Involving Others: Towards an Ethical Concept of Risk*

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Introduction

Which concepts do we have in mind when we are describing the dangerous side of technology or ecological perils? I want to reflect on those concepts we have in mind when we use the word "risk". These concepts can be used to describe practical situations involving technology and are crucial for their moral assessment. The finding that I present is that there are at least two basic concepts of risk, rather than one. This paper is an essay combining risk assessment procedures with the perspective of an "ethic of care."

Risk assessment is currently dominated by a basic risk paradigm adapted from economics, which I call the "economic" concept of risk. That concept has dominated the academic discussion of risk assessment since the work of Chauncey Starr in the sixties.[1] I call the alternative basic concept of risk the "juridical" concept, from its origin in the judicial theories of responsibility and liability. Though it has been left out of the academic discussion of risk assessment, it would be helpful for an ethical approach: It might connect the ethical discussion with the experiences of persons who find themselves (or others they are related to) affected by technico-ecological risk. There is considerable discrepancy between their perception of risk, which often is an

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1 *See e.g.,* Chauncey Starr, *Social Benefits Versus Technological Risk,* 156 **Science** 1237 (1969).

experience of injustice, and the conceptualization of the issue by risk assessors who see risks as variables connected to the options of a choice.

The juridical risk concept seems better suited for the ethical analysis of the situations generated by the use of risky technology. While the economic risk concept diverts attention away from those affected, the juridical risk concept includes those affected as real partners in a complex network of moral relationships. Moreover it has the heuristic advantage to lead ethical analysis into concrete complexities of real situations.

When I speak of "risk concepts," I am not reflecting upon different meanings of the word risk, but rather the way risk defines a situation. My basic questions are: What structure is given to the initially chaotic circumstances? How do we transform the practical reality into an issue which can be debated in risk assessment? What kind of problem do we realize? These are basic questions deserving some philosophical scrutiny. There is such a transformation and we disagree about it. Often, those physically affected by the burdens and harms think differently from those making decisions and consequently use different descriptions of the situation. Ethical analysis is practically implicated in the processes of forming the world we live in. Using a particular conceptualization of the practical situation when beginning ethical deliberation can have momentous effects on our moral choices.

In sum, the standard economic concept of risk is biased. It systematically hides those affected and contributes to the political exclusion of them, or in the case of future generations, their representatives, and of other living beings in nature.

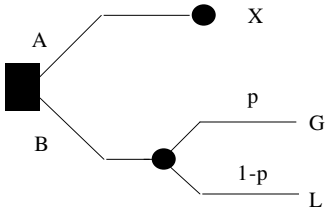
The Economic Concept of Risk

Introductory texts of risk assessment usually present, as the "basic risk paradigm," a variant of the following well-known picture (where (A, B = options; and X, G, L = outcomes):[2]

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[2] From F. Wharton, *Risk Management: Basic Concepts and General Principles,* **Risk--Analysis, Assessment and Management** 1-14 (J. Ansell & F. Wharton, eds. 1992); *see also* N. Rescher, **Risk. A Philosophical Introduction to the Theory of Risk Evaluation and Management** (1983).

Figure 1
The "Economic" Risk Paradigm



The situation in which a risk occurs is defined as that in which a decision must be made between at least two different options, A and B, each with distinct outcomes, X, G and L. Some outcomes depend on unpredictable events and have correlated probabilities. The outcomes are described as possible gains and possible losses. The fundamental structure of the problem is an optimization with reference to a certain value scale: minimization of damage or maximization of utility. The behavior at issue is represented as walking along a decision tree.

The classical exposition of this concept is found in Frank Knight's book where he defined the term risk as "measurable uncertainties."[3] The criterion of calculability is the most important feature of the economic account of risk. A broad scientific literature has subsequently developed. Sophisticated methods for "rational" decision-making in situations of uncertainty have been worked out; the fields of game and decision theory have been established. When the harmful side effects of technology entered public and scientific discussions, it seemed obvious that this economic concept could also be applied to the novel topics of ecology and technology assessment. Additionally, the ethical problem of coping with risky technology was correspondingly seen as a question of acceptability, in the sense of what amount of risk would be acceptable to those affected, or what level of additional, humanly-derived risk would be small enough to be considered negligible.

Of course, this approach has also provoked much criticism, among the most prominent of which was formulated by Kristin Shrader-Frechette.[4] The criticisms by Shrader-Frechette and others reflect the unease we feel when we are using a concept which was elaborated for

3 *See* Frank H. Knight, **Risk, Uncertainty and Profit** (1921).

4 *See* Kristin Shrader-Frechette, **Risk and Rationality** (1991).

optimization of entrepreneurial behavior in an unpredictable market, to describe technological interventions into the physical world with physical consequences to other persons and living ecosystems which may reduce or even eliminate the probability of their survival. What is rational in the first context might not be rational in the second.

The disadvantage of the economic concept in an ethical analysis of technico-ecological risks is the following. In the economic concept there is only one personal position: the decision-maker. We have difficulty in adequately including those other persons physically affected by the consequences of the decision. Often, they themselves have to fight to be included in the decision-making process, where the concept of risk is worked out in reality. These other participants are abstract; attention is diverted away from them. These participants are conceptually hidden.

The Juridical Concept of Risk

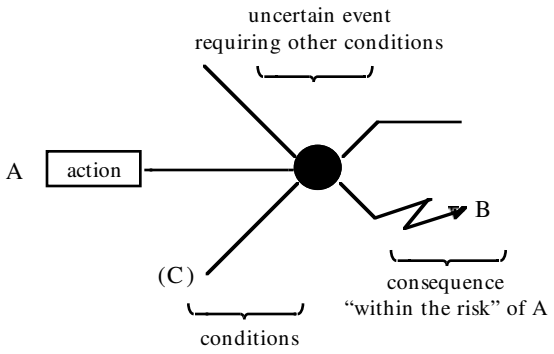
Legal philosophy, especially the theory of causation and liability in law, has developed another concept of risk. The literature is nearly as old as that of the economic. References to W. Seavey, the protagonist of risk theory in the law of torts in the thirties,[5] can be found in the well-known book of H.L.A. Hart and Tony Honoré, *Causation in the Law*.[6] The context for this juridical risk theory is the relationship of responsibility for harms for which the action of some person was a condition sine qua non. In this context, there is a need to differentiate between cases where a condition necessary for the emergence of some harm can be seen as the "cause" for that harm, and other cases where it cannot. The courts generally do not hold someone guilty and liable for a harm to another person on the sole ground that his or her behavior was a necessary condition for it. If for example a letter bomb is brought by a postman, this action of the postman may be a condition sine qua non for the damage to the receiver, but the postman is not seen as guilty or liable for it. In other cases the necessary condition is enough for establishing a relationship of responsibility or at least of co-responsibility. If an employee failed to lock the door through which a thief entered, they might perhaps be seen as liable for negligence. The

5 *See* W. Seavey, *Principles of Torts*, 56 **Harv.L.Rev**. 72 (1942-43).

6 *See* H.L.A. Hart & Tony Honoré, **Causation in the Law** (2d, 1985)(citing Seavey, *supra* note 5).

risk theory of responsibility tries to resolve the problem of demarcation by establishing that in one sort of case the harm is within the risk of a certain behavior and in the other sort the harm is not within the risk of the behavior. We can attempt to illustrate the concept in an analogous form (where A = responsible person; B = affected person; and C = intervening person):

Figure 2
The "Juridical" Risk Paradigm



When we say (taking the simple example) that the invasion of a thief is "within the risk" of failing to lock the door, we are describing a relationship of responsibility between three persons. Two of them are actors that share responsibility: the thief (A), and that person who failed to take ordinary precautions, (C). A third person, (B), is harmed. From the perspective of the person (C) who is obliged to take precautions, the actions of the thief (A) are mere conditions necessary for an event resulting in a harm. Their responsibility is directed towards those affected by the outcomes of an uncertain event.

That picture can be read in two directions. Seen *ex post facto,* the person affected (B) appears as complainant and the first actors (A & C) as defendants. The issue is whether one or both of them are guilty and thus liable or not. Seen *ex ante facto* the first actor (A or C) is in the center of the analysis and there are known or unknown others who may be affected by the consequences of the actions. The question in this perspective can be one of moral responsibility towards those affected. The concept was developed originally in an *ex post facto* perspective in the legal literature. I propose here to introduce it to the *ex ante facto* perspective in the ethical discussion of technico-ecological risks.

The main advantage is the following. In the juridical concept there are two main personal positions, the defendant and the complainant. This concept describes a relationship of causation and liability, and leads to a perception of moral responsibility toward concrete others as affected persons.

Some Arguments Against the "Risk Thesis"

(i) Hart and Honoré convincingly criticize the "risk theory" within a view *ex post facto*. They assert that liability should not generally be restricted to harm that was foreseeable at the moment of the action, because this principle would unduly prevent recovery for "ulterior harm."[7] There are types of situations of negligence where courts held defendants liable for unforeseeable harm and where such an imposition of liability seemed just. They cite (among others) Vandenburgh v. Truax,[8] where the "defendant frightened a boy (thereby committing an intentional assault) who, in his panic, ran into plaintiff's shop and overturned a cask of wine. For the loss of the wine defendant was held liable, though he did not intend it," although it is questionable whether it was in fact foreseeable by him or not.[9] Liability for harms resulting from an intentionally harmful behavior is sometimes not restricted to those harms the wrongdoer could foresee at the time of his wrongdoing. In other words, even for those harms not lying "within the risk" of a behavior one can be held liable if other conditions are present, such as the harmful intent of the actor. But in the opposite view, *ex ante facto*, when responsibility in its ethical sense rather than liability is the relevant category, this objection to the risk theory disappears. For epistemological reasons we cannot be responsible for consequences we are not able to foresee, and such unforeseeable effects cannot be a part of the action.

But it is important to realize that the range of foreseeability can be expanded by that type of research we call "risk assessment." There are situations where we have good reason to assume that our knowledge about the consequences of a certain act is insufficient. In such situations,

7 *Id.*

8 Vandenburgh v. Truax, 4 Denio NY 464 (1847).

9 Hart & Honoré, *supra* note 6, at 259

responsibility cannot be restricted to those consequences we actually can foresee (in a certain state of knowledge) but must include those we could foresee if we would only make enough effort to reveal their potential.

(ii) It is questionable whether liability should include all foreseeable harm, or instead, only such harm not resulting from a combination of the action in question and "the subsequent intervention of a free voluntary act or of an abnormal or coincidental event."[10] In the view *ex ante facto,* I can see no reason for an *a priori* exclusion of harms resulting from an action and a second event, if its possibility or even its likelihood can be anticipated. There is, for example, an ethical responsibility to include the harm that could result from a criminal attack on an atomic power plant, even if this harm results from a subsequent intervention of a free and voluntary act that could cancel the juridical liability of those planning the power plant *ex post facto.*

The reasoning in liability issues *ex post* is not identical to the reasoning in responsibility issues *ex ante.* Therefore, the risk doctrine in the described version, as responsibility for foreseeable harm, can survive those objections. Hart and Honoré, however, discussed the doctrine in its liability version.[11]

(iii) An argument intended to restrict the "risk thesis" in the theory of moral rights was brought forward by Judith Jarvis Thomson.[12] She includes the perspective *ex ante* in the discussion of the hypothetical case of A, who is clearing his land, which abuts the highway. A does not care where he is throwing the logs he cuts from his trees and in fact throws one of them into the highway. B is a person who comes along later, but luckily sees the log in time, does not trip over it, and does not break an arm, although this (or another harm) could have happened to her. Thomson's question is: Does A infringe a claim of B's? This question could be answered positively by the reason that imposing on B only a probability of harm is causing a disadvantage to B. Causing a disadvantage may be itself causing the person a harm, and therefore, A is infringing a claim of B's. But this is, as Thomson argues, "a bad

10 *Id.* at 275.

11 *See generally,* Hart & Honoré, *supra* note 6 (This point certainly needs further discussion).

12 Judith Jarvis Thomson, **The Realm of Rights** 242 (1990).

argument," for we cannot allege "that causing a person to be at a disadvantage is itself causing the person a harm."[13] A harm would be *actually* breaking an arm, but not *probably* breaking an arm. We feel that A did infringe a claim of B's, but not because we have claims against each other that they not impose risks of harm on us, but because of the "fact that throwing the logs one clears off one's land into the public highway is illegal."[14] One of the main reasons for making log throwing on highways generally illegal is that by allowing such behavior, the risk to the rest of us would dramatically increase.

In my view also, the singular act of imposing a risk to known or unknown others can be seen as infringing on a moral right of theirs. I admit that there is an apparent difference between actually being harmed and being exposed to a risk of harm (who could seriously try to deny it?), but a probability of harm still leads to a change in the situation of those affected The situation where a certain (set of) harm(s) are probable is simply a worse place to be. Morally, this should count. So, the known and unknown others affected by my risk-imposing behavior are affected considerably and for the worse by imposing risk on them. A ought not to bring B into a dangerous situation. This would be true even if no legal rule existed that addresses the case, and therefore, A did nothing illegal.[15]

Constructing a Situation

Let me illustrate with two examples drawn from real cases. One is low-technological-private and the other high-technological-public. I will compare how one and the same circumstances can be described as two different situations of risk by the two risk concepts.

(A) A family decides to cross a small lake with their row boat. They are deliberating whether their two children, who cannot swim, should put on their life jackets or not. The weather is sunny and the wind light; the children hate putting on stiff life jackets. There are motorboats racing around. According to the economic risk concept the situation

13 *Id*. at 244.

14 *Id*. at 247.

15 And there is no need to seek refuge in a shaky *ad hoc* theory of "objective oughts" in the case that no legal or moral fault is made, *id*. at 241, 246. Even without infringing a law or an accepted moral rule, bringing others into a dangerous situation is directly infringing a personal claim of theirs.

can be described as a situation of a choice between the options of putting on versus not putting on the jackets. The consequences of putting on the life jackets are a decrease in the probability of two human deaths during the lake crossing, some annoyance of the kids and some irritation of the responsible parents. The consequences of disregarding the life jackets are an increase in the probability of two human deaths, and the avoidance of annoyance and irritation. This choice has a first moral dimension in the determination of the relative weights of the probabilities, harms and gains. Additionally, there is a second moral dimension: the acceptability of that (small) probability that the rowing boat might be rammed by a motorboat and the children might not be saved in either way. The only way to determine whether this would be acceptable or not is to compare that likelihood with other likelihoods such as already accepted risks or natural dangers.

According to the juridical risk concept, the first question would be: What is within the risk of not putting on the life jackets? That leads our thinking in a quite different direction. What could we do to avoid harm to those we take care of? Which precautionary measures are due? Can it be considered responsible behavior towards the possibly affected children, not to put on life jackets for the only reason that it is troublesome? Would we, if we were the parents, be considered guilty or not, if a motorboat capsizes our boat and one or both of the children drowns? Would we, as parents, hold ourselves guilty or not guilty in a moral sense?

(B) As a second example let us choose the transport of highly radioactive waste to an interim disposal site.[16] According to the economic risk concept the transport could be seen as acceptable, if it does not increase the probability of a serious accident and the consequent release of radioactivity above a certain value. According to the juridical risk concept the question would again be: What lies within the risk of such transport? Acts of sabotage, criminals who could exploit the situation, accidents nobody could anticipate, concatenations of

[16] One such incident took place in Germany 02/28-03/05/1997 just at a time I delivered this paper: the third transport of Castor containers to the old salt mine of Gorleben. The protests of environmental activists were strong and led to brawls with the police. Some 500 persons were injured, but the storage of the containers could not be prevented (*cf.* the relevant newspaper reports).

improbable coincidences, a further stabilization and fostering of the atomic industry and of a lethal system of energy production that threatens the life and health of not only the present but of future generations? The action is now seen as one element of a causal network, not as the result of an isolated decision.

"Within the Risk"

Moral responsibility contains a fundamental paradox. A responsible actor cannot exclude consideration of the impact of the act upon other beings. But what is the impact? On the one hand a reflecting actor must be responsible for all the consequences of their behavior, regardless of whether they are actually foreseen, whether they are intended and how far away they are in time. On the other hand, in practice it is impossible to foresee all the actual consequences, and the temporal distance also represents a cognitive barrier. Democritus laid the foundations of atomic theory but he could not be held responsible for the atomic bomb.[17] Similarly, the pioneers of the motorcar could not be held responsible for the damaging effects of acid rain.[18] Those consequences that are seen as being "within the risk" of a certain activity comprise a selection of all actual consequences a reflecting actor should include in his or her responsibility.

An ethical approach to risk has (i) to acknowledge that such a selection takes place, moreover that it is unavoidable, (ii) to investigate in what respect the standards and rules guiding this selection are a legitimate issue for moral and political debate, and (iii) to explain whether the guidelines used in the selection processes are not true or false (as in theoretical questions), efficient or inefficient (as in technical questions), but just or unjust, due to the moral nature of the "range" of a risk.

Jeremy Bentham was aware of the existence of such selections and he does not seem to have thought the issue could be surmounted by simple conventions.[19] In his book he reduces the range of the relevant

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[17] E. Russo & D. Cove, **Genetic Engineering, Dreams and Nightmares** 203 (1995).

[18] *See* G.S. Wetstone, *A History of the Acid Rain Issue,* **Science for Public Policy** (1987).

[19] Jeremy Bentham, **The Principles of Morals and Legislation** ch. VII-VIII (1948).

consequences to those that are "material."[20] But he gives no easy answer to the question: which part of the real consequences belong to the material? However, he suggests that a special perspective is needed to be able to distinguish between those which can be said to be as material and those which cannot: "such only, by one who views them in the capacity of a legislator, can be said to be material."[21] The legislator perspective is in Bentham's thinking, a point of view where the decisions are guided by the same first principles as in moral decisions.[22] It needs to be an impartial and benevolent view. This is a view in which everybody counts as one, nobody as more than one, and in which the promotion of happiness of all those involved is the aim. The decisions about the range of possible consequences being "within the risk" should, therefore, be a moral issue, open to moral deliberation case by case. As can be learned from Bentham, the decisions in each case, whether a type of consequence lies "within the risk" or not, should be guided by the very first moral principles we have.[23] However, I do not think that the principle of utility can be the one and only principle that we should apply to in addressing these questions. The selection of the principles or of the moral approaches we decide to use should be the subject of an open discourse. In a pluralistic society, generally binding normative decisions can only be established in ongoing, open deliberations, or as a necessary prerequisite for ongoing, open deliberations.[24] I would like to include in the discourse the selection of "moral standpoints" or "ethical theories." A practical discourse must be particularly open enough to challenge the rationality of the "generalized other" and to introduce the rationality of the "concrete other" in its own right.[25]

Hart and Honoré have shown for the causal relation that the standards and rules guiding the selection of the consequences "within the risk" reflect, among other elements, social definitions of

20 *See id.* ("Of the consequences of any act, the multitude and variety must needs be infinite: but such of them only as are material are worth regarding.")

21 *See id.*

22 *See id.*

23 *See id.*

24 J. Habermas, *Drei Normative Modelle der Demokratie*, **Die Einbeziehung des Anderen** 277-92 (1996).

25 *See* Seyla Benhabib, *The Generalized and the Concrete Other,* **Situating the Self** (1992). (In this point I am convinced by Benhabib's interpretation of the significance of the Kohlberg-Gilligan Controversy in moral theory).

normality:[26] Which situations are normally to be expected? What is an appropriate range of situations in which effects of the action should be considered? The standards and rules include accepted theories of the effects that must be examined in this variety of situations.

To make this issue more transparent in actual cases of risk assessment, I propose to distinguish between three levels:

(i) Consider the following hypothetical. A is building a new garage on her land and is planning a blasting operation to remove some parts of a rock.[27] A considers herself to be liable for damages on persons and buildings in her neighborhood that could be caused by flung debris or by the shock wave. She feels herself accountable for such possible damages in a juridical and a moral sense, because blasting operations generally are considered to include a risk by flung debris or shock waves. There is a socially constructed norm, continually confirmed, which suggests that it is plausible to demand the accounting of effects caused by flung debris and by shock waves to those persons responsible for blasting operations. Such consequences ought to be foreseen, even if A, in fact, did not foresee them. This norm, which I call a "norm of accounting," prescribes that consequences, which belong typically to blasting operations (or any other sort of action), ought to be foreseen. A given norm of accounting is presumably precise enough to be used but it does not cover all eventualities.

(ii) Consider a neighbor B, who after the blasting complains about an arrythmia of the heart and brings it in relation to the blasting operation. A will only be held responsible for the arrythmia of her neighbor, if it was in fact "caused" by the blasting (i.e. if the blasting was one of the necessary conditions and was considerably unique). If B's physicians say he would have experienced the arrythmia following the next loud sound anyway, the "causal" relation to the blasting would be questionable. Nevertheless, if A knew of B's sensitivity to loud sounds, A would have acted negligently at least in a moral sense, by not alerting B before the blasting occurred. A uses a theory of effectiveness of her doing. This is not a scientific theory but an empiric "everyday" theory with certain scientific elements. The theories of effectiveness say what

26 *See* Hart & Honoré, *supra* note 6.

27 Hart & Honoré, *supra* note 6, at 286 (a somewhat similar example is discussed).

effects can take place in principle when a given action is done within the given actual and concrete circumstances. Theories of effectiveness enable the actors to exclude a whole infinite range of nonmaterial consequences from the responsibility. For example, it seems unnecessary to include the possibility that neighbors always have a light chance of becoming sensitive to loud sounds in the very next minute, so that the bang of the explosion would actually harm them. If we had to include such (and similar) possibilities in our moral deliberations, blasting operations (and so nearly every other sort of activity) could nearly never be morally responsible. The exclusion of consequences from the range of morally relevant effects seems just as necessary to allow a responsible behavior, as the inclusion of possible effects. On the other hand, theories of effectiveness urge us to be more attentive to the real circumstances and the possible developments in the situation.

(iii) Some of the future developments are regarded as normal and others as totally unexpected. If the blasting accidentally opens a source of natural gas and thereby causes a big fire, A will probably not be held responsible for the harms which are caused by that fire. However if the blasting by accident causes a passing gas tanker to fall over and to explode, A will probably be additionally held responsible for the harms which are caused by that explosion. The reason will be that the passing of gas tankers is a normal event, and the occurance of which at the time of the blast could and should be prevented, whereas the discovery of natural gas sources is mostly unpreventable. In moral deliberations definitions of normality are used.

Together, norms of accounting, theories of effectiveness and definitions of normality help to determine what we see in a situation as "within the risk" of certain actions. Just like all elements of a given morality, these norms, theories and definitions can either be used unquestioned or they can be the object of rising dissent.

In the above discussed example (A) one parent might think only of accidents caused by a storm. His definition of normality drives him in this direction. Dangerous situations can emerge when the boat is overturned by a storm or by high waves or when someone falls into the water due to carelessness. Because the weather is sunny, the wind light and the kids are at least old enough to be careful, he perceives no

urgency for putting on life jackets that could outweigh the trouble it would cause. The other parent might use a different definition of normality, believing that motorboats on the lake can cause collisions and that dangerous situations can emerge even if the weather and the wind are benign and the kids are careful. For that reason she might urge the kids to put on their life jackets. The issue between the two parents in this example would neither be a difference in assessing the relative weight of the advantages and disadvantages nor a difference in the idea of acceptable risk. Rather, the issue is a difference in the variety of situations where it seems apt to consider the effects of the action.

A considerable part of the present political debate on the acceptability of technico-environmental risks is not a dissent on acceptability limits of smaller probabilities and negativities, but rather a dissent on the justice or reasonableness of some of these elements used to determine the "range" of the risk. The conflict between defenders and opponents of nuclear power and of the storage and transport of radioactive waste (example B) can be interpreted as dissent over the reliability of that narrow selection of possible situations the defenders use to legitimize the activities concerned. A very reasonable objection to this moral legitimacy is that the situations that will occur in the next hundreds or even thousands of years cannot be anticipated and therefore a risk assessment using any selection of situations can never legitimize the production, transport or storage of nuclear waste.

Reality and Modeling

The economic model suggests that the outcomes can somehow be weighted and quantitatively or semi-quantitatively compared at the theoretical level. The actual activity is modeled as a choice between different ways to proceed, each having diverse potential effects which can be measured by assigning to them a negativity and a probability value. The moral point of view must be introduced at the level of this evaluation and comparison, i.e. at the level of the generalized model. This leads to a series of important moral questions. For instance, there are morally unacceptable comparisons. If, for example, someone counts only his or her own profit and reduces the possible harms to those affected (illness, death and reduction of life chances) to monetary

values. In this approach, the values that enter the calculation have to follow a generally acceptable account of values. In my view, however, an ethical approach should do more. The most important task for an ethical analysis is the perception of the situation including its context. We must know what the action under consideration will change. The action takes place in actual, concrete situations, in a distinct place, at a distinct time, involving distinct, actual persons and other beings in nature. Each situation is fundamentally unique. A description of the action and the situational context cannot avoid the use of general terms. Thereby, such a description interprets each situation in a certain way and makes a case comparable in some respects with other cases. Therefore, each comparison with other situations must be handled as an essay in interpretation of the actual situation. To communicate, we have to draw comparisons.

The ascription of probability values, for example, is in my interpretation nothing but such an essay in comparison. A probability value results from a tentative comparison of the actual situation with others in the past. It is unclear what other, more substantial meaning a probability value can have in a situation which is unique. An accident like Chernobyl should definitely not take place a second time and has never occurred before. So, there can be no serious probability assessment for "Chernobyl-like disasters." Moreover, a probability of *p,* even if it is small, gives no guarantee that this rare event will not happen tomorrow. Probabilities are mathematically defined as averages that can be approximated over a large number of trials.

To see the difference between model and reality is also important for the following reason: The safety of a nuclear power plant is not established by lowering the calculated probability but by working on the real circumstances such as better security measures, better containment, better training of the staff, reducing the number and size of the power plants, etc. And the reduction of probability is only an indicator of a change in the real state of affairs. Ethical analysis has to start in the real situation and not in a model such as the decision tree.

This is also important for participative risk politics. Public participation and effective risk communication can only start in the real complexities of a unique case.[28] An ethical concept of risk should help

[28] *See* Christoph Rehmann-Sutter & A. Vatter, *Risk Communication and the*

in the perception of the actual case. The model has to be taken as a heuristic aid and not as a reduced and simplified picture of the situation in which the solution becomes calculable. The moral solution of practical problems must be rooted in the real situation, and not in a picture described in general terms. Morality should be concrete. The main task of moral philosophy could therefore be defined, to use a phrase of Whitehead, "as the critique of abstractions."[29]

Consequences

To evaluate the relevance of this from an ethical approach I highlight five main points:

1. The moral significance of an action that imposes risk on other persons is not about observing or transgressing a certain limit of risk, an "acceptability limit", so to speak. Rather it is the bringing of other persons into a changed situation, where there an evil component is introduced; a danger of a certain quality. If we impose risks on others we involve them in situations we create. Imposing risk is not a separate or novel form of acting as could be suggested by the idea that risk is not an actual harm but only the "chancing of a harm."[30] It is a sort of direct action towards others who are affected by a direct consequence. This direct consequence is a situation in which others are exposed to a certain danger. Imposing a risk is not an introduction and acceptance of some probability of bad outcomes but a direct change for the worse of the situation, the socially co-constructed environment in which other people have to live. Here, the language matters.[31]

Ethos of Democracy, **Coping with Deliberate Release — The Limits of Risk Assessment** (Ad. van Dommelen, ed. 1996); *See also* **Demokraische Riskopolitik. Vorschlag für ein Mediationverfahren im Kanton Basel-Landsschaft** (Christoph Rehmmann-Sutter, ed. 1996); A. Vetter, Christoph Rehmann-Sutter & Hj. Seiler, **Partizipative Riskiopolitic** (forthcoming).

29 A.N. Whitehead, **Science and the Modern World** (1925) (*see* ch. 4 with respect to theoretical philosophy).

30 N. Rescher, **Risk. A Philosophical Introduction to the Theory of Risk Evaluation and Management** 5 (1983) (Rescher's definition of risk:"Risk is the chancing of negativity--of some loss or harm.")

31 Sometimes, situations described with the term risk are actual and certain destructions. The extinction of global biodiversity, for example, is not a risk but an actual catastrophe taking place before our eyes. The word risk can even have a playing-down effect and can be misused to hide what is going on in reality.

2. The establishment and the distribution of technico-ecological risk is, therefore, a matter of justice or injustice. An imposition of risks can be unjust in two ways: First, the imposition of a risk on a person or on a group in a certain situation can be an infringement of a legitimate moral claim. Second, the distribution of risks between persons and groups can be an infringement of a legitimate moral claim to be considered equally.[32] The latter can be understood as a question of distribution of the risks in itself and/or of distribution of risks relative to the distribution of the advantages.

3. The ethical perspective on this type of activity is opened when those others who are involved in the risk situations are not only abstracts like bearers of value, but instead are persons who are to be respected in their personal needs and their moral autonomy.[33]

The perception of the real persons affected can lead to active engagement in favor of those affected. Ecofeminist Carolyn Merchant states that for women engaged in the struggle to preserve nature, "Women become activists in part because their bodies, or the bodies of those with whom they have a caring relationship, are threatened by toxic or radioactive substances or when land or another species about which they care deeply is threatened with extinction."[34] I think that this is true for all humans (both women and men) involved in caring relationships or prepared to get involved in such a relationship. The parents in example (A), if they describe their situation in a way analogous to the risk concept we named "juridical," are taking precautions because their children, with whom they have a caring relationship, could be threatened. These parents are not neutral, detached, calculating observers (like Hare's archangel),[35] but they are themselves involved in the caring relationship. They are responsible in the sense of being ready to give a "response" to threats imposed on others. The "juridical" risk concept can be a better conceptual framework for ethical questions about the acceptability or responsibility

32 *See* R.D. Bullard, **Dumping in Dixie: Race, Class and Environmental Quality** (1990); **Faces of Environmental Racism. Confronting Issues of Global Justice** (L. Westra & P.S. Wenz, eds. 1995).

33 *See* J. Kellenberger, **Relationship Morality** (1995).

34 Carolyn Merchant, **Earthcare: Women and the Environment** xviii (1996).

35 R.M. Hare, **Moral Thinking: Its Levels, Method and Point** 3.2 (1981).

of risk-imposition than the "economic." It connects the issues of risk to the ethic of care. Example (B) shows that besides the abstract moral issue of affecting "future generations" with a radioactive burden, there is a much more concrete issue of being involved in relationships of caring responsibility with people and children of whose existence we know, even if we do not know them personally. Conceptually obscuring these concrete relationships under an abstract pattern of quasi-mathematical relations in the "economic" risk concept, that cannot differentiate between "self" and "other," was perhaps as necessary to give social legitimation to high-risk technologies as is hiding their dangerous side-products physically in dumps and mines.

The relation which is generated by involving others with those virtual bonds of humanly-derived and imposed hazard can be transformed into a moral relationship of personal respect. A concept of risk, devised from the experience of discussions in jurisprudence, can perhaps aid in strengthening the social reality of those transformed moral relationships.

4. The "juridical" is not equivalent with the "ethical" concept of risk. Because moral questions of responsibility are related to juridical questions of liability, but not identical to them, an "ethical" concept of risk can be based on the "juridical" as a basic framework. However, it will certainly need additional elements, and identifying these elements must be the object of further studies. One of these additional elements, in my view, is that the affected persons are not only bearers of rights but also themselves responsible, political "selfs", in many cases ready to cooperate in building better lifestyles, as long as they are viewed as competent partners.

5. From this point of view it seems to me obvious that the affected persons have another serious moral right, one arising from their being affected. That is the right to be included in participative democratic discourse. Moral responsibility in risk societies can only be a joint responsibility of all those involved, otherwise it fails to be responsibility.