care”? Or may we argue with good reason that certain uses of less dangerous radioisotopes fall on the other side of the line? Or may we so interpret the phrase as to exclude certain types of reactors or certain processes involving the handling of critical quantities of fissionable materials when the reactors or processes become well established, with well understood technology and good safety records? Do they then become “matters of common usage”? What is to be deemed “common usage” under the circumstances?

As Dean Prosser has pointed out so clearly, the Restatement doctrine is more inclusive than the rule of Rylands v. Fletcher in at least one respect, for by ignoring the effect of the place where the activity is carried on and its surroundings; even a location far removed from population centers would be included. Also it falls short in another respect, namely, in the insistence placed upon the necessity of extreme danger and the impossibility of eliminating it with all possible care. This sharply limits the list of “dangerous substances.” Accordingly it would follow that, under the Restatement, the fact that an atomic reactor is located in the middle of a desert would not constitute a defense, but, on the other hand, a cobalt 60 source used for the irradiation of food or drugs might not be deemed so extremely dangerous as to warrant the imposition of strict liability. The Restatement doctrine was not formulated until 1938, and thus far only a very few cases have been decided in which it has been interpreted and applied. In California, for example, the courts seem to have adopted the Restatement rule, possibly for the reason that they have in at least three cases expressed disapproval of the rule of Rylands v. Fletcher and they are seeking some basis for granting relief in proper cases. Luthringer v. Moore is illustrative. There the California court took advantage of the Restatement and applied it to impose strict liability in a case involving the use of hydrocyanic acid gas for fumigating operations on certain premises. The gas escaped into an adjoining building where it injured the plaintiff. The court regarded the use of the gas under the circumstances as “a hazardous activity,” holding that it was “perilous and likely to cause injury even though the utmost care is used” and that “the use of it, under these circumstances [i.e., the circumstances of the case] is not a matter of common usage within the meaning of the term.” Thus the Restatement paved the way to the plaintiff’s recovery.

87 Prosser, Selected Topics on the Law of Torts 158 (1953).
88 31 Cal. 2d 489, 190 P. 2d 1 (1948).
On the other hand, in another California case, *Guy F. Atkinson Co. v. Merritt, Chapman & Scott Corporation*, the federal court, following what it believed to be the law of California, declined to apply either the *Rylands* case or the Restatement doctrine to a case of water damage caused to plaintiff’s property by the failure of a cofferdam built by the defendant. There was no charge of negligence involved, and the cofferdam failed because of flood conditions. Refusing to find ground for imposing strict liability the court said with respect to the Restatement doctrine:

This court does not believe that this doctrine has been or should be extended to damage by water under the circumstances set forth in the complaint.

The Oregon Supreme Court relied upon the Restatement doctrine in *Bedell v. Goulter*, which involved injuries to real property caused by concussion and vibration from blasting operations. The court quoted Sections 519 and 520 of the Restatement and concluded that “blasting is ultrahazardous because high explosives are used.” Continuing, the court said, “The one who causes the injury must be held to engage in the dangerous activity at his peril ‘because it is impossible to predict with certainty the extent or severity of its consequences.’”

In another blasting case the Supreme Court of Pennsylvania reached a like result, also relying upon the Restatement. In *Federoff v. Harrison Construction Co.* it appeared that the plaintiff’s house, distant some 1,600 feet from the defendant’s blasting operations, was damaged by vibration and concussion. The defendant was held liable. The court, relying primarily upon the Restatement, said:

We think the record supports a finding that the damage was caused by the blasting, thus bringing the case within the rule stated in Section 519 of the Restatement of Torts: that, subject to exceptions not now material, “one who carries on an ultrahazardous activity is liable to another whose person, land or chattels the actor should recognize as likely to be harmed by the unpreventable miscarriage of the activity for harm resulting thereto from that which makes the activity ultrahazardous, although the utmost care is exercised to prevent the harm.”

The Restatement principle has also been applied in the state of Connecticut. In *Whitman Hotel Corp. v. The Elliott & Watrous Engineer-

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90 Id. at 722.
91 199 Ore. 344, 261 P.2d 842 (1953).
93 Id. at 183.
ing Company the court relied upon the doctrine in a case involving damage caused by dynamite blasting within the city of Norwich, the damage again having been caused by vibrations of the earth set in motion by the activities of the defendant. In the absence of proof of negligence the court nevertheless held the defendant liable, referring to Sections 519 and 520 of the Restatement and stating:

The rule [i.e., the Restatement rule] is adhered to in Connecticut. It has been stated as follows: A person who uses an intrinsically dangerous means to accomplish a lawful end, in such a way as will necessarily or obviously expose the person of another to the danger of probable injury, is liable if such injury results, even though he uses all proper care.95

The foregoing brief examination of the cases is a summary of the rather limited number of judicial decisions in which the Restatement doctrine has been directly applied in support of the imposition of absolute liability. Only twenty years have elapsed since the publication of the Restatement, and it is therefore not surprising that the number of decisions based upon it is not great.

There have been several opinions in which the courts have cited the Restatement doctrine with general approval, but have declined to apply it to the facts of the particular cases at hand. For example, in Smith v. Okerson an action was brought to recover the cost of fodder which the plaintiff purchased to feed his cattle after the defendants, while spraying their potato crop with arsenic solution, had rendered the plaintiff's alfalfa crop useless. It appeared that some of the arsenic spray had drifted to the plaintiff's adjoining fields. The court, stating that the New Jersey courts have declined to follow Rylands v. Fletcher, also observed that it was doubtful if they would go as far as indicated by the Restatement rule. Section 519 of the Restatement was cited, the court saying:

The prevailing American rule admits liability in the absence of negligence, only in connection with an activity that is not a matter of common usage and that necessarily involves a risk of serious harm to others, and not even in such case if the activity is carried on in pursuance of a public duty. . . . I doubt whether in New Jersey we go even that far.

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94 137 Conn. 562, 79 A.2d 591 (1951).
95 Id. at 565.
I conclude that the defendants are not answerable to plaintiff unless they were negligent in the spraying of the arsenic solution.\textsuperscript{97}

The fact of "common usage" of arsenic solution spray for potato fields would have saved the day for the defendant in the absence of proof of negligence, but unfortunately for the defendant in this particular case the court found evidence of negligence on the basis of which the plaintiff recovered a judgment for damages.

Again, in a Delaware case, Fritz v. E. I. DuPont de Nemours & Co.\textsuperscript{98} an action was brought against the company for personal injuries occasioned when the plaintiff was overcome by a concentration of chlorine fumes which escaped from a plant operated by the defendant. The court, although urged to do so, declined to apply the doctrine of absolute liability either under Rylands v. Fletcher or under the Restatement, stating its position as follows:

In the present case it was not unlawful for DuPont to have on its premises chlorine gas, nor was its presence there unusual, and it cannot be said that the mere possession of chlorine gas by DuPont without more was dangerous per se in the light of recognized industrial use. To say that any corporation or individual possessing or using dangerous substances upon its or his premises should be held liable as an insurer in the event of injury to others by reason of the mere possession, use, or escape thereof would be but to strangle corporate and individual enterprise in many well recognized fields of endeavor. If the rule of absolute liability is to be adopted in this State, it seems to me that its application should be confined to those operations which have connected with them a history of doing injury to others or the destruction of their property, and only in those cases where a nuisance by reason of their presence or use can be established.\textsuperscript{99}

Chlorine gas would seem to be a reasonably dangerous commodity, perhaps fully as dangerous as some forms of radioisotopes. Yet the court, persuaded in part by considerations of relative utility—a balance of convenience—reduced the scope of the Restatement doctrine as well as Rylands v. Fletcher to uses having a "history of doing injury."

Again, in South Dakota, in Midwest Oil Company v. City of Aberdeen\textsuperscript{100} the court, in the absence of proof of negligence, declined to apply

\textsuperscript{97} Id. at 564, 565.
\textsuperscript{98} 6 Terry 427, 75 A.2d 256 (1950).
\textsuperscript{99} Id. at 437, 438.
\textsuperscript{100} 69 S.D. 343, 10 N.W.2d 701 (1943).
the Restatement doctrine to impose absolute liability in a suit for damages inflicted upon plaintiff's gasoline filling station by a break in the defendant city's water main. In regard to the applicability of the Restatement doctrine the court said:

The present facts disclose water being sent through a ten-inch main in the manner now generally accepted for the purpose of furnishing a water supply to city dwellers. We think it clear that such a distribution of water does not constitute an ultra-hazardous activity. The definition of an ultrahazardous activity as set forth in Section 520 in the Restatement of the Law of Torts is as follows: [Thereupon Section 520 is repeated.]

Water mains are universally in use in cities, and to hold that a proper and reasonable use of such mains "necessarily involves a risk of serious harm to the person, land or chattels of others" would be contrary to the experience of at least several generations.101

This is, of course, quite like the result that would be reached by most courts in applying the doctrine of *Rylands v. Fletcher*.

By way of conclusion, we may suggest that the doctrine of the American Law Institute Restatement of the Law of Torts, though not yet widely applied, is, at least, a worthy attempt to achieve precision and definiteness in the field of absolute liability. At the same time, although there is not enough case law as yet available to warrant reaching a definite conclusion on the matter, it would seem likely that the Restatement would not accomplish the desired result of bringing order out of chaos in strict liability. In the twenty years in which it has been available the courts have been inclined to ignore it and to rely upon previously developed common law principles derived from *Rylands v. Fletcher*. So, at the very most, we can only say that the Restatement gives us one more doctrine of occasional utility to be added to the welter of confusion under American law, and that, up to the present time at least, it has not made a significant contribution to the solution of strict liability problems.

Moreover, there are several good reasons why the Restatement doctrine is not likely to contribute much in the future to the solution of problems of liability for radiation injuries. Not only has it not as yet enjoyed wide acceptance by the courts in this country, but, more importantly, its rigid coverage runs counter to the flexible application of *Rylands v. Fletcher*, which is current practice in this country. Further-

101 *Id* at 347
more, it may be said with accuracy that certain courts both in England and the United States have receded somewhat from their earlier enthusiasm for the *Rylands* doctrine. Finally it should be noted that the language of Sections 519 to 524 of the Restatement departs rather markedly from the patterns of liability for radiation injuries that are currently being developed by statute in other important countries—in England, Germany, Switzerland, and elsewhere in the world. Both the scope of the coverage and the specified exceptions differ radically from current thinking elsewhere. It is far more likely that European influence will be effective than that the American Law Institute doctrine will be accepted even in the United States, for the former is better and more realistically fitted to the facts of radiation injuries. The foreign proposals will be examined later in this chapter.

F. Private Nuisance Doctrines—Absolute Nuisance

1. Nuisance Doctrines and Remedies

In order to complete the review of American doctrine involving or related to absolute or strict liability we must give brief consideration to a considerable group of cases disposed of either wholly or in part under the law of private nuisance. Of especial interest is a doctrine that has been developed which for want of a better name has often been called “absolute nuisance,” or “nuisance *per se,*” although the addition of the words “absolute” or “*per se*” cannot be regarded as either significant or definitive.

By way of definition we may say that, in general, a private nuisance may result whenever there is an interference with the use or enjoyment of the land of the plaintiff occasioned either by the intentional misconduct of the defendant, or conduct which is negligent, or conduct with respect to which the courts are inclined to apply strict liability without proof of either intent or negligence. It is this third category with which we are primarily concerned. A nuisance case normally is disposed of by a petition in equity in which the plaintiff seeks an injunction to restrain continuance of the nuisance and perhaps asks damages as well. However, the decisions reveal that the courts of law also, in actions in which damages alone are sought, frequently refer to nuisance principles and apply them in reaching the conclusion that the circumstances call for the imposition of the equivalent of an absolute liability.

102 We are not concerned with public nuisance which is, in effect, a crime and is punishable as such.
In considering the possible relation of nuisance doctrines to liability for radiation injuries we should take account of two classes of cases. The first includes cases in which the defendant intentionally maintains an activity in a neighborhood where in normal operation it causes annoyance or injury to occupants of property in the vicinity, e.g., the operation of a plant which gives off sulphuric acid fumes, or, in the atomic field, possibly radioactive gases. The second covers cases of unduly hazardous operations which, in normal and successful operation cause no harm whatsoever, but if an accident takes place trouble ensues, e.g., storage of nitroglycerin, or, in the atomic field, operating a reactor or a fuel processing plant. In both instances the courts work out and apply a "balance of convenience" doctrine with the result that no nuisance is found and no liability is imposed apart from negligence, if the activity is reasonable in relation to its location, its proximity to population, its economic worth, and other related factors. If otherwise, however, the court will enjoin or will give judgment for damages, or will afford both such remedies as the equities may require. It is apparent that such a doctrine will embrace many cases that would fall within the scope of Rylands v. Fletcher as currently interpreted, and therefore the two doctrines are concurrent in effect to a considerable degree. We need not be surprised, therefore, when we find some courts using the two doctrines interchangeably, or perhaps using both in the same opinion. Doubtless, defendants in radiation accident cases will encounter the double-barrelled approach with considerable frequency in the years to come.

For example, we have previously referred to the case of Berry v. Shell Petroleum Company, an action for damages in which the court based its conclusion of absolute liability both upon a theory of nuisance and also upon the precedent of Rylands v. Fletcher. Many such cases could be cited and, indeed, several of the other cases previously referred to in this chapter reveal more or less of the same dual reasoning.

It is also apparent that many courts which purport to reject the principle of Rylands v. Fletcher do in fact reach like conclusions under the name of absolute nuisance. As stated by Dean Prosser:

There is in fact no case applying Rylands v. Fletcher which is not reasonably duplicated in all essential respects by some American decision which proceeds on the theory of nuisance.¹⁰⁴

¹⁰³ Supra note 43.
¹⁰⁴ Prosser, Selected Topics on the Law of Torts 170 (1953).
A wealth of authority could also be cited in support of the foregoing statement, but the following will serve as illustrative and typical cases. In none of them was there a showing of either negligence or wrongful intent. In *Longtin v. Persell*[^105] the plaintiff recovered damages in an action involving use of explosives producing vibrations which were held to constitute an actionable nuisance; in *Holman v. Mineral Point Zinc Co.*[^106] the plaintiff was refused an injunction but was awarded damages in an action to abate as a nuisance and to recover damages for losses caused by defendant's plant emitting sulphuric acid fumes; in *Bartell v. Ridgefield Lumber Co.*[^107] the plaintiff also recovered damages but was denied an injunction asked by him to prevent the operation of defendant's saw mill which emitted sparks, smoke, and soot; in *Whittemore v. Baxter Laundry Co.*[^108] the plaintiff brought an action to restrain the storage of inflammable liquids on the defendant's premises adjacent to those of the plaintiff, and under the circumstances the court held that an injunction should issue. In the *Holman* and *Bartell* cases, in which the injunction was denied, the court based its action on balance of convenience under the particular circumstances in each instance. In the *Whittemore* case, the injunction was issued, but actual construction had not yet commenced, thereby illustrating a phase of the nuisance remedy not available under the *Rylands* doctrine. Other cases that might be cited involve percolating water, storage of explosives, fireworks, oil wells, mining operations, the accumulation of sewage, and bad odors, noxious gases, smoke, dust, etc. In other words, the cases in which American courts have resorted to an absolute nuisance doctrine as the basis of strict liability cover much the same territory as that covered by cases directly based upon *Rylands v. Fletcher* and the doctrines developed thereunder.[^109]

Professor Warren Seavey, an eminent authority in the field of tort law, is inclined to criticize the theory underlying these cases and to feel that this broad application of the doctrine of nuisance is unjustifiable. He asserts that it should not be applied to accidents arising from lawful conduct but only in cases involving tortious conduct.[^110] He main-

[^105]: 30 Mont. 306, 76 Pac. 699 (1904).
[^106]: 135 Wis. 132, 115 N.W. 327 (1908).
[^107]: 131 Wash. 183, 229 Pac. 306 (1924).
[^109]: Dozens of other cases are cited in Prosser, Selected Topics on the Law of Torts 166-171 (1953).
[^110]: See Seavey, supra note 7.
tains that some *wrongful* act, either intentional or negligent, should be established as a proper basis of the charge of nuisance. He says:

The primary function of nuisance as a separate topic in the law of torts is to mark out the area within which it is unreasonable for one to subject his neighbors or the public to noise, vibrations, fumes, immorality or the risk of physical harm. Where there is a nuisance because of the risk of harm, nuisance overlaps negligence. But its rules are neither esoteric nor eccentric; they follow the normal pattern of tort principles. A few courts have been misled by incautious statements, especially statements dealing with harm resulting from a public nuisance. But the results reached by those courts are not representative. In general it may be said that legal fault is a requisite for nuisance and that contributory negligence is a defense to an action for harm caused by a nuisance resulting from merely negligent conduct, whether or not the physical condition which was the cause of the harm was intended.\(^\text{111}\)

Mr. Seavey is undoubtedly right so far as the historical origin of the doctrine of nuisance is concerned. But the plain fact is that the American courts have, in large numbers of cases, ignored the historical distinctions and have spoken in terms of nuisance when they have wished to impose strict liability in situations where the activity itself was not illegal either by reason of wrongful intent or negligence. This being the case, we can only take account of these decisions as existing factors of importance in the current juristic scene. Therefore, we must perforce recognize the existence of an absolute nuisance doctrine when we seek to appraise the likelihood of strict liability being imposed upon the atomic industry of the future.

2. Some Special Features of Absolute Nuisance as Compared with *Rylands v. Fletcher*

We have already called attention to the fact that, under the doctrine of *Rylands v. Fletcher*, the location of the dangerous instrumentality becomes important, for if it is located at a sufficient distance from others who might conceivably be injured by it, or if, because of the customs of the community or the nature of the activity, it is appropriate to the place where it is maintained in the light of the character of that place and its surroundings, no strict liability will ensue. The doctrine of nuisance embraces an equivalent line of reasoning, and that which might

\(^{111}\text{Id. at 995, 996.}\)
be deemed a nuisance in a congested community would not be so regarded if located in a desert miles removed from human habitation.

With respect to another feature, however, there would seem to be an important difference between *Rylands v. Fletcher* and the doctrines of nuisance. The *Rylands* theory focuses primarily upon the "dangerous nature" of the instrumentality, and if it escapes and it "does mischief," strict liability is imposed without further question. On the other hand, the nuisance doctrine, in accord with the general approach of courts of equity where most of the cases arise, is more likely to produce decisions based upon a balance of public convenience or a balance of interest between the plaintiff and the defendant. The court of equity has discretionary authority, particularly (although not exclusively) used in connection with issuing the injunction. Intangible factors, including among others a high measure of social utility or economic value, may serve to exculpate an activity that otherwise would be deemed a private nuisance. The fact that the strict liability cases which we are now considering normally (although not always) have arisen in courts of equity has given rise to the idea of balancing of equities. It should be observed that this element not only serves to mitigate undue hardship, a worthy consideration, but also it serves to create a decidedly vague and indeterminate standard to be applied. Under such a theory the lines of demarcation between strict liability and otherwise become shadowy indeed.

One other point of interest is the distinction that is sometimes asserted to the effect that in order to constitute a nuisance the defendant's conduct must result in a *continuing or recurring* damage to the plaintiff, whereas the doctrine of *Rylands v. Fletcher* contains no such limitation and a single event may give rise to liability. This distinction finds some justification in American decisions for most of them involve situations in which the damage has been a continuing one. It is a fact, however, that courts have, in a number of instances, found an absolute nuisance to exist when but a single damaging event has taken place, such as a single accidental explosion setting off a powder magazine or the setting off of a single charge of blasting powder.\(^{112}\) Accordingly, we may conclude that the singleness of the act is no absolute bar to resort to the application of the nuisance doctrine, although the duration or recurrence of the interference with plaintiff's property is always a factor to be weighed in determining whether or not the damage is sufficiently substantial to constitute a nuisance.\(^{118}\)

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\(^{112}\) See Heeg v. Licht, 80 N.Y. 579 (1880), and Patrick v. Smith, 75 Wash. 407, 134 Pac. 1076 (1913). Also see the discussion of the subject in Prosser, Torts 397 (2d ed. 1955).

\(^{118}\) See 4 Restatement, Torts 245, Comment on §827.
Wholly apart from the fine points of refinement relative to the precise scope of the doctrine of absolute nuisance and the remedies which it affords, we must conclude that in a general way the doctrine parallels that of *Rylands v. Fletcher*, and that courts in the United States are inclined to use the two doctrines more or less interchangeably and even simultaneously, although not coextensively. As Dean Prosser has pointed out, although the two remedies have a large area in common, the nuisance remedy is primarily directed toward providing redress for injuries to land, and does not cover personal injuries not connected with land. Moreover, it can lead to the issuance of an injunction as well as an award of damages. On the other hand, *Rylands v. Fletcher*, strictly a damage remedy, reaches personal injuries but does not, so far as the decisions reveal, reach certain relatively non-hazardous types of injury, such as those arising from noise, for example, which might conceivably be subject to attack under the nuisance doctrine. It is clear that both doctrines must be taken into account in dealing with radiation hazards.

G. Defenses to Strict Liability—Defendant’s Contributory Negligence or Assumption of Risk—Third Party Actions

We have hitherto noted that the rule of *Rylands v. Fletcher* has been held not to apply in case the escape of the dangerous substance arises from plaintiff’s contributory negligence, or from an act of God, or of a third party stranger, or if its activity is specifically sanctioned by statutory authority. We have also noted that the American Law Institute Restatement specifically provides for exemption in case of activities carried on in pursuance of a public duty (Restatement, Sec. 521), in case of an assumption of risk by the person harmed (Sec. 523), in case of action by the person harmed which causes the dangerous activity to miscarry (Sec. 524), or, after knowledge that the activity has miscarried or is about to do so, in case he fails to exercise reasonable care to avoid harm (Sec. 524).

It is desirable, before concluding this discussion of strict liability under common law doctrines, to give further brief consideration to certain of these defenses. They are often resorted to in connection with ordinary actions based upon negligence. This is true of contributory negligence, assumption of risk, and contributing third party action. These defenses may be pleaded and relied upon in actions for damages based upon strict liability for radiation injuries. Are they to be deemed valid

114 See text at notes 25-28 supra.
115 See text at note 86 supra.
defenses when the action is based upon the *Rylands* theory, or the Re­
statement, or the doctrine of nuisance? Are they valid under all circum­
stances, or, if not, to what extent may they be relied upon?

**Defendant's Contributory Negligence and Assumption of Risk.** It is
frequently said that contributory negligence is not a defense in cases of
strict liability whether such liability is based upon *Rylands v. Fletcher*
or upon a doctrine of nuisance. Yet this statement is only partially true.
The Institute Restatement seeks to clarify the point by dividing con­
tributory activities of the plaintiff into two categories. The plaintiff is
not barred from recovery on the ground of contributory action if it con­
sists of negligently failing to observe the dangerous situation, or of
intentionally coming into proximity to the hazard (Restatement, Sec.
524(u)). However, he is barred if he precipitates the miscarriage of
the dangerous substance, or if, after learning of the hazard, he fails to
take reasonable care to avoid personal harm (Sec. 524(2)). In other
words, he is barred in those instances in which his own default or his
own assumption of the risk has contributed to his injury in such manner
as to suggest the injustice of holding the defendant to the absolute lia­
bility. If contributory negligence and assumption of risk are to be ac­
cepted as valid defenses in an action based upon negligence when the
defendant is proved guilty of a social wrong, *i.e.*, negligence, it would
seem only just that a somewhat equivalent defense be available when
the defendant is by hypothesis innocent of social wrongdoing. This
the Restatement seeks to achieve. Moreover, the cases and text writers
bear out a like conclusion with respect to actions based upon *Rylands v.
Fletcher* and also those based upon nuisance.¹¹⁶ Therefore the general­
ization to the effect that these defenses are not valid in strict liability
proceedings is inaccurate.

**Third Party Activities.** It can and sometimes does happen that a
third party contributes in a significant way to the incident causing the
damage, and the question arises as to whether or not such third party
action will exculpate the defendant from strict liability. So far as radia­
tion injuries are concerned, one of the principal problems raised by third
party activities is the possibility of two or more users of atomic energy
each contributing to stream or air pollution under such circumstances
that neither acting singly would have caused damage or created a nui­
sance, but the combination of the several users does so. What should
be the effect of these third party contributions? In cases of a similar

¹¹⁶ See Prosser, Torts 341-343, 423-426 (2d ed. 1955); also Harper & James, Torts,
nature based upon the nuisance theory it has been consistently held that each contributor to the plaintiff's injury is liable jointly with his fellow contributors for the full amount of the damage, although, if apportionment of damage can readily be made, the court may undertake to do so.\textsuperscript{117} A like result would be reached under Section 522 of the Restatement. On the other hand there have been a number of cases tried under the \textit{Rylands} doctrine in which third party action has intervened in such manner as to relieve the defendant of his strict liability.\textsuperscript{118} In short, the confusion and inconsistency of doctrine to which reference has hitherto been made in another connection also prevails with respect to these special defenses.

H. Conclusions Concerning Common Law Doctrines

We should now attempt to shape some conclusions from the foregoing review of case law, particularly having in mind the problem of obtaining redress for persons injured by radioactive substances.

(1) We must keep general principles in mind. It is a principle not only of the common law but also of the Roman law and the Codes based upon it that no one is to be held liable unless he is guilty of negligence or wrongful intent. However, today, under all responsible legal systems, there is a tendency to gravitate from liability only in case of fault toward the principle of absolute liability—"liability without fault." Over-all absolute liability without any restrictions or limitations whatsoever is rare. It is too severe and too unsophisticated. Instead the law seeks (and should seek) what has been aptly called "the golden mean" between too much and too little—between the ancient Roman principle that persons are responsible only for negligence, (a principle under some circumstances too generous to the defendants) and the primeval common law principle that persons who cause injury are to be held unconditionally liable in all circumstances (a principle too generous to the plaintiff).

The basic problem in connection with users of radioactive substances is to find this "golden mean," the middle way suited to the atomic user's circumstances, appropriate in view of the desirability of encouraging the development of atomic enterprise, yet taking due account of justice to the injured persons.

(2) As we have noted, there are two directions from which the

\textsuperscript{117} See Northup v. Eakes, 72 Okla. 66, 178 Pac. 266 (1918), a stream pollution case; see also Prosser, Torts 422 (2d ed. 1955).

\textsuperscript{118} See Prosser, Torts 340, 341 (2d ed. 1955) and cases cited.
"golden mean" may be approached. On the one hand we may extend the concept of negligence by expanding the standard of due care in such manner as to facilitate recovery by the injured person, thus promoting justice without taking the ultimate step of invoking a doctrine of absolute liability. Or, on the other hand, we may create absolute liability, yet, by attaching appropriate conditions and limitations to the concept, bring it into line with justice and good sense. Each approach is exemplified by judicial decisions in more or less analogous fields. It is apparent, however, that the approach of absolute liability with exceptions is the more in harmony with current thinking.

(3) We must take account of the *Rylands v. Fletcher* doctrine, including the many variations found in different states of the Union. Yet this doctrine has not helped us to the "golden mean," but has left us with a welter of indefinite boundary lines and differences of judicial views.

(4) We must also take account of the American Law Institute doctrine of ultrahazardous activities. Although this doctrine has been formulated by eminent authority, it has not yet been fully ripened by judicial decisions. However, it is sufficiently important to have been accepted in several jurisdictions. At the same time, for the purposes of atomic energy, it seems quite unlikely to bring about an orderly and acceptable solution.

(5) We must also take account of the vague contours of the doctrine of absolute nuisance, with its possibilities for injunction as well as judgments for damages. This doctrine, although frequently invoked, does not provide the precise answers necessary to dispose adequately of civil liability for radiation injuries.

(6) None of the foregoing theories leads us to any helpful drawing of lines of demarcation in the atomic field. For example, a reactor containing critical quantities of uranium is relatively more dangerous than a cobalt 60 radiography capsule, and the latter is worse than a radioisotope thickness gage. In one sense all are "dangerous substances," likely to "cause mischief" if they escape. Yet a line must be drawn unless we wish to place all atomic uses in a single category so far as liability is concerned. This would not be realistic, yet common law methods offer very little help in resolving the difficulty.

(7) In view of this complicated and uncertain state of affairs of one thing we may be certain, namely, that before we move very many years into the atomic age, state legislatures will be taking action to provide statutory rules covering the matter of liability in radiation injury cases,
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thus making an effort to bring order out of chaos, giving certainty to the law, and attempting to satisfy contemporary ideas concerning justice for injured persons. We should not anticipate the discussion later in this chapter but we may merely suggest that in the near future statutes will be enacted, as they have been, for example, in connection with fires caused by railroads, to impose calculated, though varying, degrees of liability upon users of radioactive substances. Indeed, as we shall later see, a statutory solution of the problem of liability for radiation injuries may well become the standard of practice throughout the civilized world, both in common law countries and in those basing their law upon civil codes.\[119\]

I. Factual Analysis of Applications of Atomic Energy to Show Basis of Liability

Up to this point we have examined the existing law, with only occasional references to atomic energy uses and radiation accidents. We must now, before attempting to reach final judgments concerning the law that will be applied to such accidents, undertake to get a fairly detailed view of the highly variant kinds of accidents and injuries that may take place. We will then be in a position to draw some informed conclusions. These fact situations vary widely in extent, severity, character, and quality, and we can predict with certainty that courts will react differently depending upon individual circumstances. They will no doubt be sympathetic with the applications of doctrines of strict liability in certain of the aspects of this new development, but they are far less likely to do so in others.

1. Early History of Radiation Accidents

Hitherto in this volume we have called attention to the fact that at an earlier day the pitchblende miners in Czechoslovakia were found to be dying of pulmonary ailments at a rate approximately thirty times greater than that of the general population. They were in fact dying of lung cancer although the nature of the ailment was not known at that time. It is believed that the inhalation of the radioactive radon, a gas created from the disintegration of pitchblende, caused the cancerous growths and resulted in the high degree of mortality.

We have also called attention to the fact that, when radium was first discovered, the earlier workers with the element suffered radiation in-

\[119\] This idea of a statutory liability receives interesting support in a recent brief article by Professor Warren A. Seavey, "Torts and Atoms," 46 Cal. L. Rev. 3-13 (1958).
juries as a result of undue exposure. The same has been true of X-rays, for, in the early stages of development of that useful instrumentality, the scientists and technicians working with it were frequently overexposed, with the resultant development of malignancy.

One of the most highly publicized of the earlier cases involves the radium dial painters of New Jersey. The well-known case is *LaPorte v. United States Radium Corporation.* In this case it appeared that the decedent had been employed for approximately a year and a half painting watch dials with radioactive luminous paint. She had been following the common practice of pointing the bristles of the paintbrush with her lips, thereby ingesting small quantities of radioactive material. Twelve years after she left the company she began to exhibit the symptoms of radium necrosis. She commenced an action for damages, and shortly thereafter she died. The action was revived by her legal representative.

There was a two-year statute of limitations. The action, which took the form of a suit in equity to enjoin the defendant from pleading the statute of limitations as a bar, was dismissed. Because of the statute, the plaintiff was unable to recover damages.

2. Radiation Accidents Since World War II

We now turn to injuries which have been suffered in more recent years as a result of undue exposure of persons and property to radioactive substances. These are the World War II and later developments connected with the important contemporaneous expansion of nuclear enterprise.

In general, there are three broad classes of injuries arising and likely to arise from atomic enterprise. There are those that arise from accidents of a conventional character although occurring in atomic installations, *e.g.,* ordinary cuts, bruises, broken bones, etc. Then there are accidents that are peculiar to atomic industry because they arise from materials or processes peculiar to that industry but do not involve radiation as such, *e.g.,* uranium scrap fires. Finally, there are those in which radiation is the principal or the exclusive cause of injury. Since we are concerning ourselves with the *unique* legal problems of atomic energy, we will direct our attention primarily to this third category. No doubt the shape of the law of civil liability is going to be very largely determined, as we have seen, by the characteristic hazards of the business, and we must try to appraise these hazards as they are revealed by experience. We can learn something from "the incidents" that have already arisen,

although fortunately they are few in number. Thereafter, we will hypothesize the possibilities for the future, thereby obtaining a complete, though necessarily speculative, view of the field.121

(1) Criticality Incidents. During the earlier years of experimentation with fissionable materials several tests at Los Alamos, New Mexico, involving the assembly of critical quantities of such material, resulted in accidents. Two deaths ensued, one in 1945 and the other in 1946. Thereafter, remote control devices were utilized, strict regulations were imposed governing the conduct of criticality experiments, and the most meticulous precautions were taken to prevent further accidents. Although several other unexpected criticality incidents have taken place since then, and several staff members have been overexposed to radiation, there have been no observable, untoward symptoms. However, these incidents reveal the need of the highest degree of care and skill and the utmost in precautions to be taken in carrying out all experiments or operations in which supra-critical masses may be assembled. If a private reactor operator should have an accident with off-site injuries to persons or property, it would seem certain that a court which follows Rylands v. Fletcher would impose strict liability upon him. Moreover, the same result would probably be reached under the Restatement principle and also under nuisance doctrines unless the court should insist upon a continuing or recurring activity before relying upon the latter.

(2) The NRX Reactor at Chalk River, Ontario. The Chalk River reactor which commenced operation in 1947 was a high power reactor being used for experimental purposes. Natural uranium was the fuel; heavy water, the moderator; and ordinary water, the coolant. The reactor was used for general research purposes and for the production of radioisotopes as well as plutonium. In December 1952, when a special experiment was being carried on, a power surge took place which resulted in the reactor “running away.” The incident is thought to have been due to a combination of human and mechanical errors. Melting caused the failure of the aluminum sheathing of some ten per cent of the uranium rods in the reactor. Both melting and oxidation of the uranium accompanied the failure. As a result a considerable quantity of radioactive fission products was carried into the coolant water. Simultaneously gaseous fission products spread throughout the reactor structure and into the ancillary equipment. The reactor vessel was damaged beyond repair. It contained highly radioactive uranium which could not

be withdrawn in the ordinary way. All the ancillary equipment was radioactively contaminated, and the basement was flooded with radioactive water. The ceiling, walls, and floors of the upper part of the building were also contaminated. About a million gallons of radioactive water had to be pumped to a remote deposit area. It was, however, found possible by using entirely new techniques to decontaminate the surrounding property, and by early 1954 the reconstructed reactor was working again. There were no personnel injuries, although about ten thousand curies of fission products were released. So far as legal implications are concerned the incident can be regarded as illustrative of the fact that even a major reactor disaster can take place without unduly serious results excepting to the plant itself, and yet there is an "escape" of a dangerous substance and the potentialities are such that strict liability for damages may well be deemed a certainty. Moreover, the radioactive effluent would produce a continuing condition of private nuisance that would without question support a finding of absolute liability on that theory.

(3) The Argonne Control Rod Test Incident. On June 2, 1952, at Argonne National Laboratory a damaging incident took place in connection with an operation involving the testing of a series of newly manufactured control rods. The standard procedure for inserting a new control rod required that the water moderator of the critical assembly be first drained away, thus reducing reactivity and permitting the safe withdrawal of the control rod for which substitution was to be made. However, in the particular operation that resulted in an accident, the water was not first removed. One of four test crew members proceeded to withdraw one of the control rods by hand. As he did so a bluish glow was emitted by the center of the reactor core. A large bubble formed and an explosion took place. The operator immediately dropped the rod and automatic devices drained the water from the core. All four operators left the assembly room. Later tests showed exposures of 190, 160, 70, and 12 rems respectively. Two of the operators suffered nausea, but there were no other observable symptoms. Clinical tests revealed increase in excretion of urinary amino acids and decreased sperm counts, although these effects disappeared in due course. No damage to the eye lenses was observed. What the future may hold for the victims no one can say.122 Apparently the human being can absorb a very substantial

overexposure for a short period without suffering immediate and observable damage, although it is usually estimated that a total dosage of 450 rems will be fatal to about one half of the population, i.e., this is the "mean lethal dose." Although the injuries were limited to persons employed on the premises, it is quite conceivable that under a proper combination of circumstances, off-site damage could take place, and again one can hardly doubt that the dangerous nature of the test device would lead to strict liability.

(4) Borax No. 1 Run Away. A small experimental reactor at Arco, Idaho, known as Borax No. 1, was constructed in 1953 with water as both coolant and moderator. The core assembly consisted of plates made from an alloy of enriched uranium and aluminum, clad in aluminum and immersed in water inside a steel tank. In July 1954, after more than 200 tests on the reactor, it was decided that it should be sacrificed in an experimental runaway. Control rods were withdrawn, the last one rapidly. The results were much as expected. Most of the fuel melted, and the reaction from the molten metal in contact with the water burst open the tank. The control rod mechanism was carried away, and the remains of the reactor core were ejected high into the air. Most of the fuel element fragments fell within a radius of two hundred feet. There was no appreciable radioactive fallout except within a radius of a few hundred feet. The explosion by ordinary standards was a mild one, being comparable with that which would be produced by a few pounds of TNT. Indeed those who may feel concern lest peaceful atomic industry may result in explosions approximating those of atomic weapons may take comfort from the fact that this is virtually an impossibility. Highly specialized techniques are required to produce sharp explosions. Industrial atomic reactor accidents even if serious will inevitably be of a milder character, although this is not to say that extreme precautions are not desirable and even necessary. If, instead of taking place miles from the nearest habitation, Borax No. 1 had "run away" on the outskirts of a city, the question of legal liability would be presented. In view of the precedents involving explosions, nuisances, and escaping dangerous substances there can hardly be a doubt of strict liability under such circumstances.

(5) The EBR-1 Reactor Accident. In November 1955 at the Arco testing station a partial meltdown and release of radioactive substances took place in an experimental breeder reactor being operated under the supervision of the Argonne National Laboratory. Dr. Walter H. Zinn, Director of the Laboratory, described the accident as follows:
EBR-1 had been used for a number of years in an experimental program, mostly in the physics of fast reactors. The core loading was reaching the end of its useful life and it was scheduled to be removed from the reactor early in 1956. As a last series of experiments with this core, it was decided to make measurements on transient temperature coefficients. The experiments consisted of measuring changes in reactivity of the reactor as the temperature of the fuel elements was increased. . . . Because it was desired to obtain the temperature coefficient of the fuel only, it was necessary to shut off the flow of the liquid metal coolant.

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Increasing the temperature of the uranium rapidly involved very considerable chance of distorting the fuel element jackets, especially since uranium metal and stainless steel form a eutectic at about 725° C. This is very little above the temperature to which it was desired to pulse the fuel elements.

That there was some risk of melting the fuel elements was well appreciated.

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In previous experiments of this type, it had been possible to interrupt the excursion and return the reactor to low power by making use of the motor-driven control rods. These subtract reactivity slowly. In this excursion, the technician at the control panel was expected to use the fast-acting shut-off rods upon receipt of a spoken instruction from the scientist in charge. . . . Upon receiving instruction to shut down the reactor, the technician repeated the use of the slower control rods. The staff scientist, as soon as he realized the situation, reached over and pressed the rapid shut-off button and, simultaneously, the automatic power-level trips responded to activate the shut-off rods. The delay in time, which was almost two seconds, was sufficient to permit the reactor power to overshoot to a point where the alloying of uranium and steel and melting of the uranium took place.

The reactor shut down and there was no way by sound or sight to know that anything untoward had occurred. . . . After a period of fifteen minutes, detectors for radioactivity installed both in the cooling system, . . . and in the ventilation exhaust ducts . . . began to show readings higher than normal.123

A dangerous quantity of radioactivity escaped into the atmosphere of the test building, but material damage was restricted to the reactor core and the inside of its vessel. There was severe distortion of the elements

but there were no personnel injuries. The incident illustrates the possibility of human fallibility and the need for protection against accidents by use of all possible mechanical devices, shields, protective envelopes, and other safeguards, just in case something does go wrong.

If similar human fallibility connected with a private reactor should result in off-site damage, the ensuing law suits will raise many interesting questions involving not only strict liability under its various doctrines, but also questions related to the standard of care to be exercised in connection with such an operation. Yet the time may arrive in the distant future when fast breeder reactors will be used to produce a significant percentage of the electric power supply. When that time arrives the technical problems will have been resolved, the safety of the facilities will be assumed, the installations will become numerous and commonplace. Under such circumstances there will be much force in the argument that they have become “matters of common usage” subject only to liability for negligence.

(6) The Saclay Reactor. A reactor at Saclay, France, was fueled with natural uranium using heavy water as the moderator and carbon dioxide as the coolant. The reactor was used for the preparation of radioisotopes for research purposes and for the production of small quantities of plutonium. Continuous operation at a high power level was permitted. In June 1956, a rupture occurred, breaking the sheathing enclosing one of the fuel rods. This caused a slight contamination of the cooling circuit. The incident lead to release through the ventilation system of a quantity of slightly radioactive carbon dioxide gas. Measurements of radioactivity on the instruments located near the reactor showed only a modest increase, and there was little, if any, contamination of personnel. The incident was such that repair could be effected quickly with only a temporary holdup in operation. The incident was a minor one, but it reveals the dangerous possibilities inherent in a defect in a minor component part, in this case the sheathing on one of the control rods. We can anticipate that the highest of mechanical skills will be required in the fabrication of essential component parts of atomic equipment, that private reactor operators will be held to the very highest inspection standards, and that mechanical faults must be completely eliminated if liability for legal fault is to be avoided. Even if all this is done, strict liability seems a virtual certainty under present day theories and circumstances.

(7) The Benjamin Zawacki Case. Every half hour throughout the evening of January 10, 1956, and all during the night, radio and tele-
vision stations in Connecticut and New York flashed emergency bulletins ending with this sharp warning:

The life of the person carrying the radioactive cylinder missing from a construction job at Devon is in danger. Dispose of it in a remote area at least a hundred feet from any house. Call the police, giving them its location. Then go immediately to the nearest hospital.

Benjamin Zawacki was the man who had the radioactive cylinder. As an electrician he had been working on a new building being erected on the outskirts of Bridgeport, Connecticut. Late in the afternoon he was seeking a piece of cord to tie down a cable that was being installed. Nearby, passing through a hole in the concrete floor, there was a twelve-inch steam pipe. Loosely tied to this pipe and hanging down to the floors below was a long strand of cord, apparently not serving any useful purpose. Zawacki pulled the cord up through the hole and detached it from the steam pipe. After tying up the cable, he observed that there was a little weight hanging on the end of the remaining cord. He automatically dropped the capsule into his shirt pocket. Upon leaving the job he tossed the contents of his pocket, including the capsule, into the glove compartment of his car. Another electrician rode with him into Bridgeport, and later in the evening a friend also rode some distance in Zawacki's automobile.

The next morning another construction worker rode with Zawacki to the job site. As they approached the watchman's gate they saw a long line of cars waiting, each being tested for radioactivity. When Zawacki's car reached the test point, the Geiger counters began to click violently, and the capsule was discovered in the glove compartment. The capsule was a cobalt 60 source, 1,280 millicuries in strength, which had been used for radiography on the construction job. The radiographer had left it unguarded and no warning signs were posted.

Two weeks of hospitalization and much testing failed to reveal any outward signs of physical disorder. However, the incident had a substantial demoralizing effect not only on Zawacki but on his companions as well. Various psychosomatic disturbances resulted.

A suit for $200,000 in damages for negligence has been filed against the contractor on the construction job and against the subcontractor who was engaged in radiological inspection. If this incident cannot be regarded as actually prophetic, at the very least it indicates that in the atomic future unusual care must be taken in instructing workmen, in posting danger signals, and in alerting the public generally to the
hazards involved. We can and must learn to live with these hazards as we have learned to live with other dangerous instrumentalities, e.g., the automobile, but we must also learn how to protect ourselves against overexposure to radiation. Whether or not the use of cobalt 60 in radiography will call for an application of the doctrine of Rylands v. Fletcher remains to be seen, but it may well be that such uses are already so commonplace as to be deemed "common usage" as that term is used both in the Rylands case and in the Restatement.

(8) The M. W. Kellogg Company Incident. The M. W. Kellogg Company was an Atomic Energy Commission licensee doing business in South Houston, Texas, engaged in the task of encapsulating and selling iridium 192, a radioactive isotope which is used for industrial radiography. On March 13, 1957, irradiated pellets of a mixture of compressed iridium 192 and aluminum metal powder were broken while being handled. The incident resulted in severe contamination of the laboratory. The laboratory was not used for several days thereafter and was partially decontaminated by the company. Two employees were present at the time of the incident and at least one of them may have have inhaled some of the radioactive powder. The exposure to external radiation was not believed to have been large. Investigation indicated that the clothing of at least the two employees was contaminated and was not removed until after the employees arrived home. Radioactivity was detected in the home of one of the employees and also in a trailer where the other lived at the time of the incident. Some of the clothing of other members of the family was found to be slightly radioactive, presumably as a result of being washed along with the employee's clothes.

The Atomic Energy Commission immediately directed a temporary suspension of the license of the company and issued an order to show cause at a hearing in Washington as to why the order should be modified or vacated. Subsequently the Commission modified the order sufficiently to permit salvaging and sale of the inventory of radioactive material, but the company was not permitted to resume its normal activity.\(^\text{124}\)

Only careful and competent operation can be tolerated, and the regulatory power of government must be utilized to protect against the careless and the incompetent. However, even rigorous compliance with governmental regulations will be no more than evidence of due care and will not relieve the defendant if strict liability principles are applied.

(9) Oak Ridge National Laboratory "Wrong Room" Incident. On

\(^{124}\) See AEC Release No. 1213, Nov. 6, 1957.
October 4, 1957, an employee of the Atomic Energy Commission’s Oak Ridge National Laboratory accidentally received an exposure to radiation when he mistakenly entered a room containing highly radioactive material. He was looking for a wrench which he had actually left in another nearby room in which he had been working. He entered the wrong room although the door was clearly marked with radiation hazard signs. The incident was discovered when laboratory technicians noted that his pencil-type radiation detection instrument revealed the overexposure. The facts were confirmed when the film badge was subsequently processed. Investigation revealed that he received an exposure of about 63 roentgens in the period of about one minute in the room. The incident involved only exposure to external radiation with no internal contamination involved. According to all appearances the employee was inexcusably careless, but in the atomic age especial care will have to be exercised to protect others against employee inattention and even stupidity. The defense of assumption of risk will be applied only under unusual circumstances when the claim is based upon strict liability.

(10) The Windscale Accident. On October 17, 1957, one of Britain’s plutonium producing reactors located at Windscale, Cumberland, produced the free world’s worst nuclear accident to date from the standpoint of off-site injuries to persons and property. Although at this writing a security blackout masks the cause of the accident and the extent of the damage, it is clear that it was a major occurrence possibly involving as much as several hundred tons of uranium. Seemingly a really major catastrophe was averted only by a successful, on-the-spot emergency action led by nuclear experts.

The reactor was an open-cycle, air-cooled machine (thus to be differentiated from Calder Hall’s closed-cycle, pressurized gas-cooled type with carbon dioxide used as the coolant). According to reports, the Windscale reactor was shut down for routine maintenance. It was then discovered that a considerable number of the fuel elements were glowing red hot. This meant that they were several hundred degrees hotter than they should have been, and that uranium was fissioning in the supposedly idle reactor. Also it meant that radioactive products were being discharged from the stack being carried by the rising column of coolant air. The immediate threat was the escape of volatile fission products, principally radioactive isotopes of iodine which could pass through the chimney filters. Solid particles such as radioactive strontium and cesium were for the most part trapped in the filters. After careful consideration water was applied to quell the overheating.
Milk samples from freshly milked cows in the vicinity were rushed to Harwell and showed traces of radioactive iodine. In twenty-four hours the content had rocketed to six times the permissible tolerance level. Soon a special press conference announced a shutdown of all milk distribution within a three-mile radius, an area that was later extended to cover 200 square miles. All contaminated milk was discharged into the sea.

Speculation has indicated that the cause of the unexpected heating effects lay in fission products trapped in the fuel elements the heat producing reactions of which continued after the reactor was closed down. Further study will be necessary to determine the exact cause of the difficulty, and doubtless an official report will be issued in due course.

This incident is the first that has resulted in extensive damage to persons or property off the plant site, although the Chalk River affair gave rise to a certain amount of neighborhood inconvenience. The fact that such incidents can occur is certainly of significance in appraising the theory of civil liability to be applied to atomic operators, but at the same time the rarity of such occurrences is also both significant and encouraging. It is understood that the people in the vicinity who have suffered damage will be fully compensated for their losses by the Atomic Energy Authority, for under Section 5(3) of the Act of 1954 the Authority is made absolutely liable for injuries occasioned by the escape of radioactive substances. However, even so, there will be troublesome questions of damages to resolve. For example, will compensation be paid for diminution of property values caused by popular fears of another such accident? This question has arisen at Windscale and up to the moment has been answered negatively by the Authority.

(11) The Hot Fish Study. The disposal of radioactive wastes is one of the primary obstacles to widespread use of atomic energy. A three-year study was recently initiated by the U. S. Atomic Energy Commission and the Tennessee Valley Authority for the purpose of determining if the partially purified liquid wastes discharged by the plant into White Oak Lake had any ill effects on fish life in the lake. The study brought forth the significant information that discharge water released by the plants produces "hot" fish many times more radioactive than the water in which they live.

The study particularly revealed that two species of fish, the bluegill and the blackcroppe, absorbed and concentrated in their bone structures large quantities of radioactive strontium. This substance is readily deposited in bone tissue much the way calcium is deposited. Skeletons of
these fish were found to contain radioactive strontium in concentrations 20 to 30 thousand times as great as that of the lake water itself. For example, it was noted that the body of a seven-inch blackcroppe produced on the average well over one microcurie of radioactivity. Moreover, it was noted that the fish in White Oak Lake not only grew more slowly than those of the same species in nearby reservoirs but that they died younger.

Studies such as this may well give pause to those who would dispose of radioactive wastes in the ocean depths or in fresh waters inhabited by fish on which man relies for food supply. Damage suits will be a certainty, and strict liability will probably be the applicable rule of law. Moreover, if there are several contributors, each may be held fully liable although his own contribution is well below tolerance levels.

(12) The Oak Ridge Y-12 Radiation Accident. In June 1958, at Oak Ridge, a quantity of highly enriched uranium bearing solution, normally stored in “always safe” tanks of such geometric configuration that a critical quantity could not be assembled, was permitted by a most unusual series of events to flow into an ordinary 55-gallon drum: A critical quantity was thus assembled and a chain reaction followed. Eight persons were within fifty feet, one being not over six feet away. Injuries to personnel seemed to be temporary only, but the incident illustrates the possibilities that exist when handling critical quantities of fissionable material. As stated in the official report, the accident “could not have happened unless a chain of about twelve unusual and unrelated events happened in just the right order. None of these twelve events was by itself sufficient to be called an error. The chance of just these twelve events occurring in just the right sequence is so small as to be rightly called impossible.” 126 An accident of this sort would seem to involve an ultrahazardous activity that would satisfy even the restricted category of Section 520(a) of the Restatement doctrine.

(13) Miscellaneous Minor Incidents. In addition to the foregoing that may be regarded as the major and more striking radiation incidents, we should refer briefly to a number of other minor occurrences which, although they caused no serious damage, nevertheless indicate the kinds of hazards to which the atomic business may be subject. For example, there have been instances of contamination of premises due to the breaking of radium sulphate capsules used in laboratories; similar results have followed the rupture of neutron source capsules (such as those containing polonium and beryllium); there is one recorded instance of

considerable quantities of radioactive mesothorium being discharged into a city sewer system where it was handled in a “complete treatment” sewage plant, from which the dry sludge (with fairly high radiation levels) was spread as a fertilizer; a tank trailer containing 1500 gallons of radioactive uranyl nitrate hexahydrate has overturned and spilled its contents on a highway; fires have taken place in contaminated waste accumulations, in uranium scrap, in plutonium turnings, etc. (These metals are pyrophoric in nature, and although natural uranium is of negligible radioactivity, U-235 and plutonium can cause serious contamination). These are illustrative of the possibilities and indicate the wide range of events of possible legal consequence against which those who engage in nuclear enterprises must guard.\textsuperscript{126}

Summary. The foregoing is a virtually complete list of the principal nuclear “incidents” that have taken place during the thirteen years following World War II. The period really shows a remarkable record of freedom from serious accidents. The Atomic Energy Commission has taken extraordinary precautions to minimize the hazards both for personnel working on plant sites and even more so for outsiders. Very few workers have been exposed beyond the allowable limits of radiation. A few accidents have resulted in injury and even death. A few workers have undergone technical overexposure but without untoward symptoms. Indeed the entire history of the thirteen year period affords considerable assurance that operations utilizing radioactive substances can, by proper precautions, be made extraordinarily safe. Such installations may eventually become rather highly regarded as good places in which to work and good neighbors in the community. When that time arrives the facts should have a material bearing upon the rules of law to be applied. Developing still further the remarkably safe record up to the present time, in a complete tabulation set forth in the July-December, 1956, report of the Atomic Energy Commission can be found a complete listing of all incidents involving radiation overexposure during the period 1945 through 1956 in Atomic Energy Commission activities. In that period of time some sixty-nine persons were overexposed in eight separate incidents. There were two fatalities, the two previously noted as occurring at Los Alamos. Twenty-eight of the total number of overexposures resulted from an unexpected fallout in the course of a weapons test in the Marshall Islands. Of the total sixty-nine exposed, nineteen suffered only skin injury and several other exposures were comparatively minor. In a word, to date, the atomic energy business has

\textsuperscript{126} For a more complete coverage, see Hayes supra note 121.
proved to be an exceedingly safe operation so far as employees are concerned.

With respect to persons and property off the plant sites, the fact is that the public has not suffered in any material degree, notwithstanding the potentialities of the business and the rather widespread extent of its utilization. Adequate safety precautions seem to make the activity fully as safe as many other types of industrial enterprise—as safe, for example, as the chemical business. A reference to the Texas City disaster involving nitrate fertilizer and the East Cleveland disaster involving a large gas container, each resulting in many deaths and much property destruction, is all that is necessary to indicate that an industrial economy necessarily involves certain limited hazards. They must be minimized and guarded against as well as possible but an occasional accident is almost inevitable. To date, then, the atomic industry has no cause for concern about its safety record. It has been remarkably good. In regard only to the safety of reactors, as distinguished from other atomic activities, in over twelve years of operation, the Atomic Energy Commission reported two years ago that it has operated twenty-five nuclear reactors for a total of 606,868 hours using 17,799,000 man hours with no accidents involving either contamination of off-site property or personnel exposure sufficiently serious to cause lost time. This is good evidence that reactors can be safely operated, as safely, perhaps, as the more conventional sources of heat energy. When they become commonplace and a necessary part of the economy, there would be good reason for urging that they be subjected to the legal principles applicable to other industrial units with equivalent safety records.

3. Some Hypothetical Possibilities of Radiation Accidents

Although the record of atomic industry up to the present time has been an extraordinarily good one, remarkably free from incidents resulting in damage to persons or property, we should not for this reason alone become too optimistic with respect to the future. When peaceful applications of atomic energy become widespread throughout industry, agriculture, medicine, and the numerous other possible areas of utility, we can expect that accidents will take place, that people will be injured, and that property will be damaged and destroyed. Safety regulations will, of course, be in effect, at both state and national levels. But, with

128 See Moran v. Pittsburgh-Des Moines Steel Company, 166 F. 2d 908 (3d Cir. 1948).
the large number of persons utilizing radioactive substances, persons of varying degrees of knowledge and competence, and with the many possibilities of dispersion of radioactivity here and there throughout the numerous areas of human activity, we can be reasonably sure that injuries will ensue.

We are seeking to determine the nature and extent of the remedial rights of the individual whose person or property is subjected to overexposure to radiation. Is liability to be predicated on doctrines of negligence or, taking account of the possibilities, is the operator to become strictly liable for the damage resulting from his atomic activities? In order to further place this problem in proper perspective, let us now add to the previous account of actual accidents by trying briefly but systematically to envisage hypothetically the principal types of accidents which may be anticipated in the atomic future if something goes wrong, as it may well do. Examination of these types will give us background for more adequate consideration of the legal theories that should be made applicable. Let us consider a dozen or so hypothetical possibilities starting with those displaying the more serious potentialities.

(1) A large power reactor meltdown. We shall start with the type of accident that, although extremely unlikely to happen, could be the most devastating of all—a reactor “burn-up.” As of June 30, 1958, one full-scale civilian power reactor was in operation, four more were being built in the United States, and some ten more were being planned. These operations contain certain inherently dangerous potentialities against which proper precautions must be taken. In the first place, each reactor contains an amount of fissionable material considerably in excess of the critical figure, i.e., in excess of the quantity which if properly concentrated would result in a chain reaction. Secondly, in addition to the fuels themselves, after operation for a period of time a reactor will contain a considerable inventory of radioactive byproducts. Some of these byproducts are said to be from three million to two billion times more toxic than chlorine, the most potent common industrial poison. Moreover, these substances cannot be detected by the senses, even in lethal concentrations, and they are capable of producing injuries which may not become evident until many years after exposure.

Although the reactor will not explode in the sense of an atomic bomb explosion, it may, if the unexpected takes place, become overheated, the fissile elements may melt, perhaps become vaporized, and the rapid formation of gaseous products create pressures which will rupture all containment structures, and release radioactive fission products to the environment. Operating personnel on the plant site may be injured or
killed, and a cloud of lethal gas with radioactive particles in suspension may escape from the reactor building and drift downwind toward inhabited areas. Fallout of radioactive material may take place which will contaminate farms, animals, and buildings, as well as people in the vicinity. Radioactive materials may be deposited on or in the ground and be carried by the percolating ground waters to adjacent rivers or other water supply sources. Under certain atmospheric conditions a radioactive cloud of gases and particles in suspension may proceed downwind for many miles at approximately ground level, carrying its destructive potentialities along with it.

All of this is decidedly on the pessimistic side and is quite unlikely to happen especially in view of the extensive precautions taken by the Atomic Energy Commission in evaluating plans and facilities prior to issuing operating licenses. Moreover, all power reactor accidents are not necessarily going to be as violent as that indicated. There may be no rupture of the containment vessel. Or if there is a rupture, the radioactive cloud may rise vertically and disperse itself without damage to persons or property on the ground. Nevertheless, if an accident of major character takes place within a short distance of a major center of population, it is theoretically possible, assuming a high percentage of dispersion of the core inventory of fission products and unfavorable inversion type of atmospheric conditions to produce a serious situation that might require the evacuation of the population and possibly result in widespread damage to persons and property. Unlikely as all of this may be, it is within the range of remote possibility and must be taken into account in appraising the applicability of various doctrines of legal liability. Should an accident such as that described take place, at least during the earlier years of atomic industry, there can be little doubt that strict liability will be imposed upon the reactor operator. He must protect himself by appropriate insurance coverage.

(2) A contained power reactor accident. The above-stated case is an extreme. Let us assume that, instead of the foregoing extensive disper-

129 For a full scale study of this problem, see Gomberg, Bassett, & Velez, "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 Lagoon Beach, Michigan," published by Engineering Research Institute, University of Michigan, July 1957, 2506-1-F. Also see the so-called "Brookhaven Study," officially and lengthily entitled "Theoretical Possibilities and Consequences of Major Accidents in Larger Nuclear Power Plants—A Study of Possible Consequences if Certain Assumed Accidents Theoretically Possible but Highly Improbable were to Occur in Large Nuclear Power Plants," written by a team of Brookhaven staff members with Kenneth W. Downes as Project Director, March 1957.
sion of radioactive products, we have the massive large scale reactor meltdown but the gaseous fission products are retained within the reactor containment vessel—a structure that has become an essential feature of reactor design. The only leakage is relatively minor, consisting perhaps of gamma radiation penetrating the walls of the containment vessel which may affect persons within a narrow radius, or possibly leakage through the foundations or otherwise which result in some contamination of underground waters, which in turn affects wells in the vicinity and possibly water supply sources of larger communities. This may be referred to as a partially contained accident, and the question arises as to whether or not the fact of more or less successful containment should affect the principles of liability. One can only speculate on the answer, but in view of the decided cases and the general trend of thought of the present day, the fact that a critical mass of fissionable material has been brought by the operator to the premises would doubtless result in the imposition of strict liability.

(3) An accident involving a small privately owned research reactor. Consider the possibility of the small research reactor with a thermal capacity of perhaps one or two megawatts “running away” and distributing a limited amount of radioactive substance over a limited area, compelling evacuation of farmers and others in the vicinity, and contaminating agricultural products and farm animals within a relatively limited radius. Such a reactor might be owned by an industrial organization which utilizes it for research purposes, or it might possibly be owned by a university or a research institute. Again, legal liability principles come up for consideration. Is the same principle of strict liability to be applied as to the large power reactor with its more lethal potentialities? The law has not, in evolving its strict liability doctrines differentiated on the ground of size.

(4) An atomic fuel-reprocessing plant radioactivity accident. Consider the possibility of an accident taking place in a fuel-reprocessing plant, with the result that radioactive fission products escape by some means other than an uncontrolled chain reaction, either into the air or into adjacent water supply, thus causing damage to nearby persons or property or both. The damage might be no more extensive than that which would result from the escape of chemicals as a part of an accident in a chemical plant. However, it would involve radioactive substances in a plant containing critical quantities of fissionable materials, and for this reason alone it may subject the operator to a strict rule of civil liability. Yet the fact that no chain reaction is involved means that the potentiali-
ties are less severe, and this fact affords a significant distinction that could well affect the legal result. Should it do so? The available case law is inconclusive.

(5) An atomic fuel-processing plant non-radioactivity accident. Consider the possibility of an atomic fuel-processing plant having an accident involving the explosion of zirconium oxide or some other material connected with the atomic industry but not of itself fissionable or radioactive. Such accidents have taken place; for example, at the Sylvania Products Company plant on Long Island and at Oak Ridge, Tennessee. Employees may be injured, and we may assume also that minor elements of damage may be inflicted upon surrounding property as a result of the force of the explosion. Such an event would be comparable to and not significantly different from an accident in any industrial installation where explosive materials are kept on hand as a part of the process. Should the principles of legal liability be different simply because the accident is connected with atomic energy? It would seem otherwise.

(6) An accident in a radiation laboratory connected with an industrial plant. Let us suppose that a chemical plant maintains for developmental purposes an experimental radiation laboratory in which it carries on various types of testing and experimentation with radioisotopes or possibly with high level radiation sources, all in an endeavor to find new ways of making articles useful to mankind. Let us assume that by accident some of the radioactive isotopes are discharged into the sewage system and thence to the river or lake water supply or possibly into a sewage treatment plant. Damage to individuals or possibly to farm animals can ensue if these radioactive elements become incorporated in a drinking water supply or fish life or vegetation. What will be the theories of liability to be imposed in such instance? Should they be different from those applicable to a chlorine plant? Should the fact that radioactive substances are permitted to escape result in the same strict liability as that applied to the reactor in which a chain reaction takes place? The available case law does not afford the answer.

(7) An escape of radioactivity from a waste disposal plant. Consider the legal status of an operator who is licensed by the Atomic Energy Commission to carry on activities which involve the disposition of radioactive waste products. Presumably either the terms of the license or general Commission rules will include appropriate specifications for operation which will cover matters of health and safety, including the maximum concentrations of radioactivity that may be dispersed into
air, water, sewers, etc. Suppose the licensed operator proceeds in accordance with the specifications without exceeding prescribed limits, but nevertheless damage ensues (a) if radioactivity is deposited on land, by pollution of air or underground waters, or, (b) if deposited at sea, by pollution of fisheries, or (c) if discharged in diluted form into a sewage system, by eventual damage to fish, animal, or vegetable life. Will the fact that the operator under such circumstances has proceeded in accordance with specifications of the Atomic Energy Commission license preclude his being liable, or, at least, to strict liability? Or consider another possibility, namely, that the operator has accidentally or negligently permitted the release of radioactive substances and in so doing he has failed to act in accordance with the specifications in his license. Will he then become per se liable and if so, shall it be on the basis of strict liability or merely for negligence? Discussion in the next section will throw some light on these questions, but the answers are far from crystal clear.

(8) An accident in food or drug irradiation plant. Consider the possible liability of an operator of a food or drug irradiation plant, who by reason of accident over-irradiates the articles involved, thus causing unexpected changes in the irradiated products and damage to persons or animals who consume the products. What is to be the nature and measure of the operator's liability under such circumstances? Under American decisions he probably will be deemed an insurer since the end products are intended for human consumption.

(9) An accident involving an industrial user of radioactive isotopes. Suppose an industry makes use of radioisotopes for thickness gages, or for tracers in connection with wear testing, or in the form of a cobalt 60 gamma ray source to be used in radiography. Assume that certain of these radioactive substances, through accident, are removed from their protective shielding and get into contact with persons or property either on the plant site or possibly off-site as a result of transmission through the air, water, or otherwise. Again we must ask ourselves whether or not the operator is to be held liable on the theory of negligence or on the basis of a doctrine of strict liability. Since no chain reaction is involved, it is not unreasonable to argue that the same rules of negligence should be applied as would be used if the incident had involved chemicals of a less hazardous nature.

(10) An accident involving medical uses of radioactive substances. Suppose a doctor of medicine is engaged in operating a teletherapy unit on a cancer patient, or is using a radioactive tracer to locate the seat of a malignancy, or administers a radioactive substance to be taken internally
for therapeutic purposes. Assume an overdose or overexposure, due to accident. Is the medical operator to be held strictly liable if it can be proved that the injury to the patient bears a causal relation to the exposure to radiation? Or is he to be held liable merely for negligence as seems to be the case in connection with the X-ray operators? Both reason and precedent would indicate that only the principles of negligence should be applied, but can this conclusion be reconciled with the strict liability cases?

(II) An accident involving transportation of radioactive substances. Radioactive substances will be transported throughout the country by bus, truck, rail, and airplane. They may also be transported across the ocean by surface vessel. Suppose the truck overturns, or the train is in an accident, or the airplane crashes, or the vessel sinks in the harbor. The radioactive substances may be either relatively inoffensive tracers, or they may be high energy cobalt, or they may be even more dangerous objects, such as irradiated fuel elements that have been taken from a power reactor and are being returned to a processing plant for separation of the unexpended fuel from the fission products. Are all of these operations to be treated alike so far as legal liability is concerned? Or is strict liability to be applied in certain instances and not in others? Unless normal principles of liability of those who operate transportation facilities are applied, law suits for such accidents will become decidedly complex. Again, current case law fails to afford the answers.

4. Conclusions Concerning Types of Accidents and Injuries

The foregoing hypothetical possibilities might be multiplied many times over, and doubtless some of them will materialize in the form of actual incidents as the atomic age becomes a reality. However, the types of situations exemplified by the recapitulation of the accidents that have already taken place, together with the dozen or so hypothetical suggestions, present sufficiently well the kinds of fact situations with which the law must now concern itself.

Let us now proceed to take a broadly perspective view of the entire range of possibilities of injury from overexposure to radiation.

First of all, we note the wide range of possible incidence of overexposure, i.e., from injuries to many persons and much property, both on-site and off-site, to very minor affairs, involving possibly the pollution of a single well or a slight overexposure to gamma radiation of one or two persons. Second, we note that the damages may extend in intensity throughout a wide range—from death and widespread devast-
tion of property, to trivial injuries of no real consequence. Third, we note that the undertakings causing the injuries may vary from activities of fairly serious potentialities to rather commonplace, routine, and relatively non-hazardous affairs; the meltdown of a reactor illustrating the former, the use of a radioactive isotope for industrial wear test representing the latter. Fourth, we note that in the nature of things the locations in which the activity will be carried on will range all the way from unpopulated deserts to great population centers in industrial areas—from Frenchman's Flat, Nevada, to New York City. Finally, we note that the utilization of atomic energy in its peaceful applications will range all the way from well-established, long-tried, and generally accepted operations that eventually become quite conventional, to new and unusual applications of an experimental but promising nature, well worthy of trial, but not yet fully accepted as a safe and normal procedure.

In short, in thinking about the problem of the nature of civil liability for radiation overexposure we cannot think of a single, simple operation or activity. This would be unwarranted oversimplification. There is instead a vast spectrum of possibilities, of coverage, of damage, of hazards, of locus, and of uniqueness. Nevertheless, sooner or later we must come to grips with the problem as to whether or not and to what extent we must accept and apply the doctrine of strict liability or its equivalents, or, in the alternative, be satisfied with an application to any or all atomic injuries of the more widely accepted doctrines of negligence. Can we properly say that the same rule of legal liability should be applied throughout all of the spectra? This would be both unrealistic, unwise, and unnecessary.

In turning to our attempt to reach solutions of these problems we shall take into account both the foregoing spectra of possibilities and also the fact that to date, at least, the atomic energy business has been extraordinarily successful in minimizing the overexposure of persons or property. In the final section of this chapter we shall assemble our conclusions based upon the decided cases, the general trend of the times, and the nature of the fact situations likely to arise. Before reaching this point, however, we must give consideration to various statutory enactments that bear on the problem and that suggest some helpful ideas.

J. Statutory Provisions Affecting Strict Liability

With the chaos of case law, and the great variety of possibilities as to radiation accidents laid before us, we can now give consideration to
possible statutory means of bringing some measure of order out of the juristic confusion facing operators in the atomic field. We shall first examine certain statutory provisions which may, to a greater or lesser extent, immunize defendants from strict liability. Thereafter, we shall consider certain other statutory possibilities which serve to extend strict liability, incorporating appropriate exceptions and limitations, and introducing helpful statutory clarification of the applicable rules.

I. Statutory Immunization from Strict Liability

At this point we are confronted with a question of policy. In view of social trends is there any justification whatsoever for considering the possible immunization of atomic activity in whole or in part from the non-intentional and non-negligent accidents which are certain to take place?

Recognizing that it is desirable to encourage and promote the development of atomic enterprise, should this be done by holding it within the limits of liability for negligence only, and thereby minimizing the costs—doing this, however, at the expense of persons who may, without fault of their own, be damaged by overexposure to radiation. All members of society must pay a price in the form of inconvenience or even assumption of loss for the privilege of living in an improved society. If accretion to general welfare will be sufficiently accelerated by relief from strict liability, then it is possible that society should pay the price in the form of individual assumption of the risks and burdens. On the other hand, there are those who argue for the proposition that industry should pay its own way by being subject to strict liability excepting, perhaps, for catastrophic disasters, in which event the government should step in with indemnity from the public treasury. The trend of present day thinking is, as we shall see, toward the latter alternative. It is socially more acceptable, and accordingly we shall not find much current emphasis on statutory immunization.

a. Statutory Franchises, Licenses, or Privileges and Their Effect

There is some authority, mostly in the form of early court decisions, for the proposition that activity which would otherwise entail strict liability may be privileged because conducted under statutory authority, or because it involves the performance of a public duty, to the extent of relieving that activity from the burden of responding to strict liability, holding it, however, within the conventional standards of the doctrines
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of negligence. This proposition has been most frequently applied to transportation facilities and public utilities which, although they may in fact constitute dangerous activities, are, nevertheless, highly valued for their social utility and, by virtue of their franchises, licenses, or privileges, are given a special place by the governing authority of the state as an essential part of the economy. The rationale seems to be that statutory authorization and regulation amount to a government declaration that the activities concerned are sufficiently necessary to the public welfare to justify immunity from strict liability. There is also to be found in the cases the suggestion that such functions are compulsory and are quasi-governmental in nature and should therefore share the ancient sovereign immunity to the extent of relief from liability without fault. In view of the necessity of obtaining licenses for the conduct of atomic activities, this theory has an obvious possible application to atomic industry.

A brief examination of some of the pertinent decisions will show more precisely the limits of this doctrine. In reviewing the cases it should be remembered that, although immunity from strict liability may perhaps be conferred, a result almost the equivalent of strict liability may be reached through the application of the doctrine of res ipsa loquitur, or by an elevation of the standards of care to which the industry is subjected. Therefore, the change may be of but little significance.

In an early English case, Price v. South Metropolitan Gas Co., the plaintiff was injured by an explosion of the defendant public utility's gas line. The court of the Queen's Bench refused to apply strict liability, saying:

It is clear, too, that where a gas company such as this, having statutory authority to lay pipes, does so in exercise of its statutory powers, the . . . [rule of] Fletcher v. Rylands is inapplicable.181

In an early American case, Actiesselskabet Ingrid v. Central Railroad of New Jersey the court voiced a somewhat different reason for a similar immunity. The action was based upon a theory of strict liability, the complainant demanding compensation for injuries inflicted upon him by the explosion of a quantity of dynamite then in transit on the defendant's railroad. The court held that, since the defendant was a

130 65 L.J.Q.B. 126 (1895).
181 Id. at 127.
132 216 F. 72 (1914).
common carrier, it was obliged by law to transport explosives as well as other commodities, and, this being so, it would be unduly harsh to impose the additional burden of an insurer's liability.

The type of statutory authorization deemed to immunize a quasi-public enterprise from strict liability was defined in *Cogswell v. New York, New Haven, & Hartford Railroad Co.*\(^{183}\) In that case the court made the following statement:

> But the statutory sanction which will justify an injury to private property, must be express, or must be given by clear and unquestionable implication from the powers expressly conferred, so that it can be fairly said that the legislature contemplated the doing of the very act which occasioned the injury. This is but an application of the reasonable rule that statutes in derogation of private rights, or which may result in imposing burdens upon private property, must be strictly construed. For it cannot be presumed, from a general grant of authority, that the legislature intended to authorize acts to the injury of third persons, where no compensation is provided, except upon condition of obtaining their consent.\(^{184}\)

Occasionally the question has arisen as to whether or not such statutory privilege will serve to immunize the operator so that he may conduct a nuisance adversely affecting the lawful utilization of neighboring property. On this point a distinction must seemingly be drawn between the right of the aggrieved person to obtain an injunction to prevent the continuance of the alleged nuisance, and his right to obtain a judgment for damages to the extent he has suffered loss. There are several cases in which it has been held that the aggrieved party cannot enjoin a licensed activity.

> For example, in *Strachan v. Beacon Oil Co.*\(^{185}\) an attempt was made to enjoin the defendant from maintaining and operating his business of refining and distributing petroleum. The defendant had invested many millions of dollars in his plant and many more millions were invested in tank steamers and other materials used in his business. The site of the plant was well fitted for the conduct of such a business. A permit for the building of the refinery and its operations had been duly issued by the proper authorities to the defendant, and it was found that there was no failure on the part of the defendant to comply with the statutes and regulations, as well as the conditions of his license. The court found

\(^{183}\) 103 N.Y. 10 (1886).

\(^{184}\) *Id.* at 21.

\(^{185}\) 251 Mass. 479, 146 N.E. 787 (1925).
that, although the normal conduct of the business resulted in more or less pollution of the air, nevertheless, on balance, these acts did not constitute a nuisance in view of all of the circumstances. But the court also addressed itself to the question of the effect of the licenses held by the defendant. Said the court:

The question remains whether the defendant has conducted its business in conformity with the licenses granted to it. It is settled that under statutes similar to those under which the defendant was granted the licenses, if the licensee has complied in all respects with the terms, what he does thereunder cannot be considered a nuisance or be restrained, even if without such licenses the acts done would be a nuisance.136

The court cited many cases in support of its conclusion as thus stated and dismissed the bill.

However, so far as damages are concerned two leading cases decided by the United States Supreme Court throw light on certain constitutional aspects of this question of statutory immunity. The cases are Baltimore & Potomac Railroad Co. v. Fifth Baptist Church137 and Richards v. Washington Terminal Co.138 In the latter case it was claimed by the plaintiff that his property had been damaged by large quantities of dense black smoke and dust, together with dirt, cinders, and gases, emitted from trains while passing in and out of a tunnel in the District of Columbia. A fan system caused all such gases to be forced out of the south portal of the tunnel and the plaintiff’s nearby property was especially damaged thereby.

The Court held that in view of the act of Congress which authorized the establishing of the railroad and specifying its location within the District, the activity could not be deemed a public nuisance. Nevertheless, said the Court, the acts referred to, if done without legislative sanction, would form the subject of an action by the plaintiff to recover damages as for private nuisance, and, with respect to this element, the provisions of the Fifth Amendment to the Constitution are applicable to the effect that private property shall not be taken for public use without just compensation. 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

136 Id. at 487.
138 Supra note 78.
private nuisance of such a character as to amount in effect to a taking of private property for public use. 139

Accordingly, it was held that, although the railroad duly licensed by public authority would not be subject to the issuance of a restraining injunction, an action for damages would be available. As to the extent of recoverable damages, the Court held that there would be a limited immunity with respect to those damages that naturally and unavoidably result from the proper conduct of a railroad, such as are shared generally by property owners whose lands lie within the range of the inconveniences necessarily incident to proximity thereto. This would include ordinary noises, vibrations, and the necessary emission of smoke and sparks from locomotives. The Court pointed out that this limited immunity from liability for incidental injuries, although it is attended by a considerable degree of hardship to the private landowner, nevertheless is a necessity unless the company is to be made liable for damages for these minor items in which case the practical result would be to bring the operation of the railroad to a standstill. But this principle, held the Court, does not carry to the point of construing the act of Congress in the light of the Fifth Amendment to authorize the imposition of a special, direct, peculiar, and substantial burden upon the plaintiff’s property without compensation to him. Accordingly, the defendant was held subject to liability for damages suffered by the plaintiff over and above those incidental inconveniences suffered by all who live nearby a railroad right of way. In short the statutory privilege precludes the injunction and the payment of damages for incidental inconveniences, but the Constitution prevents closing the door to damages for special and severe losses. This principle would clearly be applicable to licensees of the Atomic Energy Commission.

We may conclude from the foregoing that, although there is some possibility in view of the case history of a limited immunity deriving from statutory privileges, such immunity has not been particularly significant in the more recent evolution of the law, and it is unlikely to play an important part in atomic activity except perhaps to preclude the use of the injunction against Atomic Energy Commission licensees.

b. Statutory Limits on Maximum Liability

Statutory limits upon the recoverable damages seem destined to be a significant feature of atomic liability legislation, not only in the United States but in other countries as well. We have long been used to the

139 Id. at 553.
imposition of such limits in workmen's compensation legislation where fixed dollar limits serve to offset the broader liability coverage. As to atomic energy in the Anderson-Price Act, adopted in 1957, amending the United States Atomic Energy Act, it is provided that the liability of a licensee shall not exceed the amount of insurance coverage prescribed in his license (not to exceed the approximately $60,000,000 available in the insurance market) plus the government indemnity that covers amounts in excess of the insurance up to $500,000,000.

In other countries, similar liability limits are under consideration. In England, a limit of £5,000,000 for any one accident may be adopted; in West Germany the figure is DM 15,000,000; in Switzerland, Sw fr 30,000,000. Some form of government indemnity in excess of those sums is also under consideration in Germany and Switzerland. Accordingly, it may be concluded that atomic industry, although it may be subjected to strict liability in connection with its more hazardous activities, will have the benefit of definite monetary limits on such liability, probably also supported by governmental indemnity. Such limits will permit insurance companies to enter the field with assurance of manageable losses, and operators will be enabled to protect themselves by covering predictable maximum risks by insurance. Such provisions serve to promote the development of a new and useful field of activity, and we may conclude that they stand a good chance of becoming universally a part of the pattern of atomic legislation for the future.

c. The Federal Tort Claims Act

The Federal Tort Claims Act provides a major exception to the rule of sovereign immunity from private legal action. The government is made liable for certain of its torts. It is interesting to note, however, that courts are in effect establishing an “exception to the exception” to the effect that in no case shall the government be held subject to strict liability while in the execution of certain of its public duties. It is this feature that interests us especially in connection with atomic energy liability.

The Tort Liability Act permits an injured party to sue the United States government for a tort claim brought because of harm caused by activities that would otherwise enjoy sovereign immunity on account of their governmental character. However, an important limitation is embodied in Section 2680 which prevents action being brought upon

claims for harm caused by "discretionary acts" of government officials. Then there is another limitation which does not expressly appear in the act but is implied by the federal courts. It is that the government cannot be found liable without fault in connection with harm caused by legitimate pursuit of activities of a purely governmental character. This is in interesting contrast to the British policy under Section 5(3) of the United Kingdom Atomic Energy Authority Act which provides for strict liability without limit.

The most dramatic case that has arisen up to the present time under the act is *Dalehite v. United States.*\(^{141}\) This case involved an action for both personal injuries and property damage caused by an explosion of a shipload of ammonium nitrate while in transit to Europe to be used as fertilizer.\(^{142}\) The fertilizer was produced from surplus military explosives and was being sent to the Continent as a part of the government's plan to aid European agricultural development. Action was brought under Section 1346 (b) and Section 2680 of the Federal Tort Claims Act and was based upon negligence. The Court denied recovery on the ground that, even if the accident had been caused by negligence of government personnel, the government could, nevertheless, claim immunity under the "discretionary exemption" provision of Section 2680.

It is in a dictum, however, that the item of especial interest in connection with this examination of the doctrine of strict liability is to be found. The court, interpreting Section 1346 (b), stated that the government could not be held to liability without fault in an action prosecuted under the Tort Claims Act. This aspect of the opinion is particularly applicable to the government owned nuclear industry, since, in the event of a reactor burn-up, evidence of negligence would be most difficult to come by and much of it would doubtless be obliterated in the accident. Hence strict liability would be the only recourse.

The court's dictum that the government was not to be held liable without fault under the Federal Tort Claims Act was actually followed in a later case, *Bartholomae Corp. v. United States.*\(^{148}\) In that case action was brought against the government for damages to the plaintiff's building caused by shock waves produced by atomic weapons that were being

\(^{141}\) *Supra* note 127.

\(^{142}\) The ship was in the harbor at Texas City when the explosion occurred, so the mishap is now known as the "Texas City disaster." The incident is somewhat like a possible though unlikely major reactor disaster because of the enormous amount of damage involved. A large area of Texas City was laid waste by the explosion and some 300 claims were filed totaling approximately $200,000,000 dollars.

tested on the government’s proving grounds at Los Alamos, New Mexico. The plaintiff’s buildings were about 150 miles away from the scene of the testing. In an action under the Federal Tort Claims Act, one of the four counts was based on a claim of absolute liability. The court denied recovery on that count, saying:

There is an additional reason why there can be no recovery on count three which is founded on a theory of absolute liability without fault where the government is engaged in an ultra-hazardous activity. In Dalehite v. United States, supra, the court stated that liability under the Tort Claims Act does not arise by virtue of the United States engaging in an extra-hazardous activity and that it is to be invoked only on a negligent or wrongful act or omission of an employee.\textsuperscript{144}

The Tort Claims Act thus limits recovery to actions based upon negligence. By implication strict liability has no place in actions against the government. In effect the government claims the immunity that its licensees or franchise holders might conceivably derive under the theory of the utility cases heretofore referred to in this chapter.

2. Statutory Extension of Strict Liability

As we have indicated hitherto, the trend in judicial decisions is in the direction of extending strict liability rather than limiting it. We shall find that, in line with general social policies of the day, the same is true in the field of statute law, which we now proceed to examine.

a. Illustrations of Legislation in the United States Imposing Strict Liability

Strict liability is no novelty in contemporary legislation. The example which comes first to mind is the workmen’s compensation legislation, almost universally enacted in this country. Under such legislation the burden of industrial accidents is placed upon the employer if injuries "arise out of and occur in the course of the employment." Negligence is not a factor. Strict liability for occupational diseases of many different kinds is also imposed. Such legislation is based upon a desire to provide summary relief for injured employees, and also to place the burden of industrial accidents upon the employer who is in the better economic position to bear the burden or shift it to the public.

Another kind of strict liability legislation is exemplified by the Federal Safety Appliance Act which requires interstate railroads to install pre-

\textsuperscript{144} Id. at 654.
scribed safety devices, making the railroads subject to absolute liability for injuries caused by any deficiency in complying with the terms of the statutes or regulations. Again, we find many of the Pure Food and Drug Acts making the manufacturer or the seller of defective food or drugs absolutely liable to the injured consumer, without regard to questions of negligence or reasonable care.

In the field of aeronautics a dozen states have adopted a rule of absolute liability for "ground damage" through statutory enactment of the Uniform Aeronautics Act, promulgated in 1922 by the National Conference of Commissioners on Uniform State Laws. Several other states have adopted limited versions of the Uniform Act. Still other states, influenced no doubt by the safety records and the wide extent of use of civil aviation, have leaned more recently toward a negligence rule, and at least two states, namely Pennsylvania and Idaho, have adopted laws affirmatively applying ordinary rules of negligence to aviation accidents. Three other states, Georgia, Nevada, and Maryland, have adopted a presumption of negligence rule, but stop short of absolute liability.145

b. Illustrations from Other Countries of Statutory Extensions of Strict Liability

Turning to other countries for further illustrations, Sweden, as long ago as 1902, adopted an act imposing strict liability upon operators of electric installations. In principle this act prescribes absolute liability for the operator for all damage occasioned by electricity flowing from the plant. The act, however, establishes certain exemptions from liability. Exempted are damages resulting from acts of God, or major external force, those resulting from the negligence of the injured party by infringing regulations or otherwise, those caused by installations operating with an electric potential of less than 150 volts, and those that result from facilities that are completely fenced in or placed underground. In short, Sweden has long since concluded that its social structure demands widespread, strict liability for the electric power industry utilizing its special kind of dangerous facility.

Germany likewise has entered the field with its Federal Law on Liability. Article 1 of this law imposes absolute liability upon operators of railroads. They can exempt themselves only by proving that the accident arose because of an act of God, or major external force, or because

145 For statutory citations, see Eubank, "Land Damage Liability in Aircraft Cases," 57 Dickinson L. Rev. 188 (1953).
of the fault of the injured person. Article 1 (a) of the German law deals with electric companies, providing that such companies also are to be held strictly liable if personal injury or property damage is caused by their activities. Again, strict liability is made subject to exceptions for acts of God, major external force, or fault on the part of the damaged person.146

These brief references to Swedish and German laws illustrate the fact that in other highly developed legal systems, social regard for the injured party has resulted in legislative measures to assure the payment of damages regardless of proof of negligence.


We may most assuredly anticipate that in the atomic field we shall find legislatures moving in the direction of establishing strict liability by statute. Such legislation in effect will be forced by the completely unsatisfactory state of the common law on the subject; the confusion of Rylands v. Fletcher, the Restatement, and nuisance doctrines leaves too much to be desired.

In England, the country of origin of Rylands v. Fletcher, the most positive and sweeping legislation along this line has been placed in effect. The Parliament of the United Kingdom in adopting its Atomic Energy Authority Act of 1954 made the Atomic Energy Authority absolutely liable for all radiation injuries both from reactor operations, and also from all other nuclear activities, by providing in Section 5(3) of the Act as follows:

It shall be the duty of the Authority to secure that no ionising radiations from anything on any premises occupied by them, or from any waste discharged (in whatever form) on or from any premises occupied by them, cause any hurt to any person or any damage to any property, whether he or it is on any such premises or elsewhere.

This section places the English Atomic Energy Authority under an absolute duty which permits of no exceptions whatsoever, even for acts of God, except that possibly the Authority can plead a counter-claim to

any action brought by a person who by his own negligence or willful act causes or contributes to the escape of radioactivity. Moreover, the act covers all kinds of radioactivity, both that resulting from chain reactions and that from less dangerous sources. Thus, the Authority in Britain is under an exceptionally broad duty to see that their reactors and all other atomic activities are proof against acts of God, falling airplanes, and mishandling by strangers, as well as the vicissitudes of normal operational activity. Finally, the Authority's liability is without financial limit.147

It should be noted, however, that Section 5(3) applies only to the Atomic Energy Authority, namely the British government agency. It does not apply to private industry. At the present time such industry is not actively engaged in England in reactor operation but it doubtless will be so engaged in the near future; and if an accident takes place, the doctrine of *Rylands v. Fletcher* would then be controlling, unless in the meantime legislation is enacted.

But Parliament is about to act. On February 10, 1958, the British government announced its intention to introduce legislation providing for the licensing and inspection of all privately owned atomic energy operations, announcing, further, that all such private owners would be subject to the same duty as that of the Atomic Energy Authority with respect to the prevention of damage and the obligation to make recompense for personal injury or property damage occasioned by their operations. In other words, the British do not seem to feel that *Rylands v. Fletcher* is adequate for atomic energy purposes, and they intend to provide a very comprehensive strict liability measure covering atomic operations, government, private, and otherwise. There is some uncertainty as to whether or not the act to be applied to private industry would require strict liability for escaping radioisotopes as distinguished from chain reactions. A high government official has indicated that he does not believe the act in its final form will be quite so drastic. In any case this proposed measure represents the current thinking in the land of origin of the common law—one of the principal competitors for the world's atomic business in the future.

In Germany also the matter of liability for atomic injuries has recently received extensive and intensive consideration. As early as 1955

German lawyers and insurance experts were studying the liability problems likely to arise from peaceful uses of atomic energy. As a result of these deliberations a draft of a Federal Atomic Energy Act was prepared. In 1957 this draft was ready for adoption, but because of political obstacles final action was deferred. In the meantime several of the West German Länder having research reactors operating or under construction have felt the need for enacting provisional laws on the subject. In January, 1958, Land Nordrhein-Westfalen adopted a measure that included a brief interim treatment of civil liability and insurance coverage therefor and other somewhat similar measures have been adopted in Bavaria, the City of Berlin, the City of Bremen, the City of Hamburg, Hesse, Schleswig-Holstein, and Württemberg-Baden.

The 1957 German draft bill as proposed by the government of the Federal Republic of West Germany contains an exceptionally thoughtful treatment of the question of liability, and it will be worth while to summarize these provisions. They may become useful in connection with the formulation of American legislation. The principal articles of Part IV on Liability for Injuries are in substance as follows:

(Article 21. (1) Should any person suffer death, bodily injury or any deterioration in health or should property sustain damage owing to the effect of a nuclear fission process or of radiation from a radioactive substance emitted from an installation within the meaning of article 7 (installations for the production or fission of fissile materials or for the processing of irradiated fissile materials) or from equipment forming part of such installation or from any operation, including the disposal of waste, the owner of the installation shall be required to pay compensation for such damage in accordance with the provisions of articles 23 to 31. Liability for compensation shall not arise where the damage is caused by act of God.

(2) Where the use of property has been impaired by the effects of radiation from a radioactive substance, this shall be deemed to be damage to property for the purpose of the regulations under this Part.

Note that this provision does not spell out strict liability for all radioactivity from reactor plants, but merely from the reactor itself and the disposition of waste products. If there should be other radioactive substances involved, the question of liability would fall under Article 22.

148 The original draft of this measure was submitted to the Bundestag in a report dated May 9, 1957, (Paper 3502) as a result of the deliberations of the 38th Parliamentary Commission on Atomic Questions. A revised version, translated into English by Centre D'Etudes de la Commission Permanente du Risque Atomique (CERA) can be found in Information Bulletin No. 12, July 1958.
This differentiation in liability between cases falling within Article 21 and those under Article 22 is most important.

*Article 22.* (1) Should any person suffer death or bodily injury or any deterioration in health or should property sustain damage through the effects of a nuclear fission process or of the radiations from radioactive substances in cases other than those set out in article 21, the possessor of the substance affected by the nuclear fission or the radioactive substance from which the radiation is emitted shall be required to pay compensation for the damage arising therefrom in accordance with articles 23 to 31. Liability shall not arise where the damage is caused by an event which the possessor, his servants or agents cannot avoid, even by taking every precaution possible in the circumstances, and which is due neither to faulty safety arrangements nor to faulty workmanship.

The effect of this rather obscure inversion of language is to provide that there will be no liability if proper care is utilized, but the burden is placed on the defendant to exculpate himself,—a so-called “inversed burden of proof.”

It is further provided in Article 22 that the burden will not be reversed if the radioactive material is used by a physician or dentist in medical treatment of the plaintiff, nor will it be reversed if there is a legal relationship between the operator and the plaintiff whereby the latter accepts the risk occasioned by the dangerous material.

*Article 23.* This article deals with the so-called “contributory responsibility” of the injured. It is provided here that, if damage is caused by his “cooperative fault,” another provision of the German Civil Code shall be applied, prorating the damages according to the respective faults—an adaptation of a “comparative negligence” theory.

*Article 24.* This article provides the specific items of damages to be compensated. They include medical treatment, loss of earnings, funeral expenses in case of death, and maintenance costs of legal dependents, but no provision is made for pain and suffering. This subject needs careful treatment in any such statute.

*Article 27.* This article deals with limits upon the liability. In case of death a maximum of DM100,000, or in case of injury a yearly payment of not to exceed DM6,000 is provided. The total amount to be paid by the operator or his insurance carrier for any one accident shall not exceed DM15,000,000, except in case of negligence for which there is no limit.

*Article 28.* The statutes of limitations are revised. All claims under the act continue alive for two years after the time the injured person
obtains knowledge of the damage done and the person liable, but not more than thirty years from the time when the overexposure took place.

**Article 29.** This article deals with forfeiture and provides that the person entitled to the compensation will lose his right under the law if he does not furnish the liable person with notice of the damage within three months after becoming conscious of his injury. This "notice of damage" must be followed by bringing the suit within two years as provided by Article 28.

It is contemplated that the foregoing provisions will be supplemented by another federal enactment, somewhat like the United States Anderson-Price Act, requiring insurance and providing indemnity by the government to the extent of DM500,000,000 over the amounts of private liability stipulated in Article 27.\(^{149}\)

The foregoing provisions illustrate the very thorough current thinking in the West German Republic with respect to statutory extension of liability for overexposure to radioactivity.

A somewhat similar measure is being currently drafted in Switzerland. In fact, a second draft of this measure was completed by the commission charged with the task on May 6, 1958, and is now ready for submission to the Swiss Parliament. This draft also provides for absolute liability for injuries caused by those who engage in "nuclear processes," a term which is defined to be the substantial equivalent of "nuclear criticality," *i.e.*, processes involving chain reactions. It should be observed that on this point the Swiss draft is the reasonable equivalent of that of West Germany. In short, absolute liability is to be limited in both countries to the chain reaction process and its necessary radioactive auxiliaries. It will not include other radioactive substances which are therefore left to the ordinary principles of negligence.

Moreover, the Swiss draft excludes damages resulting from acts of God, earthquakes, events of war, or grave faults of the injured person. Neither the German nor the Swiss draft exempts from strict liability any accidents resulting from the activities of third persons. The Swiss draft, like the German draft, limits the amount of liability per accident, the Swiss figure being Sw fr 30,000,000, which is the maximum amount of insurance coverage available in the Swiss Insurance Pool. Under Swiss policies a deduction will be made from the face value of the policy for any amounts paid out or incurred for prior accidents during the policy period. Accordingly, the Swiss draft provides that when the remaining

\(^{149}\) For a complete discussion of the proposed West German law, see a paper entitled "International Problems of Tort Liability and Financial Protection Arising Out of the Use of Atomic Energy" presented on July 21, 1958, by Dr. H Fischerhof to the International Bar Association at Cologne, Germany.
maximum liability is reduced by one-tenth or more, the insured must seek additional coverage to meet the deficiency.

The Swiss draft includes a statute of limitations of only ten years from the date of the accident, but provision is made for a "delayed damages" fund to cover cases that turn up after the expiration of the statutory period. This fund, which would be administered by the State, would be accumulated by contributions required of all operators in the form of a supplementary payment of an amount not to exceed one-third of the insurance premium.

We may anticipate that these German and Swiss bills will become law in substantially the form stated within the next year or two. Moreover, they are likely to set a pattern for legislation in other countries of Western Europe and perhaps for other parts of the world. They have value to the United States as precedents. First, they confirm, so to speak, the wisdom of the Anderson-Price Amendment by imposing similar requirements, i.e., by requiring insurance, providing government indemnity, and limiting maximum liability; and second, they point the way toward a solution of the civil liability problem by statutory prescription of absolute liability in its proper field with clearcut definitions and appropriate exceptions. Of especial importance is the segregation of the chain reaction elements, making them subject to strict liability, but leaving other radioactivity subject to normal principles of negligence. This last named feature serves to establish an orderly system in place of the present unsatisfactory state of affairs and should provide a system of redress for injured persons based upon a careful legislative appraisal of the economic and social needs as well as the problems of a new industry. The search for such a wisely conceived statutory solution is the next important step in the law of the atomic age.

K. Conclusions Concerning Strict Liability

We have now sufficiently reviewed both the case law, the statute law, and the facts pertaining to the question of strict liability so that we may formulate some conclusions concerning its proper applicability to atomic activities, drawing together the tentative suggestions heretofore set forth and attempting to express a comprehensive prospectus of this area of the law. With a reasonable degree of assurance we offer the following:

(1) As has already been noted, the judge-made law, particularly that made by American courts, is in a state of confusion, with manifold uncertainties created by the indefiniteness of the standards to be applied. Under Rylands v. Fletcher, what are "dangerous substances?" What is
a "non-natural use?" Under the American Law Institute Restatement, what is the meaning of "ultra-hazardous?" When does an activity "necessarily involve a risk of serious harm?" What is "common usage?" Under the nuisance doctrine, how shall we evaluate the "balance of convenience" in connection with possible nuisances from atomic activities? All of these vague terms create uncertainties in the case law. The terms cannot be readily applied to users of atomic energy to determine who are included within strict liability and who are not, or what accidents fall within the exceptions and which do not, or what defenses are available in special circumstances. In addition, we find that variances between the views of different courts compound the difficulty. In short, common law processes seem ill-adapted to meet the atomic liability problem.

(2) The facts related to atomic injuries present widely variant patterns. Some radioactive substances are highly dangerous, others not so much so. Some atomic activities are unique or nearly so, others are or soon will be commonplace. Some will be carried on in centers of population, others in remote areas. No single rule can wisely be applied to all of the variants. These diverse facts further complicate the legal scene and bespeak a comprehensive rather than a piecemeal solution.

(3) Notwithstanding an excellent safety record to date, injuries to persons and property are certain to occur in the future in connection with peaceful uses of atomic energy. It is a fast moving technology, too swift, indeed, to be readily accommodated under the relatively deliberate evolutionary processes of the common law. Yet the law must provide a suitable framework for the new industry, both clarifying the duties and obligations of those who take part in it, and providing adequate, speedy, and certain redress for injured persons.

(4) Insurance and indemnity programs sponsored and administered by government are being made available to protect the industry against undue liability, but we have not yet really come to grips with the proper extent and nature of this liability so far as individual cases are concerned. This is an essential next step.

(5) In other leading countries constructive minds are coming to grips with the problem of civil liability by resort to statutory measures, with clearly expressed principles to guide the solution of problems in the field. Some statutes have already been adopted, others are in the drafting stage. It is a field in which the legislative process best serves the public needs.

(6) Certain European proposals are of especial interest by reason of the differentiation established between two classes of radiation accidents
(a) those connected with chain reaction, in which case strict liability is imposed, and (b) those due to other radioactive substances, in which case the usual rules of negligence prevail.

(7) In the United States we must give serious consideration to a similar statutory approach to determining liability for radiation injuries. The trend is towards strict liability, but exceptions must be worked out to achieve justice and avoid discouraging the development of a new and valuable technology. Many phases of nuclear enterprise can properly be fitted into the normal standards of negligence. Others must accept strict liability. The lines of cleavage must be carefully drawn.

(8) In the light of the materials presented in this chapter, we suggest the following principal points as essential to the formulation of a just and sensible law of civil liability for radiation injuries.

(a) Those who engage in atomic activity (including both private and government operations) involving critical quantities of fissionable material, or the disposition of waste fission byproducts therefrom, and those who have in their possession critical quantities of fissionable materials, should be held strictly liable for injuries occasioned by any accidental escape of radioactivity resulting from such operations, if the escape is in excess of the permissible tolerance limits specified by the Atomic Energy Commission or state regulatory bodies. This would include the power reactor "runaway," the EBRI situation, the Chalk River, and Windscale types of accidents, the fuel processing and reprocessing plants, and waste disposal facilities and even the small research reactor accident which some may feel should not be subject to such strict liability.

(b) If in connection with activities included in (a) radioactive effluents escape, not by accident, but necessarily in the ordinary course of operations but in quantities less than the officially prescribed tolerance levels, liability should be based upon principles of negligence only. This will afford reasonable latitude for normal operations without the harassment and expense of constant litigation. For example, the hypothetical escape of radioactivity from a waste disposal plant would be covered by this provision.

(c) Those who engage in atomic activity of kinds other than those included in (a) which involve the irradiation of food, drugs, or other articles for human consumption should likewise be held strictly liable for injuries caused by their products.

(d) Exceptions, if any, from strict liability should be clearly spelled out and defined. Such exceptions should be kept at a minimum, limited
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at the most to acts of God, acts of war, and results that flow from the intentional acts of the injured person. The availability or otherwise of defenses in the nature of contributory negligence, assumption of risk, or actions of third parties should also be spelled out and defined. In general, if there is good reason for strict liability, there is an equally good reason for keeping the exceptions and defenses within the narrowest possible bounds.

(e) Those who engage in any atomic activity not included in (a) or (c) above should be held liable for negligence only. This would include radiography, thickness measurement, the use of tracers, medical diagnosis and therapy, and the dozens of other highly valuable applications of radioisotopes. Again, there is a good argument for including in this category small research reactors of conventional types and proved stability. Dividing lines between negligence and strict liability situations would thus be sharply drawn in common-sense way, and all concerned would profit thereby.

(f) Statutes of limitations should be revised to extend substantially the period within which suit may be brought, thus to take account of the fact that the damaging effects of overexposure to radioactivity frequently do not become apparent for many years. A reasonable period, perhaps two years, should be allowed after acquisition of knowledge of the injury and identification of the person liable, with possibly an overall limit of twenty years from the date of the accident. Such a provision would give redress to the victim who after many years develops cancer, cataract, or leukemia.

(g) Statutory provision must be made to deal with the extraordinary problems of evidence and burden of proof that will arise in radiation cases. In negligence cases the proof of negligence will be extremely difficult and it is possible that the only feasible solution will be the "injured burden of proof" of the German draft. Moreover, it may be necessary to resolve problems of causation by resort to statutory presumptions based upon roentgens of exposure or other available objective data.

* * * * *

A statutory approach to the problem of strict liability utilizing as a framework the foregoing points, and taking advantage of the West German and Swiss thinking on the subject, would minimize litigation, bring prompt justice to injured persons, and, at the same time clarify the law to facilitate the growth of a new type of industry.