

LEGAL PROBLEMS OF  
COMPENSATION INVOLVED IN THE USE  
OF NUCLEAR ENERGY

BY

BERNHARD GOMARD

*Professor of Law,  
University of Copenhagen*

## I. INTRODUCTORY REMARKS

QUESTIONS CONCERNING LIABILITY for nuclear risks are discussed today in many countries and in several international organizations. The national legislation in this field will to a large extent be based on international conventions on the liability for damage caused by nuclear installations. The author of this paper participates in the international work in this field as a representative of his country, Denmark. The purpose of the paper is to present the author's personal views on the subject and also to investigate how the principles internationally discussed accord with the rules on liability now in force in Denmark.

In Denmark the extent to which compensation is payable for damage or injury arising during research or industrial work is generally decided according to the fault principle (principle of negligence). For certain types of such work, however, different and stricter regulations have been laid down (cf., for example, Act No. 117 of March 11, 1921, on railway operation),<sup>1</sup> and in legal theory an attempt has been made to establish a general principle, supposed to be valid without statutory support, on strict liability.

In order to answer the question whether there already exist under the Danish common law of torts, or whether the authorities should introduce, special, stringent regulations on damage arising through the operation of industrial or research plants for the peaceful use of nuclear energy, it must be made clear what hazards are involved in these activities and whether these hazards have a special character. One soon finds, however, that there is great variation among the hazards involved, and so it is impossible to discuss the question of compensation collectively for all types of damage. We shall here be concerned only with *damage to persons and property outside the plant*, and shall disregard employees' injuries and damage done to the plant itself.

<sup>1</sup> Acts and cases cited in this paper without mention of their origin are Danish.

It rests with the technical experts to state what third-party risks are involved with nuclear plant. The question has been and is still being closely studied. Among the reports published so far is one issued in March, 1957, by the American Atomic Energy Commission, entitled "Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants".<sup>2</sup>

A statement of the damage which might be caused cannot be based on experience. Although reactors have been in operation since 1942, there are no reports of any serious reactor accidents,<sup>3</sup> but in a very widely discussed incident which occurred on October 10, 1957, at Windscale in England, small quantities of radioactive matter (chiefly iodine 131) escaped with the cooling air from a reactor. As a safety measure, all the milk from the surrounding farms was destroyed daily for some time after. It is hardly possible to establish the extent of the financial, compensable loss involved. Probably much more milk than necessary was destroyed, because there was no approved maximum content of radioactive iodine in milk. The loss for which the operator of the reactor was legally responsible was presumably less than \$ 100,000.<sup>4</sup>

The technical experts believe that the risk of a reactor causing considerable damage in the surrounding area is extremely small, but that if an accident occurred under very special and unfortunate circumstances, the damage might be very great. In the American Atomic Energy Commission's report just mentioned, the following is said about the chance of a catastrophe occurring: "As to the probabilities of major reactor accidents, some experts held that numerical estimates of a quantity so vague and uncertain as the likelihood of occurrence of major accidents have no meaning. They declined to express their feeling about this probability in numbers. Others, although admitting similar uncertainty, nevertheless ventured to express their opinions in numerical terms. Estimations so expressed of the probability of reactor accidents having major effects on the public ranged from a chance of one in 100,000 to one in a billion per year for each

<sup>2</sup> A briefer account is given in a report drawn up by Columbia University, New York, "Financial Protection against Atomic Hazards", 1957, pp. 11 ff.

<sup>3</sup> However, there have been some accidents in which the reactor itself was damaged (cf. Graham, "US Reactor Operating History 1943-54" in *Nucleonics*, Oct. 1955, pp. 42 ff., and the survey of "Recorded Atomic Reactor Incidents" in a report of April 1957 to the British Insurance (Atomic Energy) Committee.

<sup>4</sup> There is a detailed description of the accident in "Accident at Windscale No. 1 Pile on 10th October, 1957", Cmnd. 302, Nov. 1957.

large reactor. However, whether numerically expressed or not, there was no disagreement in the opinion that the probability of major reactor accidents is exceedingly low."

Regarding the extent of the damage which might occur in the types of accident so far conceived, the report states that "the theoretical estimates indicated that *personal damage* might range from a lower limit of none injured or killed to an upper limit, in the worst case, of about 3,400 killed and about 43,000 injured".

Theoretical *property damage* ranged from a lower limit of about half a million dollars to an upper limit in the worst case of about seven billion dollars. This latter figure is largely due to assumed contamination of land by fission products.

Under adverse combinations of the conditions considered, it was estimated that people could be killed at distances up to 15 miles, and injured at distances of about 45 miles. Land contamination could extend for greater distances.

In the large majority of theoretical reactor accidents considered, the total assumed losses would not exceed a few hundred million dollars.

The reason why catastrophic consequences of reactor accidents cannot be ruled out *altogether*, is that there are large quantities of radioactive material in the reactor; and if this material is spread about, the surrounding area will be exposed to radiation capable of doing serious damage, depending upon its duration and intensity. Of course, numerous safety measures are applied to prevent these substances being spread about; but in other fields we have seen cases of the failure of technical installations considered foolproof by the experts.

With the atomic industry, the question arises for the law of torts whether the compensation regulations at present in force are suitable for application not only to ordinary, small-scale damage, but to actual catastrophes and to the particular kinds of damage from radioactive contamination, as well. These questions have not been raised hitherto, although other existing industries certainly involve hazards which are just as serious. The American report quoted above has the following to say on this: "We are not aware of such a study having been undertaken for any other industry. We venture to say that if a similar study were to be made for certain other industries, with the same free rein to the imagination, we might be startled to learn what the consequences of conceivable major catastrophic accidents in those other industries could be in contrast with the actual experience

in those industries." Whatever truth there may be in this statement, it should not be taken as a reason for shelving the catastrophe problem, as far as the atomic industry is concerned. It must be possible to make a sober study of these questions. Information will probably prove to be the best defence against unreasonable fears.

The reason why the problem of compensation for catastrophic damage has been raised clearly and decisively for nuclear research and industrial activities, is undoubtedly that nuclear energy is in bad company. Both technically and—in the major countries—administratively, there are certain points of contact between the peaceful and the military use of nuclear fission. During the early years of nuclear power, in particular, military involvement meant that much had to be kept secret. Another reason probably lies in the intangible element in the radiation hazard. The rays are invisible; one can be exposed to radiation without knowing it, and the radio-biologists are not yet altogether clear about the possible extent of damage from radiation. Fear of the unknown is, at any rate in the minds of many people, particularly strong.

In this context it may perhaps be useful to add a few short remarks concerning the special forms of radiation damage.<sup>5</sup> Among the kinds of damage which may conceivably arise through accidents in reactor operation, certain kinds of personal injury, in particular, can be clearly distinguished from other types of damage. Whereas the extent of damage to property which may occur can be ascertained—with greater or less certainty—a short time after the accident, this does not always apply to personal injury from exposure to radiation. Some of these injuries are *delayed injuries* (in the sense that they do not become apparent until after a period of years) or *genetic injuries*, i.e. lesions which do not break out in the person himself, but in his offspring. Special medical problems arise concerning internal contamination with fission products and concerning the exposure to radiation of the human embryo.

<sup>5</sup> A penetrating study of these questions is given in the Medical Research Council's "The Hazards to Man of Nuclear and Allied Radiations", Cmd. No. 9780, 1956, and in the "Report of the United Nations Scientific Committee on the Effects of Atomic Radiation", 1958.

## II. FAULT LIABILITY OR STRICT LIABILITY

One of the principal topics in the current discussion on the formulation of a law on compensation for atomic damage is whether the operator of an installation which presents the special "atomic hazard" should bear responsibility without fault for third party injury.<sup>6</sup>

The question as to whether liability for negligence or strict responsibility is preferable in this field is interesting also because a study of this question as applied to the atomic industry is well suited to shed light on the wider question as to the extent to which—as is maintained by some writers—liability without fault should be imputed for injury caused by any dangerous technical installation. On the other hand, the choice between these two compensation rules for the atomic industry has scarcely such practical significance as one might have expected. Even in this mysterious field every accident has a cause. Let us presume that a serious accident has occurred. It will not be easy to convince the courts, with the aid of involved technical explanations, that it was not possible either to prevent the cause appearing or to neutralize its effects, or at all events that it was not necessary to wait until more was known about the dangers associated with the installation before setting it into operation. In other fields, a severe line has been taken in Danish practice in regard to actions for damage caused by technical installations. Examples of this are provided by two Supreme Court decisions reported in 1942 U.f.R. 355 H and 1946 U.f.R. 267 H.<sup>7</sup> We have a third example in the Supreme Court case 1958 U.f.R. 365 H, which concerned the contamination of underground water by a poisonous substance (phenol) from a chemical works.<sup>8</sup> The courts will scarcely treat

<sup>6</sup> Among the published contributions to the discussion are those by Seavey in *California Law Review* 1958, pp. 3 ff.; Blythe Stason in *Forum Report* 1956, No. 12, Vol. 1, pp. 33 ff.; Kaufmann in *Schweizerische Juristen-Zeitung* 1957, Heft 20; Scheidwimmer in *Atomwirtschaft* 1958, pp. 192 ff.; Esser in *Frankfurter Allgemeine Zeitung, Wirtschaftsblatt* for Nov. 10, 1956, p. 5; and Caemmerer in *Revue Internationale de Droit Comparé* 1957, pp. 673 ff.

<sup>7</sup> The judgments are discussed by Bjarne Frandsen in *U.f.R.* 1942 B, p. 254, and by Ussing in *U.f.R.* 1947 B, pp. 291 and 300. An Icelandic Supreme Court decision of November 24, 1953, imputed liability for an explosion in a tanker, without proof of negligence, because the explosion "must have arisen through a fault" in the ship or a mistake on the part of the crew. The decision is reported in *T.f.R.* 1957, p. 81.

<sup>8</sup> The judgment is not based on the special regulations in sec. 11 of the Catchment Act (Act No. 54 of March 31, 1926), but on ordinary tort law (cf. Illum in *U.f.R.* 1958 B, p. 76).

nuclear plants which cause damage through faults in apparatus or machinery or through contamination of underground water or waterways any less severely than other technical plants or installations.

In the cases referred to, and in others as well, the courts have certainly imputed liability for situations in which the person causing the injury cannot be said to have shown any fault in the ordinary sense of the term. Presumably it will always be difficult wholly to avoid tightening up the fault rule to some extent, because judges have the same inclination as other people to be wise after the event, when they are making their decisions as to whether an accident could or could not have been prevented. However, the tightening-up of the rule which has taken place in practice can be carried further. The Swede Karlgren brings this out by distinguishing between actual and fictitious negligence.<sup>9</sup>

If an action for damages is brought for an atomic accident, before new regulations are introduced in this field, it will presumably be decided on the basis of a rather severe rule of negligence. This is not absolutely certain, however. An attempt to solve the atomic problems on the basis of the law as it now stands is to apply "the judicial experience of the past to the judicial questions of the present".<sup>1</sup> In his commentary on a case from the Danish Supreme Court, 1951 U.f.R. 290 H, Frost<sup>2</sup> points out that the grounds for the judgment are so framed that "it does not preclude the Supreme Court from imputing strict responsibility for dangerous activities in fields other than the one dealt with here".<sup>3</sup> This statement is hardly to be interpreted as foreshadowing numerous judgments on strict liability in the future; but new cases can sometimes open up quite new and surprising prospects. It is presumably another kind of reasoning which lies behind the commentary. The Court has left the question open, considering it unwise to place unnecessary obstacles in the way of the special decisions which will have to be made in the future.

The question must then be studied whether a rule on strict

<sup>9</sup> *Skadeståndsrätt*, 2nd ed., Stockholm 1957, p. 44, with footnote 1. In *Sv.J.T.* 1954, pp. 33 f., Ussing objects to a distinction of this kind being made. Karlgren has explained his views further in *Sv.J.T.* 1955, pp. 194 ff.

<sup>1</sup> Quoted from Roscoe Pound, *The Spirit of the Common Law*, 1921, p. 182.

<sup>2</sup> *T.f.R.* 1952, p. 320.

<sup>3</sup> The judgment concerns damage caused by sparks from a railway which is not covered by the Railway Accidents Act (Act No. 117 of March 11, 1921), cf. sec. 11 of this Act.

liability for atomic damage should be introduced. In Denmark it is natural to consider at the outset the points put forward by Henry Ussing who was the greatest Danish expert of this century on the law of torts. In his study *Skyld og Skade* (1914) Ussing expressed himself in favour of a general rule on strict liability for dangerous practices. Does Ussing's argument provide justification for applying such a rule to the atomic industry? The root of Ussing's doctrine, as shown in his later textbook on the law of torts, *Erstatningsret* (1937),<sup>4</sup> is that the laying of such a heavy burden of damages on the operators has a beneficial preventive effect, since the installations which show a deficit as a result of this burden will presumably be wound up, while those undertakings which can pay for all the damage they cause, and still show a profit, will continue to operate. A law on damages for objective responsibility will thus function as a desirable "automatic regulator of production".<sup>5</sup> This way of looking at the problem will not bear scrutiny. The question of what industrial and scientific concerns and establishments should exist in a modern community cannot be decided merely on a budgetary basis. The question is also linked up with that of the general economic policy desired by the country. One country may perhaps build nuclear power stations even before they are able to compete, because it does not wish to be wholly dependent upon imports of coal and oil for its power supplies. Another country may do so for fear of falling behind in the competition between countries in the technical field. Nowadays we have left far behind the classical, liberal ideal which still was the model of Ussing, with each enterprise receiving its "natural" income and paying its "natural" expenses.<sup>6</sup> The fact that an enterprise whose continued

<sup>4</sup> See pp. 115 ff. Ussing reverted to these questions later on in *U.f.R.* 1947 B, pp. 281 ff., and in *Nordisk lovgivning om erstatningsansvar*, Copenhagen 1950, pp. 9 f.

<sup>5</sup> Ussing, *op.cit.*, p. 120. A criticism of Ussing's doctrine in other parts is put forward by, among others, Sandström in *Forhandlingerne på det 16. nordiske juristmøde*, 1934, Appendix 2. See also Grönfors, *Om trafikskadeansvar*, Stockholm 1952, pp. 123 ff., Knud Christensen in *N.F.T.* 1956, p. 359, and Strahl in *S.O.U.* 1950: 16, pp. 136 ff.

<sup>6</sup> Ussing, *op.cit.*, p. 120, and *Skyld og Skade*, pp. 128 ff. In formulating his economic theory, Ussing was possibly prompted to some extent by a work written by the Austrian economist Victor Mataja, *Das Recht des Schadenersatzes vom Standpunkte der Nationalökonomie*, published in 1888. Mataja expresses his particular judicial "credo" with a quotation from Marx: "The totality of productive resources forms the economic structure of society, the real basis on which a judicial and political superstructure is built up and to which certain forms of social consciousness correspond. When the economic basis is changed, the whole vast superstructure is revolutionized at a greater or lesser rate."

existence is desired has an accounting deficit cannot be taken—as in the work by Ussing just cited—to indicate that it has such an ideal value for civilization that it can be given a Government grant. The question whether and to what extent the enterprise should be required to pay damages to injured third parties according to a law on strict liability for damages is a separate problem of social policy.

The doctrine has become possessed by the tenets of business finance and is misguided on another point as well. It cannot be assumed that an undertaking which produces a "social deficit" owing to the damage it causes will show a corresponding accounting deficit. This is particularly obvious as far as personal injury is concerned. The amount fixed for a claim for damages for personal injury is not equivalent to the loss suffered by the community through one of its members losing all or part of his capacity for work. It is true that the production regulator, which the law on liability for dangerous practices is supposed to embody, is supplemented by a form of control which is not bound by financial considerations, since the law is intended only to operate outside the bounds of negligence; but it nevertheless seems a strange piece of cynicism that the question of how far a dangerous business may continue should be allowed to depend on whether it can support its disabled and orphans. People cannot buy themselves out of the liability for dangerous activities.

Nor has the suitability as an instrument of economic policy been deemed the ground in the other countries where the introduction of a general rule concerning strict liability for some or all technical installations, industrial enterprises and transport has been advocated. In Norway, Kristen Andersen, among others, stresses the question whether the hazard involved in an activity is suitable for third-party liability insurance.<sup>7</sup> In Germany, Esser<sup>8</sup> maintains—on the basis of ideas which he finds in Aristotle—that the law embodies justice which is partly commutative (retributive and reciprocal) and partly distributive (involving apportionment and allotment). The law on compensation is undergoing development leading from the sphere of commutative justice to

<sup>7</sup> Cf. *U.f.R.* 1954 B, pp. 223 ff., and *T.f.R.* 1948, pp. 105 ff. If the insurance possibilities are to determine the form which the regulations on liability are to take, a wider study will presumably have to be made of the question as to which form of insurance is most suitable for damage of the type concerned (cf. Strahl in *S.O.U.* 1950: 16, especially pp. 68 ff.).

<sup>8</sup> Josef Esser, *Grundlagen und Entwicklung der Gefährdungshaftung*, München & Berlin 1941, esp. pp. 69 ff. and pp. 80 ff.

that of distributive justice. The time-honoured dictum that accidental damage is not indemnified—*casum sentit dominus, casus a nullo praestantur*<sup>9</sup>—has therefore lost its *a priori* validity. The fact that the law on compensation is helping to ensure that no-one is exposed to inevitable ruin, is in keeping with the expansion of social welfare systems which has taken place recently. Modern society should not be ruled by *Schicksal* but by *Planung*. In the U.S.A., a number of writers—less encumbered with a classical education—have expressed more clearly a view which is indeed very much like Esser's. "The problem, basically, may be regarded as one of allocating a probable or inevitable loss in such a manner as to entail the least hardship upon any individual and thus to preserve the social and economic resources of the community."<sup>1</sup>

It was mentioned above that one must expect the courts to want to apply the fault principle stringently to atomic accidents in any given case. The question of acquittal will presumably only be raised in cases where it is *quite* clear that there is nothing wrong with the plant's management or personnel. In practice this will probably only be so when the accident is caused by "occurrences with an outside source, of such a kind that—in the light of all experience—the damage cannot generally be avoided".<sup>2</sup> The question as to whether a rule concerning liability without fault should be introduced thus really amounts to a choice between a rule which makes exception for *vis major* and a rule of strict liability. The real issue is whether liability should be imputed when the accident is due to entirely unpredictable occurrences such as earthquake, floods, sabotage, civil unrest or the acts of criminal or insane persons.<sup>3</sup> In conformity with the German *Haftpflichtgesetz* (Employers' Liability Act) of June

<sup>9</sup> One finds corresponding maxims in English law ("let the loss lie where it fell", *Paradine v. Jane* (1647) Aleyn 26) and in Austria, where sec. 3111 of the Civil Code states: "Purely accidental occurrences concern those on whose property or person they take place".

<sup>1</sup> Harper and James, *The Law of Torts*, Boston & Toronto 1956, p. 787. Quotations from other American writers are given in Ussing's paper in *U.f.R.* 1950 B, pp. 224 f.

<sup>2</sup> Ussing, *Dansk Obligationsret, Almindelig del*, Copenhagen 1946, p. 140. Cf. the regulations on liability in sec. 65 of the Motor Traffic Act and sec. 37 of the Railway Accidents Act. Examples of application of the latter regulation are given in 1942 U.f.R. 635 and 1953 U.f.R. 1078 H.

<sup>3</sup> For reactors in ships or aircraft, other causes of accidents which might have an exonerative effect—such as certain situations involving collision—may perhaps be mentioned as well. In what follows, only static reactors are considered.

7, 1871,<sup>4</sup> an earlier German draft version of the *Atomgesetz* proposes to apply a *vis major* principle to atomic plants, while a subsequent draft proposes the introduction of a principle of strict liability. The grounds given in Germany for not imputing liability in *vis major* cases were to the effect that liability should be imputed only for "the typical operating risks", and the typical or normal risks do not include *vis major*. In the event of an accident due to *vis major* occurring, then, according to Esser in *Schuldrecht* (p. 504), "the dangerous plant is merely the scene and not the cause of accident". Here Esser presumably has in mind cases of the type where a railway passenger is struck by lightning while on the railway, since he will not have been in imminent danger specifically of suffering such injury by reason of his connection with the railway. However, such grounds for not imputing liability for *vis major* do not apply very well to reactors. With *vis major*, as with "*vis minor*", the hazard is constituted by the fact that the reactor contains considerable quantities of radioactive substances which may do damage if they are allowed to escape.<sup>5</sup>

A strict liability rule is probably preferable to a rule which makes exception for *vis major*. In support of this, it may first of all be pointed out that, for privately-operated enterprises, atomic liability will in any case be covered by insurance, and that the amount of the premiums will hardly be affected very much by a principle of freedom from liability in *vis major* cases. There may, however, be reason—in fairness to the insurers, among others—to exclude from the liability regulations damage caused by general or civil war.<sup>6</sup> The insurers cannot meet what might be a considerable number of claims at one and the same time.<sup>7</sup> Further limitations of the liability should hardly be made, however. It is extremely difficult to establish clearly the points on

<sup>4</sup> The Act is discussed in Ussing's *Skyld og Skade*, Copenhagen 1914, p. 370, and Esser's *Lehrbuch des Schuldrechts*, Karlsruhe 1949, pp. 500 ff., among other works.

<sup>5</sup> On *vis major* and typical risks, cf. Øvergaard, *Norsk erstatningsrett*, 2nd ed., Oslo 1951, p. 149.

<sup>6</sup> If an exception of this kind is made, it will mean that those suffering injury have no legal claim to damages. The State is not liable under Danish law for war damage (cf. Ussing in *Skyld og Skade*, p. 79, note 11, and in *Erstatningsret*, p. 112, and Lassen, *Haandbog i Obligationsretten*, *Almindelig del*, Copenhagen 1917–20, p. 336, note 45).

<sup>7</sup> On war insurance, cf. Knud Christensen in *Juridisk Forenings Aarbog* 1941–42, pp. 36 ff., and Jacobi in *U.f.R.* 1941 B, pp. 17 ff.

which a *vis major* rule goes beyond the fault principle.<sup>8</sup> *Vis major* is a relative concept: lightning, for example, is *vis major* if it kills livestock, but is not so if it detonates a store of explosives. The greater the damage which an accident may cause, the smaller is the number of causes which are *vis major*. The same applies to the negligence standard, however.<sup>9</sup> To what extent is there an obligation to pay damages—according to the fault principle or a *vis major* principle—arising through the destruction of roads or railways by floods, avalanches or landslides? When is a storm so severe that storm damage to houses, etc., is not negligent, and what greater wind-strength is required for the person who made the roof to be free from liability even under a *vis major* rule? Fixing a *vis major* limit must often be an altogether arbitrary affair.<sup>1</sup> This is probably one of the reasons why one finds in Danish law a number of regulations on strict responsibility and on negligence with a reversed burden of proof, but practically no rules for liability based on the *vis major* principle. As Bentzon pointed out already in 1890, in his book *Vis major*,<sup>2</sup> all the advantages of *vis major* regulations can certainly be achieved equally well, or better, by placing on the wrongdoer the burden of proving that no negligence has been involved.

For the purposes of a study of liability for atomic plants, it is hardly necessary to go further into these subtle and impalpable technical questions of law, since a specific solution to the problem is suggested by considerations of a totally different character. The real reason why a rule on strict liability must be introduced is that there exists among the public a certain vague fear of what might happen in an atomic plant. Technicians and scientists may disclose what grounds there are for fear; but, whatever conclusions these experts arrive at, we shall probably still have to face the fact that the fear in the minds of the people has not been removed. All over the world, those in authority consider the development of atomic industry to be an economic, technical and—in some cases—a military necessity. The fear in the minds of the

<sup>8</sup> These difficulties are clearly shown in the English literature, which interprets *Nichols v. Marsland* (1876), according to which the rule of objective responsibility for landowners for dangerous objects from their land, adopted in *Rylands v. Fletcher* (1866), is not applied in Acts of God cases (see for example Salmond on *Torts*, 11th ed., London 1953, pp. 631 ff.).

<sup>9</sup> See, for example, the grounds given in 1955 U.f.R. 992 H and 1061.

<sup>1</sup> The *vis major* decisions arrived at by the Swiss Federal Court (reported by Oftinger, *Schweizerisches Haftpflichtrecht*, Zürich 1940, pp. 86 ff.) show a tendency to impute liability in doubtful cases.

<sup>2</sup> Bentzon, *Vis major*, 1890, pp. 392 ff.

people, therefore, must be overcome. The introduction of rigorous compensation laws would help, if only in a modest way, to calm those who feel insecure. Viewed thus, the best law for liability is the most rigorous one.

There is yet another psychological factor which makes the introduction of a strict liability rule seem necessary. It must be expected that after a large-scale catastrophe has occurred, public opinion will require compensation to be paid to the victims. In the depressed mood which possesses us all in such situations, we are relieved to feel that something at least can be done to alleviate the lot of the injured and the dependants of those who have lost their lives. Most people will find it shameful to haggle over the obligation to pay and the amount to be paid. To the extent that the payment of damages would be enforced in this way in the event of accidental atomic disasters, a fault principle is meaningless.<sup>3</sup>

A final point in favour of the introduction of a strict liability rule is the humanitarian consideration that those who suffer through innovations which are to serve the general public have a reasonable claim to indemnification. This viewpoint is the basis of innumerable theories on strict liability,<sup>4</sup> and it has been a prominent feature of the discussion on the compensation laws to be applied to reactors.<sup>5</sup> Although widely held, the viewpoint is hardly of any great value; and in any case it is not compatible with at least the Danish law as it now stands. By no means all those who may be said to be sacrificed in the interest of development or progress are compensated.<sup>6</sup> The question as to whether an enterprise ought and is to be operated is one which must be answered on the basis of economic, political, health and cultural considerations. The question as to what is to be done to cover any damage is another matter. The question of compensation must be decided on the basis of the community's general attitude towards helping fellow citizens in distress, and it must be solved as part of general social policy, regard being paid to social welfare

<sup>3</sup> The question as to whether the liability rests with the Government or with the enterprise is not of any decisive importance, since an atomic plant will either be State-owned or have large sections of the population as its customers.

<sup>4</sup> See survey of "the theories so far" in Bienenfeld, *Die Haftungen ohne Verschulden*, Berlin & Wien 1933, pp. 93-156.

<sup>5</sup> Cf. *Bulletin d'Information* 1958, No. 10, p. 65, from the Centre d'Etudes de la Commission Permanente du Risque Atomique, and Esser in the *Frankfurter Allgemeine Zeitung, Wirtschaftsblatt* of November 10, 1956.

<sup>6</sup> Cf. Ussing, *Erstatningsret*, p. 120, regarding the pioneers of flying.

arrangements and to the country's general standard of living. Theories on law cannot help to answer the question as to how much money the community can afford for indemnifying the victims of a nuclear disaster.

This fact, that the principle of compensation is not applied to *everyone* who suffers injury from an innovation serving the public, should not, however, in itself be interpreted as an absolutely final criticism of the value of the viewpoint. There may well be a lack of consistency in the legal system, and progress often takes the form of small changes here and there in different spheres. Harmony would perhaps be established by itself between the various laws, if they all expressed what is right; but whatever is to be understood by "right", the law on compensation leaves much to be desired and should not be subjected to a requirement of harmony.

In the Latin countries, the rule that the *vis major* principle shall be excluded has a long tradition, and some of these countries have wanted to utilize such a rule as a basis in this new field as well. In the OEEC Draft Convention on Third Party Liability in the Field of Nuclear Energy<sup>7</sup> the following ruling on "exonerations" has been adopted so as to satisfy this wish to some extent: "Except in so far as national legislation may provide to the contrary, the operator shall not be liable for damage caused by a nuclear incident due to an act of armed conflict, invasion, civil war, insurrection, or a grave natural disaster of an exceptional character." The 1952 Rome Convention on third party injuries from aircraft has avoided leaving any opening for introduction of the *vis major* principle, for in Art. 5 it exonerates the operator from liability only "if the damage is the direct consequence of armed conflict or civil disturbances, or if such person has been deprived of the use of the aircraft by act of public authority".

<sup>7</sup> A committee appointed under the European Nuclear Energy Agency (ENEA) has for some time been working on a draft agreement. ENEA is part of the Organisation for European Economic Cooperation, and its members are the 17 West European countries which are members of OEEC. (Cf. Pierre Huet in *OEEC at Work for Europe*, 4th ed., 1957, esp. p. 91 and p. 102.)

### III. THE IMPACT OF THE RULES CONCERNING COMPULSORY PURCHASE AND NUISANCES FROM ADJOINING PROPERTIES

There is very little sense in deciding whether there exists, under the law in force, strict liability for reactor damage, since there can hardly be very much doubt that such liability should be imputed for the consequences of a nuclear disaster, or that during the next few years statutes covering such liability will be adopted in most of the countries of Western Europe. There may, however, be grounds—with a view to solving the problems arising from further application of the coming rules on liability—not only for studying the question what significance the doctrines on liability for dangerous activities have for nuclear liability, as has been done so far, but also for studying the relationship between this liability, on the one hand, and the law of compensation for property acquired by compulsory purchase and the law of nuisances from adjoining properties, on the other. It is not quite clear whether these rules influence the law on atomic damage. A study of these two sets of laws is therefore necessary. Especially it must be settled whether the effects of a statute which imposes objective liability, but limits the amount to be paid, deviates from those general rules of law, and if that is so, it will have to be decided whether the atomic act to be introduced should be drafted so that the existing rules regarding liability towards neighbours for nuisances from dangerous plants are limited. The situation as to the rules of compulsory purchase is different, as the rule establishing owners' right to full compensation is inserted in Art. 73 of the Constitution. An ordinary statute cannot amend provisions in the Danish Constitution. It is therefore necessary to investigate whether the scope of the nuclear law itself will be limited by the rule in Art. 73, which requires that full compensation must be paid in case of compulsory purchase. These questions on the significance of adjoining property and compulsory purchase law in the nuclear sphere are of special interest, because they dominate the discussion in other countries.

### (1) *Compulsory Purchase*

Art. 73 of the Danish Constitution provides that the owner must be paid "full compensation" for compulsory purchase. If a site for a nuclear plant is acquired by compulsory purchase,<sup>8</sup> the purchaser is therefore obliged to pay compensation to the owner of the land concerned. If only part of the land owned by a person has had to be purchased, compensation must be paid for any depreciation of the rest of the site. Compensation must probably also be paid for depreciation of the rest of the property which is due to the installations erected on the land given up,<sup>9</sup> but there is presumably only an obligation to compensate for this loss to the extent that the purchaser would have been eligible for compensation under the adjoining property laws.

No compensation can be claimed, under the law on compulsory purchase, for any damage subsequently done to the remainder of the property through an accident at the atomic plant. This is true, whether or not special compensation has been paid for depreciation through the risk presented by the new adjoining property; and it seems strange that it should make any difference, if an accident occurs and the surrounding properties are contaminated with radioactive substances, that the injured parties, perhaps years before, ceded part of their property to the atomic plant through compulsory purchase.<sup>1</sup>

### (2) *Adjoining Property Law*

The Danish juridical literature contains various doctrines to the effect that a landowner has a certain obligation to pay compensation for harm caused to his neighbours as a result of disturbance from his activities on his land. This obligation exists

<sup>8</sup> Act No. 126 of May 25, 1956, on compulsory purchase of certain sites, etc., for experimental work in connection with the peaceful use of nuclear energy, gave authority for the compulsory purchase of sites needed for the development of an atomic plant at Risø, Denmark.

<sup>9</sup> Cf. Poul Andersen, *Dansk Statsforfatningsret*, Copenhagen 1954, pp. 774-776.

<sup>1</sup> These questions are not clarified in the literature (cf. Poul Meyer, *Erstatningsfastsættelse ved ekspropriation*, Copenhagen 1943, pp. 54 ff.; Egon Larsen, *Ekspropriationserstatningen*, Copenhagen 1958, pp. 31 ff.; and Magne Schjødt, *Norsk ekspropriationsrett*, Oslo 1947, pp. 219-223). In 1940 NRt. 561, commented on in *T.f.R.* 1942, p. 239, compensation for subsequent damage was awarded; but in this case, there was talk of changing the purpose for which the property was originally purchased under compulsory powers.

when the disturbance caused through these activities is more of a nuisance than the inconvenience one is normally allowed to cause one's neighbour under the law.<sup>2</sup> Those disturbances are lawful which, as stated for German law in BGB Art. 906, "are normal for the local conditions of the property in the particular area concerned". The liability is usually said to be one of fault if the activities can be prohibited; but if the neighbours suffering the nuisance cannot have them prohibited, the liability is said to be strict.<sup>3</sup> It must be taken as certain that the courts have not the power to prohibit the operation of atomic plants whose erection has either been decided by the responsible authorities after consultation with experts or carried out with permission sanctioned by the statutes of the country,<sup>4</sup> and so the responsibility would be strict if liability were imputed for any damage caused by such plant.<sup>5</sup>

The principle of liberty of action where adjoining properties are involved is really only a special application of the standard of behaviour used in the ordinary fault principle. Both rules are concerned with activities which cause others greater inconvenience than that arising through normal behaviour. As far as excessive nuisances are concerned, the dividing line between strict liability and that for negligence is only needed for the regulations on injunctions.

The Danish scholar O. K. Magnussen<sup>6</sup> argues that the courts should be restrained from prohibiting activities which are an excessive nuisance to neighbours, when the site on which the plant

<sup>2</sup> For the extent to which, under American law, a reactor is a "nuisance" and therefore incurs liability for compensation as an "unreasonable interference with the interest of an individual in the use or enjoyment of land", see Seavey, *California Law Review* 1958, pp. 3 f.

<sup>3</sup> Cf. Ussing in *Skyld og Skade*, pp. 84 ff., esp. p. 95, in *Erstatningsret*, pp. 108 ff., and in *U.f.R.* 1947 B, pp. 281 ff., and Illum, *Dansk Tingsret*, Vol. 1, 1951, pp. 292 ff. See also the minority vote in 1955 *U.f.R.* 478 H.

<sup>4</sup> Cf. Act No. 312 of December 21, 1955 on the appointment of an atomic energy commission, and Act. No. 126 of May 25, 1956, on compulsory purchase for an atomic research station.

<sup>5</sup> Cf. Hans Joachim Fonk in *Atompraxis* 1957, p. 438, on the significance of the regulation in Art. 26 of the German industrial legislation, which runs as follows: "Insofar as the existing rights to the prevention of adverse effects, exerted from a piece of property on an adjoining property, enable the owner or occupier of the latter to take civil proceedings, such an action—when brought against an industrial plant erected with Government authority—can only be for the installation of contrivances which check the injurious effects or—when such installations cannot be made or are incompatible with proper operation of the plant—only for the payment of damages, and in no case can an action be brought for closure of the plant."

<sup>6</sup> O. K. Magnussen, *Naboretlige studier*, Copenhagen 1950, p. 261.

is built has been or could have been acquired under compulsory powers. However, this limitation on the power of the courts should apply only to nuisances which could be foreseen when the plant was set up.<sup>7</sup> This should follow from the fact that the right of neighbours—and of others—to enjoy the use of their land without disturbance can be limited only through compulsory acquisition; but this view is scarcely tenable.<sup>8</sup> The question whether or not authority for compulsory acquisition can be obtained for setting up a plant will often depend upon fortuitous circumstances. If the land required can be purchased in the ordinary way, there is no reason to pass a bill for compulsory acquisition. Moreover, the view is based upon the linking-up, criticized above, of the question of compensation with the question whether a particular enterprise can be lawfully operated. Many forms of interference which—judged by the ordinary rules of the law on adjoining properties—would constitute an excessive nuisance must presumably, according to the circumstances bearing on the regulation in Art. 73 of the Constitution regarding the protection of property rights, be counted as permissible adaptations of the law of property.<sup>9</sup>

The particular feature of the adjoining property law as compared with the fault principle is perhaps that the activities frequently need not be so objectionable or abnormal for liability to be imputed.<sup>1</sup> Moreover, in the same way as for the law of compulsory purchase, it is presumably only the fall in the value of the surrounding land, caused by special use of the site or by the erection of a special installation that is the source of the nuisance, which is covered by the special adjoining properties law. On the other hand, the question whether compensation is to be paid for damage caused through occurrences in the nature of an isolated incident must be decided according to the ordinary tort rules.<sup>2</sup>

Supposing the fear that the atomic plant will do damage causes the value of the surrounding land to fall, it should be made possible for compensation to be paid for this loss in value under the law on adjoining properties, if this risk and fear are found to be an excessive nuisance. It is difficult to say whether

<sup>7</sup> In other cases, O. K. Magnusson would solve the question of prohibition according to the principles for building on extraneous land.

<sup>8</sup> Cf. Ussing in *Juristen* 1950, pp. 259, 267, and Illum in *U.f.R.* 1950 B, pp. 243, 252.

<sup>9</sup> As an example, excessive noise from aircraft at airports may perhaps be mentioned (cf. Riese, *Luftrecht*, Stuttgart 1949, pp. 236 f.).

<sup>1</sup> Cf. Illum, *Dansk Tingsret*, Vol. I, pp. 290 f. with footnote 15.

<sup>2</sup> Cf. Ussing, *Erstatningsret*, pp. 108 f., and Ljungman, *Om skada och olägenhet från grannfastighet*, Uppsala 1943, pp. 58 ff.

the risk to which a reactor exposes neighbours living outside closed and safety zones is of this character. It is at all events an unusual phenomenon, insofar as there are not many reactors in existence; yet despite the formulation of the rule, this cannot be decisive. The law must be assumed to lay emphasis on whether the risk of damage presented by the reactor exceeds a level which is more or less normal for industrial enterprises.<sup>3</sup> However, nothing definite can be said either as to what is a "normal level" or about the degree of the risk—a slight one—presented by a reactor. The outcome of an application of the rule will therefore be moulded to a large extent by the judge's own feelings, his sympathy with persons suffering economic loss or with the atomic plant which has caused this loss and by his intuitive feeling as to whether the enterprise should or should not pay. If there really is a fall in the land values owing to a well-founded fear of damage caused by the atomic plant, it may well be that a decision based on the said principles will go against the atomic industry; but those conditions will seldom be fulfilled. For one thing, the risk of suffering damage will be so slight that sober and reasonable judgment of the situation cannot give it any weight, and for another, the anticipated demand for additional land for extensions, housing, etc., will probably as a rule raise market values.<sup>4</sup>

#### IV. THE SCOPE OF A RULE ON STRICT LIABILITY

The exact determination of the cases in which the rule on strict liability will apply presents one of the most difficult problems which the drafter of a statute has to meet within this field; and it is natural that thorough studies should be required, in order to see what hazards the various types of plant associated with the use of nuclear energy involve. These investigations can only be carried out by technical experts. It is left to the legal experts to consider for what types of damage this special protection is

<sup>3</sup> Cf. Illum, *Dansk Tingsret*, vol. I, pp. 293 f.; cf. Ussing in *U.f.R.* 1947 B, pp. 281 ff.

<sup>4</sup> Cf. Poul Andersen, *Dansk Statsforfatningsret*, pp. 776 ff.

required, and whether the existing laws on strict responsibility in other fields can be used as models.

One possibility is for the rule to be applied to any damage which takes place on the plant site, and to damage outside the plant to which the operation of the plant is the cause. On this basis, there would be responsibility both in case the accident is of a special character and in case it is altogether like other accidents for the consequences of which compensation is paid only according to the rule of negligence, falls on stairs or polished floors, to take only one example. A legal situation approaching this has been created by the Danish courts in their decisions on the application of the Railway Accidents Act (Act. No. 117 of March 11, 1921). According to the provisions in secs. 1, 5 and 7, this Act covers certain types of injury caused to passengers "through railway operation", and damage from sparks caused to real and personal property outside the railway. The courts seem to have interpreted the expression "through railway operation" mainly as meaning within the railway area. Thus in 1941 U.f.R. 532, the Supreme Court applied the law to a claim for damages from a traveller who had fallen in a tunnel leading under the tracks.<sup>5</sup>

Of course, by making the activity strictly liable for any damage caused, the technical advantage of a rule easy to formulate and easy to interpret is achieved; but, at the same time, this is the only argument which can be adduced in favour of a law to the effect that compensation shall be paid unconditionally for *any* accident caused by an atomic plant. It would be odd if, for example, the liability for damages in the event of an accident in the heating plant of the undertaking—which can hardly be distinguished from other heating plants—should be judged according to special regulations on liability.

As already mentioned, technical knowledge is required even for exact formulation of the field of application of the objective law. However, in order that the legal experts shall be able to start their work on a draft for submission to the authorities concerned, an attempt must be made to formulate some general directives for their work. The main object of a rule for atomic

<sup>5</sup> For interpretation of the Railway Accident Act, see further von Eyben in *U.f.R.* 1948 B, pp. 131 f. The law on liability for dangerous practices established in Norwegian legal usage does not seem to impute an ordinary strict liability to the railways (cf. 1955 N.Rt. 243—commented on in *T.f.R.* 1956, p. 472, and George Lous, *Jernbanens erstatningsansvar*, Oslo 1954).

compensation must be to give the public such protection and reassurance as can be achieved with money, and it is therefore natural that the starting point should be that the objective responsibility should cover a field that is too wide, rather than one which is too small. On the other hand, certain disadvantages are involved in extending the responsibility to cover certain conventional accidents.

In the first place, it is presumably always desirable to avoid unwarranted changes in the legal system. This viewpoint is particularly important when a rule on liability, such as the one under consideration for the atomic field, is to be included in an international agreement, since it means that adoption of the agreement will depend upon several countries being willing to make extensive changes in their civil law.

Next, it must be remembered that a rule on strict responsibility whose field of application covers ordinary accidents as well, will result in accidents of the same kind being dealt with in different ways. The frequency in practice of such differences will depend, among other things, on the severity with which the fault principle is applied to the ordinary accidents which are included.

A third consideration in framing the rule on atomic compensation is that, as far as possible, the activities to which the liability applies must be specified, *inter alia* because private persons operating activities to which a rule of strict liability is applicable, wholly or in part, will presumably have to meet their special responsibility, by taking out insurance or by some other financial guarantee. Probably it is not necessary to make the field to which the rule of a strict liability shall apply identical with that of a special atomic liability insurance; but identity would be preferable from the point of view of simplicity. Moreover, the scope of the strict liability may be—but is not necessarily—decisive for the applicability of yet another set of rules, namely any special regulations regarding limitation of liability, limitation of claims and proceedings for compensation claims that may be included in the law on atomic liability.

If the viewpoints advanced here are accepted as the basis for formulating the rule of liability, it may presumably be asserted that this rule must in any case cover catastrophes which—owing to the nature of their occurrence, the course they take or their extent—are peculiar to atomic concerns. It may be possible to specify which activities present this kind of catastrophe hazard, merely by reference to any existing regulations governing permis-

sion or concessions for such activities.<sup>6</sup> If this procedure is followed, the question of enforcing the obligation to take out insurance will solve itself.

The principal undertakings which present a radiation hazard, and which will therefore presumably be subjected to strict liability, are reactors, plants producing or treating reactor fuel elements, and the fuel-storage establishments. However, a list of enterprises which should be covered by the special law on liability may soon become out of date owing to the rate of technical progress. There may thus be grounds for empowering the administrative authorities concerned to include new undertakings in the list. A model is Art. 1 (ii) of the Organization for European Economic Cooperation draft. Nuclear installations are here defined as "reactors, other than those comprised in any means of transport; factories for the manufacture or processing of nuclear substances; factories for the separation of isotopes of nuclear fuel; factories for the reprocessing of irradiated nuclear fuel; facilities for the storage of nuclear substances; and such other installations in which there are nuclear fuel or radioactive products of waste as the Steering Committee of the European Nuclear Energy Agency (hereinafter referred to as the 'Steering Committee') shall from time to time determine."<sup>7</sup>

The special hazard of the atomic industry which the new liability rules are to cover is due to the fact that the industry works with radioactive materials, and so it is natural to ask whether *all* damage caused by radioactive materials or by radiation should be covered by the special liability. However, it is hardly necessary to introduce such an extensive rule. In this connection, the main interest is centred on the possession and use of radioactive isotopes, which are being used more and more in industry, medicine and research. These, however, are often used in such small amounts that, precisely for this reason, they do not involve much

<sup>6</sup> There are regulations of this kind in sec. 10 of the American Atomic Energy Act (1954). Sweden has passed a concession law—"Lag om rätt att utvinna atomenergi m.m. (atomenergilag)" No. 306 of June 1, 1956. The preliminary work for the Act is contained in *S.O.U.* 1956: 11.

<sup>7</sup> This delegation of competency has aroused concern among some of the committee members. However, it seems safe to leave these technical questions to an international body of experts, in which all the member countries are represented and in which unanimity is required. Moreover, as far as Denmark is concerned, there are several precedents both for the delegation of authority to amend a law (cf., e.g., Act. No. 295 of September 30, 1954) and of delegation to agencies other than the Cabinet (cf. Order No. 12 of June 15, 1955, and Poul Andersen, *Dansk Statsforfatningsret*, pp. 551 f.).

danger.<sup>8</sup> The risk of extensive damage only exists where there is a possibility of large quantities of radioactive substances being spread over a fairly wide area. Although radioactive isotopes have been known for years, no demand has been made for the ordinary laws on liability to be tightened up.<sup>9</sup> This question should presumably be left alone for the time being.

If it is assumed that the basis for defining the field of liability must be an enumeration of the types of activities which *inter alia* present a special nuclear risk, the next question is whether the strict liability is to cover all damage caused by these activities, or whether it should be limited to particular kinds of damage. For reasons given before, the author is of the opinion that such a limitation should be made, if it is possible to draw a satisfactory line between ordinary and special accidents. The basis for answering this question must be provided by physicists and biologists. An indication of the direction in which a solution might be found is given in the American atomic compensation statute passed in 1957, the Anderson-Price Act, which describes the special atomic hazard as "any occurrence... causing bodily injury, sickness, disease, or death, or loss of or damage to property, arising out of or resulting from the radioactive, toxic, explosive or other hazardous properties of source, special nuclear or by-product material". The American statute thus attaches decisive importance to whether the damage is caused by a dangerous property of the materials mentioned. In a draft drawn up by the insurance companies in the six Euratom countries,<sup>1</sup> an attempt has been made to find the criterion in the cause of the accident, and it is thought that the atomic risk can be described as the risk

<sup>8</sup> There is no record of radioactive isotopes causing serious accidents (cf. National Academy of Sciences, *The Biological Effects of Atomic Radiation*, 1956, p. 105). In this connection it may also be mentioned that under sec. 1, subsec. 2, of Act No. 94 of March 31, 1953, on the use, etc. of radioactive substances, the Board of Health may lay down general regulations on exemption from the control of these materials introduced by the Act. Such regulations are given in Order No. 127 of March 31, 1953.

<sup>9</sup> In a German draft "*Atomgesetz*", however, it is proposed to impose liability for negligence, with a reversed burden of proof, on people in possession of radioactive substance; but this liability is not to exist when "between the holder and the injured party a legal relationship exists, by reason of which the latter has been exposed to the hazard originating from the material".

<sup>1</sup> In a treaty signed in Rome on March 25, 1957, Belgium, France, Holland, Italy, Luxembourg and Germany set up a "European atomic energy community" (EURATOM). The Community is to create the necessary conditions for the formation and rapid development of an atomic energy industry, with a view to raising the standard of living in the member countries and helping to develop cooperation with the other countries.

associated with the presence of fissile material in such quantity that criticality, i.e. the onset of a continuous nuclear process, exists or can arise. Sec. 2, subsec. 1, of the draft runs as follows:

The operator of a concern in which the criticality point of fissile materials is liable to be reached, and the legal possessor of nuclear fields, residues or waste produced by a chain reaction, are responsible—under the conditions and within the limits stipulated in the present Convention—for any bodily or material damage caused to third parties by a process of nuclear transmutation.

In the draft prepared by the group of legal experts under European Nuclear Energy Agency (E.N.E.A.) it is thought that “the operator” of a “nuclear installation” should be imputed objective liability for damage due to “nuclear incidents”. The definition of nuclear installation is set out above.<sup>2</sup> The two other key-words are defined as follows:

“Operator” in relation to a nuclear installation means the person designated or recognized by the competent public authority as the operator of that installation.

“Nuclear incident” means any occurrence or succession of occurrences having the same origin which causes damage, provided that such occurrence or succession of occurrences, or the damage, arises out of or results from the radioactive properties, or a combination of radioactive properties with toxic, explosive, or other hazardous properties of nuclear fuel or radioactive products or waste or with any of them.

## V. LIMITATION OF LIABILITY

It is evident that a maximum liability must be established for the third-party-risk insurance policies which the atomic industry will presumably have to take out. No insurer can assume an unlimited risk.<sup>3</sup> However, further study is required in order to decide whether the responsible person's own liability for damages should be limited as well, so that the damages which he has to pay in

<sup>2</sup> See *supra*, p. 81.

<sup>3</sup> But as suggested in the Danish report on motor third party liability, No. 179 (1957), pp. 17 and 41, a maximum is only fixed for the third party liability insurer's liability for property damage, not for personal injury.

connection with a single accident or within a certain period of time cannot exceed a maximum amount.<sup>4</sup>

In most countries, the liability of shipowners has been limited since early times. On August 25, 1924, an international agreement was signed in Brussels on the introduction of certain uniform regulations for limitation of shipowners' liability. This agreement was ratified by Denmark on June 1, 1930 (cf. Order No. 36 of February 24, 1941), after its provisions had been inserted in the Maritime Code through Act No. 69 of March 27, 1929.<sup>5</sup> The rules of the Convention were revised in 1957.<sup>6</sup>

Apart from this, in Danish law as it now stands there are no general limitations of the obligation to pay compensation, not even in cases of strict liability. Thus, liability under the Railway Accidents Act and the Dog Owners' Liability Act is unlimited, though the amount of compensation payable to each individual injured party is limited under the Railway Accidents Act (cf. sec. 4 of the Act).<sup>7</sup> The strict third-party liability under secs. 36 and 37 of the Aviation Accidents Act is also without limits. However, under both the 1933 Rome Convention and the revised Convention of 1952 on damage caused by aircraft on the ground, the

<sup>4</sup> Under sec. 66 of the Motor Traffic Act, "any owner of a motor-driven vehicle" must take out a third party insurance policy, which covers all personal damage and property damage up to 60,000 Danish kroner, but this does not limit the liability of those who use the vehicle or allow it to be used.

<sup>5</sup> Cf. *Rigsdagstidende* 1928-29, supplement A, col. 3686, and Sindballe, *Dansk Søret*, Copenhagen 1936-38, pp. 479 ff. Through Act No. 149 of May 7, 1937, some changes were made in the wording of the regulations, which have now been included in sec. 10 of the Act (cf. *Rigsdagstidende* 1936-37, supplement A, cols. 4169 and 4253).

<sup>6</sup> Cf. Philip in *U.f.R.* 1958 B, pp. 7 ff.

<sup>7</sup> In sec. 6 of the draft statute on compensation for damage caused through the use of motorcars, it is proposed that compensation for personal injury should be limited to 150,000 kroner for each person injured or killed (cf. Order No. 179, 1957, pp. 17, 41 and 50). Under Art. 11 of the 1952 Rome Convention, the liability for each person is limited to 500,000 Poincaré francs. Under Art. 22 of the Warsaw Convention, the maximum for passengers is 125,000 francs. This maximum was raised to 250,000 francs through a protocol to the Convention, signed at the Hague in 1955 (cf. Cheng in *Current Legal Problems* 1956, pp. 220 ff.; Riese, *Luftrecht*, pp. 462-69; and Hjalsted in *U.f.R.* 1957 B, pp. 11 ff.). For the sake of comparison it may be mentioned that the present value of 1 Poincaré franc is approx. 0.45 kroner. The Warsaw Convention, signed in 1929, was ratified by Denmark in 1937 (cf. Order No. 16 of May 16, 1937). Its provisions had earlier been embodied in the Air Transport Act (Act No. 123 of May 7, 1937). Under sec. 22 of this Act, the maximum for personal injury is 18,250 kroner and 37 kroner per kg for registered goods. Any maxima fixed in the atomic liability laws should hardly be in gold currency (cf. remarks in *Rigsdagstidende* 1950-51, supplement A, cols. 5281 and 5285 on Acts Nos. 93 and 94 of March 14, 1951, which cancel the gold clauses in the law on sea transport).

liability is limited to a maximum amount, which depends upon the weight of the aircraft.<sup>8</sup>

In the discussions on laws for atomic liability among E.N.E.A.'s group of legal experts, there has been general agreement that the liability should be limited and that the limit should refer to the total amount payable and not to the individual claims unless all the claims added to one another exceed the limit presented, and the same conclusion has been reached in the U.S.A. The Anderson-Price Act, however, does not introduce any rules limiting the responsibility of the operators. It only deals with the financing of their obligations under the law as it stands. Under the American act the Atomic Energy Commission has to indemnify the concessionaires for any liability they incur for atomic damage, up to an amount of 500 million dollars. The Commission must also ensure that an insurance policy for an amount fixed by the Commission is taken out for the plant concerned. The Commission may demand that the policy be for the maximum amount which the market in the U.S.A. can cover, approximately 60 million dollars.<sup>9</sup>

In support of limiting liability, some people have pointed out that such a rule is a natural counterpart to extension of the basis of the liability, a *quid pro quo*. This argument is not convincing. No statute and no legal or moral rule compels any one group of persons to pay for an improvement in their position in one respect by a reduction in another, and the grounds given cannot in any case bear the general conclusion that liability for negligence should be limited as well. The question of to what amount a damage shall be compensated cannot be answered with the help of moral maxims such as *cujus commodum, ejus periculum*, etc., which still adorn the legal literature. The basis for fixing a maximum for the damages is simply an opinion about what one thinks one can afford to pay one's unfortunate fellow-citizens. There is more realism in the consideration that the prospect, or rather the fear, of possibly being faced with an unlimited, ruinous claim for damages will perhaps cause the atomic enterprises to choose a form of organization which is objectionable from other points of view. The enterprise may find it preferable to let each single reactor be operated by a limited liability company which only owns the reactor itself. The injured parties can then only receive at the most, in addition to the maximum amount under the third-

<sup>8</sup> These conventions have not yet been ratified by a great number of countries.

<sup>9</sup> For further details, see Thomas in *California Law Review* 1958, pp. 14 ff.

party insurance, an amount corresponding to the value of the reactor after the accident. However, it does not seem very possible that unlimited liability for damages could—as has been asserted—place major obstacles in the way of the development of an atomic industry. So far no country has limited the liability for atomic damage, yet development is continuing as fast as the countries' resources allow. In the face of unlimited liability, people in atomic industry are consoling themselves with the hope that a major disaster will never occur, and that in any particular case a reasonable solution to the financial questions will be found. In all events the main objective must be to eliminate the risk of atomic accidents as far as possible. By comparison, the settlement of financial questions after such an accident is a minor matter. On the other hand, the accountants must of course take third-party and plant-insurance premiums into consideration in their calculations of the profitability of the atomic enterprises.

Discussions of the problems associated with possible limits of liability will to some extent be left hanging in the air, so long as it is altogether uncertain what the maximum amount may conceivably be. Some figures have been mentioned, however. In some early drafts for an atomic law for Western Germany, 15 or 25 million DM has been proposed as the upper limit of liability for damage arising out of a single accident. A Swiss proposal sets the limit at 30 million Swiss francs.<sup>1</sup> In Britain an act has been passed making the maximum liability £5 million.<sup>2</sup> Technically the British act and the later German drafts do not limit the responsibility of the operator. They say instead that he only has to fulfil his obligation to pay damages with the amount which has to be covered by insurance, e.g. £5 million, plus what money the state may wish to pay towards meeting the claims of the victims. This does not change the practical implications of the rules, but it might make them easier for parliaments to swallow. According to the E.N.E.A. draft convention, the signatory countries can fix the maximum at an amount between 5 and 15 million E.M.A. units.<sup>3</sup>

It has been found necessary to allow a good deal of variation in the text of a convention, *inter alia* because widely varying compensation amounts are paid for the same kinds of damage in the different countries. The level of compensation depends

<sup>1</sup> See Kaufmann in *Schweizerische Juristen-Zeitung* 1957, No. 20, pp. 3 ff.

<sup>2</sup> See *Economist*, February 15, 1958, p. 602.

<sup>3</sup> 1 European Monetary Agreement unit is approximately equal to 1 dollar.

upon the standard of living and traditional practice. None of the drafts proposes that the maximum should be adjusted to the degree of risk which the particular plant is thought to present; instead, they all propose that the same figure be used for any activity covered by the special liability regulations. In the Rome Conventions of 1933 and 1952 on "damage caused by foreign aircraft to third parties on the surface", however, an attempt has been made to draw up a scale of liability limitations according to the anticipated extent of the damage which might occur, since the maximum amount is made to depend upon the weight of the aircraft.<sup>4</sup> The reason why none of the European drafts has attempted to draw up a scale of this kind, is simply that the experts do not consider themselves able at present to make an estimate of the extent of any possible damage sufficiently reliable for the purpose of fixing various maximum amounts for different types of plant. The American Price-Anderson Act leaves it to the Atomic Energy Commission in every case to fix the amount which the owner of a reactor must cover for third-party insurance.

Limitation of liability necessarily means that those who suffer damage through an accident which affects a lot of other people as well will not get full compensation. Any objections there might be to limiting the liability therefore lose their weight as the maximum is increased.<sup>5</sup> If the limit of £5 million specified in England is adopted by the OEEC member countries, the liability will presumably have reached the maximum which is at present coverable by the third-party insurance companies, and any liability above this limit would therefore have to be borne by the Government. It might mean ruin for those liable—e.g. hydroelectric and thermal power stations—if unlimited civil liability were adhered to. In many cases, such liability would not have much value for the injured parties, and even in cases where the party responsible is a giant power station company, perhaps holding assets worth several hundred million kroner worth of assets and thus able to pay amounts far above the liability limit, a limit for the liability should perhaps be maintained. It is hardly wise to create an obligation to pay—perhaps on an uncertain date in the future—compensation above a certain (very large) amount. The important point is not whether this obligation is imposed on the Government or on the industry. No one can say in advance

<sup>4</sup> For further details, see Art. 11 of the 1952 Convention.

<sup>5</sup> On objections to limiting contractual liability, see in Danish legal literature Günther Petersen, *Ansvarsfraskrivelse*, Copenhagen 1957, pp. 48 ff.

what effect the payment of such enormous sums will have on the country's economy. It is certain that a large part of the money would be taken from production and used for consumption. In line with this, it has for example been mentioned—as an argument in favour of the law to the effect that the Government is not liable for war damage—that the losses might be so great that it would not be possible to cover them in practice.<sup>6</sup>

Of course, if a definite limit is set to the legal liability—whether it be the Government's liability or that of private industry—this does not mean that no help can be given above this maximum to the victims of a catastrophe. However, the extent and nature of the aid given will not be determined according to compensation regulations established beforehand; instead, the legislative authority and charitable organizations must, when the situation arises, decide the amount and nature of the aid.<sup>7</sup>

The risk of atomic accidents is not the only source of great danger in the world. Other industries, too, present risks—very slight, it is true—of causing accidents which may be very extensive. One might therefore expect that ordinary compensation law should be familiar with the question as to how far the provisions of ordinary compensation law are suitable as a basis for the programme of financial indemnity and aid after far-reaching disasters. However, this is not the case; the question has not been thoroughly discussed before, probably because in the course of time people have become fatalistic or indifferent to so many other sources of danger in modern society, such as accumulations of toxic materials, explosives or inflammable liquids, etc. Now the public's attention has been attracted in quite another way by the risks involved in the use of atomic energy, and so the question has been put on the agenda.

When any limitation of atomic liability is worked out in detail, a number of technical difficulties will be encountered. These questions are not peculiar to atomic liability, and so, to make it possible for the problems to be sorted out more easily and for proposals to be drawn up for solving them, it may well prove

<sup>6</sup> Troels G. Jørgensen in *T.f.R.* 1908, p. 119, and Ussing, *Skyld og Skade*, p. 79, footnote 11, cf. pp. 70 f.

<sup>7</sup> Cf. Hindenburg's comments in *T.f.R.* 1910, pp. 407 f., on war damage. Special rules have been introduced before for full or partial compensation for the consequences of a catastrophe. For example, Act No. 475 of October 1, 1945, on compensation for victims under the occupation, and the laws on compensation for war damage introduced after the Schleswig battles (cf. 1881 U.f.R. 841 H and Troels G. Jørgensen in *T.f.R.* 1908, pp. 117–123).

fruitful to study in practice the rules applicable in other fields for limiting liability. There are, as mentioned before, rules of this kind in the Brussels Conventions on certain uniform regulations for limitations of shipowners' liability and in the 1933 and 1952 Rome Conventions on damage caused by aircraft on the ground.

If it is conceded that liability limitation is not merely based on the fact that the limitation is a natural part of strict liability, the question arises whether limitation should be applied to strict responsibility alone, or whether it should be applied to cases of negligence as well. In this field, the dividing line between negligence and non-negligence is particularly difficult to define. Where new things are concerned, progress has to be made by trial and error. There is no clear dividing line between audacious but defensible experiments and negligent behaviour. If the same regulations are applied to strict liability and liability for negligence there is no need to decide whether or not blame is to be imputed in cases where it is neither possible nor defensible to give an authoritative answer to this question. Besides this, the liability of the undertaking, both for its equipment and for its operation, will always depend upon its liability for its staff or organization. In any case, the enterprise has just as great a need for limitation of liability for the consequences of a mistake made by one of its employees, as for accidents due, for example, to an unforeseeable failure of its equipment. Both types of accident may occur in the undertaking. Whereas the first-mentioned considerations only favour limitation of liability for ordinary negligence, if the latter consideration is taken fully into account, liability for gross negligence will have to be limited as well. In the opinion of some, however, it would be scandalous if full liability were not imputed to the enterprise in cases where its employees have shown gross negligence.<sup>8</sup> It must be a sufficient concession to this view to make a special regulation imposing full liability on the enterprise for accidents due to gross negligence of the managing director and the members of the board in their management of the enterprise. Art. 12 of the 1952 Rome Convention contains a more extensive regulation. In case of *dolus* of any servant acting in the course of his employment and within the scope of his

<sup>8</sup> Cf. Art. 8 of the draft Motor Accidents Act in Report No. 179 of 1957, and Günther Petersen, *Ansvarsfraskrivelse*, pp. 45 ff., on clauses concerning exemption from liability.

authority, the liability is unlimited.<sup>9</sup> In the opinion of the author special regulations of this kind can do more harm than good. To set against the moral fear that the guilty party will not get what he deserves, there is some consolation in the fact that the law has other and far more suitable means at its disposal, especially penal measures, for expressing society's disapproval of reprehensible acts. The question whether personal liability can be imputed to a single person for damage which is not covered by the maximum amount is without any practical importance.<sup>1</sup>

If legal limitation of the atomic industry's liability is to be introduced, it is not sufficient merely to make a regulation saying just that. It will also be necessary to introduce a number of subsidiary regulations, to ensure that the party liable does not pay anything in excess of the maximum amount in compensation for the consequences of an accident, and regulations for ensuring that those entitled to compensation at all events get equitable satisfaction of their claims, if they cannot get full cover. Both the Brussels Conventions and the Rome Conventions contain subsidiary regulations of this kind. Similar problems arise in cases of compensation for motor accidents, when the party liable is insolvent and the total damages exceed the insurer's limit of liability.<sup>2</sup>

In the atomic field, the efforts to achieve equitable apportionment of the compensation amount between the injured parties come up against a special difficulty, in that it may take a long time for all the damages to be ascertained. In cases where delayed injuries may occur, there can only be a full guarantee that all the claims are considered if the period of limitation is allowed to expire before compensation is paid; and it is obvious that often an injured person cannot be made to wait so long.<sup>3</sup> One effective arrangement which makes it possible to start the payments promptly, is to group together, in order of priority, the claims

<sup>9</sup> Art. 12 runs as follows: "1. If the person who suffers damage proves that it was caused by a deliberate act or omission of the operator, his servant or agents, done with intent to cause damage, the liability of the operator shall be unlimited; provided that in the case of such act or omission of such servant or agent, it is also proved that he was acting in the course of his employment and within the scope of his authority. 2. If a person wrongfully makes use of an aircraft without the consent of the person entitled to use it, his liability shall be unlimited."

<sup>1</sup> On personal liability for motor traffic accidents, cf. secs. 65, subsec. 6, and 66, subsec. 7, of the Motor Traffic Act, and Report No. 179 (1957), pp. 27 ff.

<sup>2</sup> Cf. also Sindballe, *Dansk Forsikringsret*, Vol. 1, Copenhagen 1948, pp. 177 f.

<sup>3</sup> Cf. the regulation in sec. 24 of the Scandinavian Insurance Contract Acts.

lodged within a certain period. There is a provision to this effect in Art. 19 of the 1952 Rome Convention, according to which "if a claimant has not brought an action to enforce his claim or if notification of such claim has not been given to the operator within a period of six months from the date of the incident which gave rise to the damage, the claimant shall only be entitled to compensation out of the amount for which the operator remains liable after all claims made within that period have been met in full". In the atomic field, however, it is perhaps wiser to keep to a more cautious rule, as in the Price-Anderson Act. The rule in sec. 170, e, of this statute authorizes the appropriate district court of the United States having venue in bankruptcy matters to issue such "orders as may be appropriate for enforcement of the provisions of this section, including an order limiting the liability of the persons indemnified, orders staying the payment of claims and the execution of court judgments, orders apportioning the payments to be made to claimants, orders permitting partial payment to be made before final determination of the total claims, and an order setting aside a part of the funds available for possible latent injuries not discovered until a later time". If it should happen that so much is paid out to those injured parties who give early notification that equal amounts cannot be paid to those who give notice later on, neither the enterprise nor the injured who have received full compensation are obliged to pay anything in excess.

One special question is whether efforts should be made—in cases where full compensation cannot be paid for all the damage—to place all the claims on an equal footing, or whether priority should be given to certain groups of injured persons or perhaps even to individuals who have a special need for compensation. The 1952 Rome Convention takes a step in this direction. Art. 14 gives those who have suffered personal injury priority over those who have suffered damage to property,<sup>4</sup> presumably on the grounds

<sup>4</sup> Art. 14 runs as follows: "If the total amount of the claims established exceed the limit of liability applicable under the provisions of this Convention, the following rules shall apply, taking into account the provisions of paragraph 2 of Article 11.

(a) If the claims are exclusively in respect of loss of life or personal injury or exclusively in respect of damage to property, such claims shall be reduced in proportion to their respective amounts.

(b) If the claims are both in respect of loss of life or personal injury and in respect of damage to property, one half of the total sum distributable shall be appropriated preferentially to meet claims in respect of loss of life and personal injury and, if insufficient, shall be distributed proportionately

that a person who has only lost property is still left with his ability to work. A rule such as that in Art. 14 is probably only suitable where the amount of the liability is not set so high that it may be considered suitable to use a substantial part of it, e.g., for rebuilding plants and houses.

So far, only limitation of the compensation amount has been discussed; but there is also the question of limiting the liability in such a way that the atomic plant does not have to cover some of the types of damage which a party causing damage normally has to pay under the regulations. In some countries the opinion is widespread that strict liability should not include an obligation to pay compensation for non-material damage.<sup>5</sup> It has been proposed that the obligation to indemnify non-financial damage should be abolished altogether. Under sec. 15 of the so-called Promulgation Act of 1930, anyone who is liable for personal injury according to the Danish law of torts<sup>6</sup> must pay damages for pain and suffering and certain other kinds of non-financial injury. The author cannot find it proper to depart from this basic principle as far as atomic liability is concerned. The small compensation given under Danish law for pain and suffering is a reasonable supplement to the modest sums paid in compensation for financial loss in personal injury cases. It is possible, however, that in other countries injured persons are compensated on a more generous basis and that it would be prudent to be more restrictive. In view of the difference between the situations of each country, the draft convention on liability for atomic damage proposes merely that compensation must be paid for the "damage" caused. Each country may make its own decision as to what types of damage are "damage" in the sense of the convention.<sup>7</sup> In the same way, the conven-

between the claims concerned. The remainder of the total sum distributable shall be distributed proportionately among the claims in respect of damage to property and the portion not already covered of the claims in respect of loss of life and personal injury".

<sup>5</sup> Seavey in *California Law Review* 1958, p. 11, and Esser, *Gefährdungshaftung*, p. 108. Cf. Soergel's commentary on BGB, Art. 847, Note 1, and Oftinger, *Schweizerisches Haftpflichtrecht*, pp. 217 ff. In some countries, liability for non-financial damage is imposed for gross negligence (cf. on Norwegian law Øvergaard, *Norsk erstatningsrett*, 2nd ed., pp. 350 ff. and p. 198).

<sup>6</sup> This expression also covers the rules on strict liability (cf. Ussing, *Erstatningsret*, pp. 205 f.). The regulation will presumably be applied even though the compensation amount is limited. Cf. 1953 U.f.R. 484 H.

<sup>7</sup> This procedure is followed in the 1952 Rome Convention, Art. 1 of which states: "Any person who suffers damage on the surface shall..." The Convention does not state anywhere what meaning it gives to the word "damage".

tion may avoid making a decision as to how far the party liable is obliged to indemnify only damage which is more or less closely associated with the accident. Art. 1 of the Rome Convention states that only such damage as is a "direct consequence of the incident" must be indemnified under the provisions of the Convention.<sup>8</sup> For atomic liability it has been proposed that a rule should be introduced to the effect that the liability for damages does not cover "general economic loss".<sup>9</sup> There are hardly grounds for attempting to fix the scope of the compensation claim in an atomic compensation law in this or other ways. It is to prefer that the question is solved in accordance with ordinary principles on remoteness of the damage. However, in a draft German *Atomgesetz* it has been considered necessary to assert that compensation may involve loss suffered through property being unusable owing to radioactive contamination: "Under the provisions of this Section, if the utility of an object is affected through the effects of radiation from a radioactive material, the damage shall be treated in the same way as damage to property."

## VI. COMPULSORY LIABILITY INSURANCE<sup>1</sup>

It should perhaps be made a condition, for private persons who seek permission to operate reactors and other nuclear plants, that they must provide a guarantee, for example by taking out a liability insurance policy, so that the undertaking can meet its liabilities for damages should the need arise. The accident insurance companies in many countries have already formed national

<sup>8</sup> Cf. Riese, *Luftrecht*, p. 337, and Shawcross and Beaumont, *Air Law*, London 1945, pp. 247 f.

<sup>9</sup> The corresponding expression is used in Germany and in Sweden, e.g. by Karlgren in *Skadeståndsrätt*, pp. 97 f., to indicate financial loss other than that arising from damage caused to person or to any particular property.

<sup>1</sup> There are several reports on insurance against atomic risk, e.g. British Insurance (Atomic Energy) Committee, *Report of the Advisory Committee*, April 1957; The Insurance Institute of London, *Atomic Energy—Insurance Problems Arising Therefrom*, December 1956; Atomic Industrial Forum, *Financial Protection Against Atomic Hazards*, Jan. 1957. This latter report is discussed in detail by Becker in *The George Washington Law Review* 1957, pp. 535 ff. Lastly, the Swiss author Belser has written a number of articles and reports on the subject, e.g. *L'Assurance des Risques Nucléaires*, Feb. 1957, and *Die Stellung der Versicherung zu den Risiken der Kernenergie*, Oct. 1957.

pools for such liability insurances. Here we shall only discuss briefly a few of the questions which arise in framing these insurance schemes.<sup>2</sup>

It was mentioned above that the insurers must have a limit fixed for their financial liability. If this limit is required to be absolutely rigid, the insurers must rest content merely with an undertaking to pay out at the most the maximum amount within an insurance period. It is not a general practice in liability insurance to make the insurance amount the limit for the total compensation payable within a period.<sup>3</sup> Nor would it be advisable to do so, since the insurance required is not reduced on the occurrence of the event covered by the insurance.<sup>4</sup> It has been asserted, however, that in atomic insurance the economic burden is so heavy that the companies must confine their obligation to payment of the insurance amount, in aggregate, only once during a period. Thus, a Swiss draft atomic statute has fixed a maximum, both for compensation liability and insurance liability, of 30 million francs, less any amount paid out previously to cover damages. At the same time, the enterprise is obliged to restore the whole guarantee amount as quickly as possible.<sup>5</sup>

It is difficult to fix premiums for atomic insurance. There are (fortunately) no statistics on atomic damage, and the experts are often unable to say anything about the risk of an accident occurring, other than that it is extremely slight. The two Ameri-

<sup>2</sup> There are regulations on compulsory liability insurance in the Motor Traffic Act—cf. Order No. 314 of December 21, 1927—and in the Dogs Act—cf. Order No. 259 of September 1, 1937. Regarding liability insurance under the Aviation Accidents Act, see sec. 39 of the Act. The Rome Convention rules on the provision of guarantees for meeting liability for damages are discussed in Riese, *Luftrecht*, pp. 362–72.

<sup>3</sup> Ussing, *Enkelte kontrakter*, 2nd ed., Copenhagen 1946, p. 252, Drachmann Bentzon & Knud Christensen, *Lov om forsikringsaftaler*, 2nd ed., Copenhagen 1952–54, p. 467. On the problem, see also sec. 74 of the Insurance Contract Act; cf. Ussing, *op.cit.*, p. 251, and Sindballe, *Dansk forsikringsret*, Vol. 1, pp. 175 ff.

<sup>4</sup> Sindballe, *op.cit.*, p. 177.

<sup>5</sup> Art. 21 of this draft runs as follows: "1. When the insurer has provided loans or created reserves to cover accidents, the insured amount is reduced to the extent of these amounts. If these loans or reserves amount to one-tenth of the insured amount, the insurer must notify the insuree and the appropriate Federal authority. 2. In the event, the insuree must take out supplementary insurance so that whole of the original amount is available to cover the payment of damages. However, the supplementary insurance will only cover such damages as arise after it comes into force. In doubtful cases, the competent authority shall order the insuree to increase the insurance amount, taking into account the amount of the reserves." The rule is discussed in *Mitteilungsblatt der Delegierten für Fragen der Atomenergie*, June 1958, p. 10.

can liability insurance pools, N.E.L.I.A. and M.A.E.R.P.,<sup>6</sup> have therefore adopted a scheme for reducing the existing premiums, if after 10 years they have yielded income in excess of the sums paid out on damages and administration or to be placed to reserve. Any excess will be paid back to the insured by instalments.<sup>7</sup>

## VII. QUESTIONS OF PROOF

As is well known, the harmful effects of radiation cannot be ascertained immediately after the radiation ceases, and as a result, it may in some cases be impossible to determine all the damage until a long time after the accident. For many years after the accident, the incidence of certain serious illnesses will be rather higher among people who have been exposed to dangerous radiation than among other people. However, it is not possible to determine, in the case of a particular person suffering from such an illness, whether he has contracted it because years previously he was perhaps exposed to radiation, or whether it is due to other factors; for a given illness may arise from different causes. Consequently, it may be extremely difficult to prove a causal relationship between the accident and the supposed delayed injury.<sup>8</sup> Is the illness due to radiation, or would it have been contracted in any case? If the former is thought to be the case, it must be decided whether the sick person has been exposed to any radiation arising through accidents covered by the special compensation law, and whether the radiation was of such a kind as to be capable of producing the illness. The measures which would presumably be taken by the health authorities in the event of an atomic accident will probably make proof to some extent easier. It must be assumed that these authorities will carry out, among other things, some form of registration of the people who

<sup>6</sup> N.E.L.I.A. and M.A.E.R.P. stand for "Nuclear Energy Liability Insurance Association" and "Mutual Atomic Energy Reinsurance Pool" respectively.

<sup>7</sup> The scheme is described by Thomas in *California Law Review* 1958, p. 17. Regarding adjustment of the insurance premiums in other insurances, see Drachmann Bentzon & Knud Christensen, *op. cit.*, p. 74, footnote 3.

<sup>8</sup> Regarding proof of causation required under compensation law in general, see Ussing, *Erstatningsret*, p. 202, and Øvergaard, *Norsk erstatningsrett*, 2nd ed., p. 364.

have been exposed to radiation, and will keep a close check on their health.<sup>9</sup> Still, it is scarcely reasonable that a person shall be denied any claim to compensation simply because he neglects to fulfil the requirements imposed on him under the health laws. On the other hand, he should not be entitled to compensation for injury which he could have avoided by taking reasonable precautions. His opportunity to submit the necessary proof will likewise be limited if he disregards the authorities' instructions. It will be difficult to start a fruitful discussion among lawyers on what evidence should be required until the biologists have succeeded in producing more definite and complete material on the effects of radiation and the possibility of deciding whether a particular injury has been caused by radiation. However, it may perhaps be said that a necessary starting point is that the requirements of proof should not be made so strict that most of the injured persons are unable to fulfil them. They must therefore be formulated according to the practical possibilities of providing proof. On the other hand, one has to consider that this may lead to such a reduction of the evidence required that a very large number of injuries are accepted as possible atomic injury and compensation is awarded many people whose illness is not due to an atomic accident. In the event of a major disaster, this might mean that a large part of the available funds will not reach those who are really entitled to it.

### VIII. THE TIME LIMIT

As long as there are people alive who have been exposed to radiation from an atomic accident, there will be at all events a theoretical possibility of injuries caused by atomic accidents. If it is assumed that the difficulties regarding proof in determining the causal relationship can be overcome, the question thus arises whether a limitation rule should be introduced, not merely for barring the compensation claims a certain period after the injured person becomes aware that he has suffered injury or can put

<sup>9</sup> The health authorities will presumably require power to demand registration and examination of the exposed persons (cf. the provisions of the Epidemics Act, Act No. 138 of May 10, 1915).

through his claim, but simply to the effect that, when a certain number of years have elapsed after an atomic accident, compensation claims can no longer be made for injuries caused by it.<sup>1</sup> Such a rule would be more severe on the injured persons than our ordinary limitation regulations, since it means not only that old, forgotten claims are stopped but also that the liability itself is limited, so that it does not cover injuries which cannot be confirmed until the limitation period has expired. If the suggested rule is introduced, it must be assumed that the persons who are liable to suffer the effects of latent injury after the period has expired cannot avoid the results of this by bringing an action for a declaratory judgment against the owner of the atomic enterprise before the expiration of the period.

It is easy to find the objection to a limitation rule of this kind. Nevertheless, it is necessary for the insurers' liability to introduce a strict limitation or a respite of this kind, as an insurance company cannot be requested to bear a risk extending for an indefinite period in the future.<sup>2</sup> If it is desirable that it shall be possible to provide insurance covering all atomic liability, a time limit must be fixed for the obligation of the atomic enterprise to pay damages. The disadvantages of such a time limit for the injured parties can be reduced if the period is made so long that large groups of injured persons are not denied damages. In the legal systems of the Latin countries, a limitation period of 30 years is common. A period of this length will cover most of the victims; on the other hand, the insurance companies will be faced with a burden which they can hardly bear. Some people have therefore advocated the fixing of a much shorter period and also an obligation for the Government to indemnify the injuries which cannot be ascertained until this shorter period has expired, possibly without any time limitation.

Whatever regulations are introduced regarding the requirements for proof of the causal relationship between the atomic accident and the injury, considerable difficulty will be involved in implementing a civil liability scheme of this kind, and in any

<sup>1</sup> The regulation might therefore be said to lay down a time limit for these requirements, as well (cf. Ussing, *Dansk Obligationsret, Almindelig del*, p. 498).

<sup>2</sup> The question of limitation of the claim against the company is not very important for other kinds of insurance. The limitation rule in the Insurance Contract Act, sec. 29, contains a general suspension rule. Cf. also secs. 91 and 120 of the same act, which make liability and sickness insurers liable even for injuries arising *after* the insurance period has elapsed.

case it would not yield reasonable results in *every* case. It is therefore natural to consider whether new ways of solving the problem of compensation for delayed injuries can be found.

It is not possible to say in advance which of the persons who have been exposed to radiation will subsequently suffer delayed injuries; but the biologists can give some information as to the number of people who will be so affected. If experience can gradually be gained which provides material enabling fairly accurate forecasts to be made, it will also be possible, when ascertaining the number of manifest injuries, to make some calculation of the number of cases of delayed injury which may be expected.<sup>3</sup> To the extent that this is possible, part of the compensation may be set aside to cover delayed injuries, payment being made gradually as the injuries manifest themselves. The E.N.E.A. group of legal experts have not considered this arrangement practicable, but it was adopted in a modified form in a draft Swiss "*Atomgesetz*". Under secs. 16 and 17 of this draft, each atomic plant must make a contribution, not exceeding one-third of the atomic insurance premium, to a "delayed atomic injuries fund". This fund is to be used for covering personal injuries which do not manifest themselves until the normal limitation period—10 years from the time of the accident, according to the draft—has expired, but within 30 years of the accident. Payments from the fund are to be fixed according to the same rules as for ordinary compensation, and the fund may have grants from the Government, if necessary.<sup>4</sup>

It appears that there already exists in the writing on compensation law a basis for a scheme by which denial of compensation to some of the victims can be avoided. According to Ussing<sup>5</sup>, compensation may be paid, depending on the particular circumstances, to persons exposed to lasting hazards for the depression of value of property due to such ground.<sup>6</sup> This doctrine which, judging by its import, could be invoked by a group of people who have been exposed to radiation, is not suitable for application to cases of delayed personal injury, however. The biologists'

<sup>3</sup> Cf. *Proceedings of the International Conference on the Peaceful Uses of Atomic Energy*, held in Geneva August 8–20, 1955, Vol. 13, pp. 102 ff.

<sup>4</sup> For further details, see *Mitteilungsblatt der Delegierten für Fragen der Atomenergie*, No. 2, June 1958, p. 11. See also Price-Anderson Bill, Art. 170, c (small print), cited *supra* p. 91.

<sup>5</sup> Ussing, *Erstatningsret*, p. 135.

<sup>6</sup> See Øvergaard, *op.cit.*, pp. 308 f., criticizing Stang's arguments in *Erstatningsansvar*, pp. 297 ff. Cf. also 1929 U.F.R. 801.

studies indicate that the number of people who will suffer delayed injuries will generally only be a small proportion of the exposed group. There would be no sense in paying a very small compensation amount to a very large number of persons for an insignificant shortening of their expectation of life and health due to radiation.<sup>7</sup> The fixing of the compensation amount would have to be an altogether arbitrary matter. On the other hand, claims for compensation from people threatened by delayed injuries can hardly be disallowed if in the individual case the medical experts consider that the risk of a delayed injury is so great that, for example, the person concerned can only obtain employment in a non-pensionable post or take out life insurance subject to his paying an extra premium. In such a situation, there would be a sufficiently solid basis for making reasonable compensation.

#### IX. WHO SHOULD BEAR THE RESPONSIBILITY?

Among the many problems of compensation and insurance law which will arise in formulating special atomic liability, there is yet another question as to who should bear the responsibility. The rules on strict liability already in existence place the liability for damages on the operator.<sup>8</sup> The latter is described for example in sec. 36, para. 1 of the Aviation Accidents Act as "the owner or person for whose account the aircraft is used".<sup>9</sup> "The operator" is also made liable under the 1952 Rome Convention. For further details, see Arts. 2-4 of that Convention.

It seems quite natural that the atomic liability in civil law must be placed on the operator as well. This is also proposed in the E.N.E.A. draft for the "Convention on Third Party Liability in the Field of Nuclear Energy". The question of ownership is not important as far as liability is concerned. Thus if, for example, a power station operated by a concessionary

<sup>7</sup> Nor does it seem possible to pay compensation in these cases under the British rules on compensation for "shortened expectation of life" (cf. *Salmond on Torts*, 11th ed., pp. 384 ff.).

<sup>8</sup> Cf. Ussing, *Erstatningsret*, pp. 130 f. and pp. 104 f.

<sup>9</sup> Cf. *Rigsdagstidende* 1922-23, supplement A, cols. 3702-3. Under sec. 65 subsec. 6, of the Motor Traffic Act, the liability rests on "the person—whether he be the owner or the user—who uses the motor-driven vehicle or allows it to be used".

company uses fuel elements owned by the Government or by an international organization, the objective liability will only rest on the company.<sup>1</sup>

If, in a future atomic liability statute, it is merely laid down that the operator is liable for atomic accidents without regard to blame, the victims of such an accident will be able to put through claims against builders and contractors as well, if the accident is due to a fault in the reactor. The same grounds probably apply for limiting the liability of these people for negligence, as for limiting the atomic undertaking's own liability for negligence. Besides this, if the contractors' liability is not limited, they will presumably be able in many cases to demand that the person who is to operate the atomic plant shall indemnify them for their liability; and so it is laid down in the E.N.E.A. draft that the victim of an atomic accident can only claim damages from "the operator". The draft states that the latter should only have a right of recourse against the contractors if a provision to this effect is contained in the contract for the supply or erection of the atomic plant. This new rule of law has been christened "the principle of channelling". This expression indicated that normally only the operator is responsible for nuclear damage. All liability is channelled to him.

<sup>1</sup> Under sec. 52 of the American Atomic Energy Act, all nuclear fuel in the U.S.A. is owned by the Government (cf. H. Kruse in *Atompraxis*, 1957, pp. 250 ff., on this and similar regulations).