The danger culture of industrial society

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Responses to chemicals

How do we appear to handle danger in our culture? That is the main, sociological question, I want to discuss, and our responses to chemicals are a particularly good entrance point. So I am not addressing problems like the health risks of a chemical or procedures of standard setting. Such technical questions are obviously important, but they are not the whole story. Nor is the psychology of risk perception my first concern. Both technical and psychological questions should be seen as embedded in social and cultural patterns. It is the socio-cultural aspect that I want to highlight. Not only because it is important by itself, and has often been neglected,¹ but also because it will allow me to explore some of the normative issues of risk communication as one part of how we handle dangers in our society.

Living in the modern world

Ours is a standard-setting and hazard-adaptation world. Some quotes serve to express this experience:

Look around you. Wherever you are, within your field of vision there are likely to be at least a dozen items that have been officially ruled or labelled "safe". In our home you are literally surrounded with assurances of safety. The building materials, the paint and all your appliances have been pummelled, shaken, dropped, burned, immersed, frozen, baked or subjected to other bizarre, elaborate and expensive tests prescribed by blue-ribbon standard committees formed to determine adequate safety for each item. Duplicates of your car have been rammed into walls, smashed by other cars from all sides and baked and frozen like your household items. Prototypes of your car seats have been set on fire, and the seat belts stretched at thousands of pounds pressure until they snap. Almost everything in your medicine cabinet has been fed to rats, mice or monkeys, perhaps even tested on volunteer prisoners, before you can buy it for your own use. Your

kitchen cleanser has been placed in some helpless rabbit's eye to determine if it will blind you or your children. The pesticides that leave invisible residues on your fruits and vegetables, and the preservatives in your meat, fish and poultry also have been fed to laboratory animals to see whether they cause cancer, birth defects or toxic reactions.

The results of most of these millions of tests performed every year in thousands of research laboratories around the country are sent to at least one regulatory agency. If doubts arise about the protocol or the results of the research, the agency may demand the entire study be repeated.

Tens of billions of tax, foundation and corporate dollars are spent annually to assure you that our home, workplace, foods, medicines and even travel are safe. Tens of thousands of scientists in the U.S. devote their working days to making this complex, high-tech world less hazardous. More than 100,000 of your federal civil servants are at work to keep you safe. Insurance companies employ armies of safety engineers, and large corporations now have people in positions with titles like "Vice President in Charge of Safety" (Foster and Dowie 1982, p. 38).

The authors of the article (in *Mother Jones*) continue by giving an ironic twist to their introduction: "Feel safe? Read on." Their aim is to expose malpractices, and to argue that this feeling of safety is an illusion. My point in quoting their text is that the feeling, and its institutional backdrop, are a reality by themselves and should be analyzed in order to understand the way our culture handles hazards.

My second quote derives from an article arguing that residents can be useful actors in "popular" epidemiological research. In the course of this argument, the author makes the following observation:

[...] "street-wise or creek-side environmental monitoring" precedes awareness of health risks. My interviews with Woburn residents show the same phenomenon: People noticed the water stains on dishwashers and the bad odour long before they were aware of any adverse health effects. Love Canal residents remembered years of bad odors, rocks that exploded when dropped or thrown, sludge leakage into basements, chemical residues on the ground after rainfall, and children's foot irritations after playing in fields where toxic wastes were dumped (Brown 1987, p. 81).

The disturbing aspect of this observation, not noticed by the author in his hurry to get to his normative point, is that citizens have been living with hazardous waste for a long time, adapting themselves by warning their children not to play where their feet would get blistered, etc, and generally accepting the waste as part of their surroundings.

Together, the two quotes show our modern world as one geared to repertoires of rules and routines that create order, and perhaps some safety. I shall elaborate this point by discussing two examples at more length. My first example continues the idea of safety assurance; the second example is about when to heed which danger signals. I shall mix sociological analysis with normative evaluation, but in such a way that it becomes clear that the sociological “detour” is necessary to reach a balanced judgement.

Washing vegetables

Behavioral rules derived from an assessment of risk of chemicals have to be followed in order to contain the supposed danger. There may be safeguards in the system of disciplining dangers, for example for residues of pesticides and other agrochemicals on vegetables and fruits. Treatment with chemicals immediately before picking is often forbidden. Even so, it is advised to wash vegetables and fruits before eating them, in order to rinse off any residues of pesticides or other agrochemicals. This advice has led to a routine followed in most households. And, as happens with routines, it has taken on features of ritual: eating unwashed fruit becomes a sin.²

Routines to push off danger can get a life of their own, being followed with great care, without any necessary substantial link between the behavior and the effects originally intended (viz. less residues left on food to be eaten). There will be other effects, such as being able to live in a well-ordered reality. I have met housewives who were so concerned about chemical residues that they were washing lettuce with hot water: it made the leaves limp and tasteless, but that was a price they were paying willingly. And it did help, they argued, because a greyish foam is coming off, which does not happen when rinsing with cold water. Clearly, that greyish “dirt” remains in the lettuce, unless you use hot water.³ Substantial argumentation here goes together with the notion that hot water will exorcize impurities.

Note that I am not arguing that these housewives, as naive laypeople, respond purely on the basis of perception. Their response shows something of the way we handle danger, specifically the dangers related to “dirt”. And to understand this response, the notion of fear (i.e., perception) is not very helpful, whereas the notion of hygiene (i.e., social rules) is. Using these notions allows me to draw out the parallel with the anthropological argument:

[...] primitive religious fear, together with the idea that it blocks the functioning of mind, seems to be a false trail for understanding these religions. Hygiene, by contrast, turns out to be an excellent route, so long as we can follow it with some self-knowledge. As we know it, dirt is essentially

disorder. There is no such thing as absolute dirt; it exists in the eye of the beholder. [...] Eliminating [dirt] is not a negative movement, but a positive effort to organize the environment (Douglas 1966, p. 12).

The organization of environments is a local task, although it is to some extent oriented by global rules, available in our culture.

Chemophobia

Chemists and industrialists have noted an excessive fear of chemicals, and dubbed it “panic”, “hysteria”, and “chemophobia”. Whatever the validity of the evaluation of the fear as “excessive”, there are many examples that labelling an ingredient with a chemical or chemical-sounding name is taken as a warning flag. This runs from simple cases where soda used in restaurant kitchens to dissolve the fat and oil is avoided as soon as Na_2CO_3 is printed on the bag, to more complicated cases, like the Dutch mini-controversy, where a list of ingredients of commercial ice creams was published in one magazine as a curiosity, then taken up by another magazine under the heading “There’s antifreeze in your icecream” (because of the glycol thickener). This, in turn, led to questions in Parliament, reported in newspapers as “we should not be test tubes”.

In our culture, a recognizably chemical name is associated with danger. Chemists will get angry and frustrated with this “fact of life”, and attempt to redress it by what they see as educating the public. Such an education, however, is shaped by their view of what chemistry is (a trusted friend) and what the dangers of chemicals are like (negligible). And their lack of appreciation of the cultural repertoire makes their efforts counterproductive, for example when they insist that natural products are full of chemicals, so that chemicals in general *must* be natural, acceptable – which only leads to confusion.⁴ They also emphasize that some naturally occurring substances, like aflatoxin, are highly toxic, to exonerate the burden of guilt on chemicals. Again, the effect may be increased rather than decreased suspicion of chemicals.

To introduce some normative considerations to this example: it is certainly true that within chemistry there is little sense in distinguishing “natural” and “chemical”. And in the world at large, the label “chemical” may not be the best guideline to distinguish between dangerous and safe. But we need some signals in our lives, and chemical labels are a reasonable choice for a warning signal. Chemistry, one could argue, stands for our capacity to understand and transform materials. It enables us to introduce new ingredients into the world, or existing ingredients in new places and/or new quantities. It is not possible to

foresee the consequences, and the public has good reasons to equate strange names with potential danger.⁵

Cultural transformations

The examples of the preceding section are more than just anecdotes. The way we handle chemicals indicates something of how our kind of society handles dangers in general. In addition, they demonstrate that there is a concern about chemicals also when there is no actual sign of danger. This implies that there is diffuse political support for strict measures: we spend resources and political energy to check for risks of chemicals, including the risk of carcinogeneity (which is a social and political mobilizer) and devise systems to set adequate standards. The whole social, cultural, and political complex evolves, and its evolution must be traced broadly, taking into account the general cultural repertoires as well as specific regulations.

Within this evolution, particular developments can be traced as cultural transformations. I will show that the establishment of strict health standards for chemicals then appears as the emergence of taboos. Although this seems to condemn standards as “just” ritual, one should realize that it is possible to argue, and argue rationally, about ritual.⁶ To do so, it is not enough to consider the technical aspects of the content of the standard and the procedures of standard setting. The existence and impact of standards-as-taboos is part of a transformation to a “danger culture”, and an evaluation of the standards must be part of an evaluation of our danger culture. There is no royal way to achieve such an evaluation, but in the final section of this chapter I shall explore the need for meta-norms and the important role of partial outsiders in counter-acting institutional and cultural rigidity. In a sense, this is saying that cultural transformations do not just happen and carry us with them, but that we create and maintain them, and so should also be able to change them.

The debate about strict regulation

I have argued that repertoires of rules and rule-following are everywhere. The question how safe is safe enough is answered continually in concrete decisions and behaviors. It is when decisions are contested that the search for general rules and reasons begins. After some time, the debate may focus on the grounds for the general rules and forget about everyday routines. This does not only allow dangerous practices to continue, as stories and studies of enforcement of safety standards and the lack of compliance demonstrate, but may also slant the debate and make it less productive.

Take for example the debate about safety in the chemical industry. Industry representatives and many risk analysts say that the chemical industry is a relatively safe industry, and that regulation is unnecessarily strict. Firms still comply with the regulation, though, (as happens in the nuclear sector also), because they do not want to run the *social* risk of something happening while they are outside the rule book. Some very visible incidents, with Bhopal being only the most recent one of a sequence, maintain both the public's concern and the industry's compliance. Note that the incidents have the big impact they have because of a prior, culture-embedded concern with the dangers of chemicals. Airplane accidents are about as common as chemical plant accidents, but many people fatalistically step on to the next plane.⁷

An analysis of the situation in terms of a fearful public, overzealous politicians, and interest-biased industrialists and chemists will capture only part of what is happening and will not produce a productive response to any impasse. Relaxation of standards and different, less adversarial ways of achieving regulation are advocated for the USA, with reference to the different traditions in Europe (Brickman, Jasanoff and Ilgen 1985), while Europe looks at the USA procedural strictness as the way to go. There clearly is public and political support for strict responses to the actual or perceived dangers of chemicals, and this support is embedded in our overall culture. A number of different strands go into the production of this situation, including a general trend toward accountability of public and private institutions.⁸

Because of the cultural embeddedness, there are no easy routes towards change. Scientific analyses (e.g. of risks of chemical compounds, whether "natural" or "chemical"), will not of themselves change our culture, even if ambivalences in our practices can be pointed out easily (e.g. the double standard of being lenient toward "old" risks and strict toward "new" ones; the well-known example of the carcinogenicity of toast; and the quip about toxicity testing on animal models – making the world a safer place for rats!).

It is not a solution, either, to rely on risk perception of the public, making sure that feelings of anxiety are minimal, etc. Such arguments can be put forward in particular cases (e.g., when a plea is made to give a hearing to community groups in hazardous waste cases), but their logical conclusion is populism: good is whatever is wanted by the popular will. Thus, while it may be justifiable to glorify "cultural rationality", the cognitive part of the popular response to risk (Plough and Krinsky 1987, pp. 8-9), as a tactic to compensate for some of the limitations of "technical rationality", it is not simply a case of a naturally available rationality in the public just because it is the public.

One should be allowed to *evaluate* the popular perception, even while accepting its importance. To create a basis for evaluation, a socio-cultural dimension should be added. To understand what is happening, one should

look at the emergence of public and political support for strict standards for chemicals as a case of cultural transformation. I shall explore this possibility by first discussing another example of cultural transformation in relation to handling of dangers. To create an entrance point for normative discussion, I shall introduce a further concept, danger culture, in a separate section.

The war against germs

Around 1900, the idea that diseases could be caused by “germs”, tiny organisms invisible to the naked eye but dangerous intruders all the same, took hold in our culture. The idea of health changed in the same movement (which was preceded by comparable changes within the medical community). Healthiness was not any more a matter of internal and external balance, but the body was seen as a fortress that had to be defended against intruders, specifically against germs, but generally against contaminants, toxics. Thus, new behavioral rules emerged: wash your hands, don’t sneeze near others, up to neurotic cleanliness “in the name of health”. Each time surgeons wash their hands for some minutes before entering the surgical room, they re-affirm “germ” as the justification of a cluster of risk-reducing practices in our own culture.⁹

The symbolic element, in the sense of the importance of the rules for the way we order our world,¹⁰ is apparent not only in the ritual way in which the rules are followed, but also in the anomie resulting from their contradiction. People are desolated (or just disbelieving) when they are told that germs are everywhere, also in the air we breathe. “Can’t we be safe anywhere, then?” is the reaction.

This particular cluster of practices is now fully integrated in our world view, and so stable that advertisements can use it to help sell products, as when toilet disinfectants are recommended “because they destroy *all* the germs”. And the war against germs may lead to other kinds of deaths, when products and practices intersect in unsuspected ways. In 1985, an elderly lady in the Netherlands died because she used two different, and chemically antagonistic, toilet disinfectants – to be absolutely safe – and inhaled the resulting chlorine fumes. The manufacturers mounted a campaign to reinforce safety rules (although without mentioning the accident).¹¹ This will help to absolve them, but will not make much inroad into our germ and dirt fighting culture.

In passing, I note that such cultural transformations are not limited to responses to dangerous intruders. Vitamins were recognized in the 1920s and 1930s as essential ingredients of our diet, in order to avoid deficiency diseases. Scorbout caused by lack of vitamin C was, and is, the prime example, which was culturally reinforced by the history lessons about long sea voyages in the 15th, 16th, and 17th centuries and the usefulness of halfway stations like the Cape of

Good Hope. Vitamins (especially C) then became symbols of health, and mothers were concerned to give their children enough vitamins, independent of other eating habits. Many people have been educated this way, and the orange is still recognized as a symbol of healthy living.

Seeing these cultural transformations, the rules for our association with chemicals can now be recognized as a further addition to the "arsenal" of the culture of our industrial society. Rules like washing fruit, but also standards for maximum allowable concentrations of chemicals in the work place and for acceptable daily intakes of food additives together form a net to catch and contain the dangers of chemicals. *The rules may be justified in terms of toxicological data, but their functioning is assured through the emergence and entrenchment of the relevant cultural transformation.*

Standards as taboos

We learn to live with chemicals by domesticating them, in the small worlds of households and in the big world of standard setting and regulation. There is no difference in kind, only in scope. And each time a fruit is washed, or a standard for chemicals is set, the principal danger of chemicals is re-affirmed, and thus maintained as part of the culture of industrial society.

Fischhoff (1984, 823) opens his article with the sentence "Standards are a pervasive feature of modern society". This is probably just a way to get his story going, but the ease with which such a statement can be made tells us something about our cultural repertoire. The importance of (strict) standards, instead of other forms of regulation that might be more efficient or effective (e.g., from an economic point of view), has cultural grounds. They create a boundary, either by setting bounds (on occurrence or levels) or by materially creating a boundary between ourselves and the danger (e.g. wearing protective clothing, containing chemicals or hazardous wastes). In this sense, standards are fully similar to taboos (Douglas 1966).

We may argue about standards explicitly, but that does not imply that they are not like taboos. Rather, we should look for cultural dynamics in the setting and maintenance of standards. Natural ingredients being excepted from close regulatory attention is such a cultural mould, and arguments from industrialists and others about the double standard that is being used, are easily brushed aside. In addition, there is an expediency argument: "Congress realizes that it's economically and politically expensive to regulate old risks, but believes it's relatively cheap to regulate new ones" (Huber 1984, p. 11). These costs, however, are related to the extent to which the occasions for risk regulation are embedded in our culture.

Activities of agencies like the US Occupational Safety and Health Adminis-

tration and the US Food and Drug Administration can be described with the help of anthropological terminology without creating shocked reactions:

Standard-setting agencies drag us slowly and usually reluctantly into a safer world, driving out the devils we know. Screening agencies act as guardians at the gate, making yes-no kinds of decisions, protecting us from the ominous unknown (Huber 1984, p. 10).

The very attempts to rationalize standard setting and risk handling partake of cultural dynamics in the way they create boundaries to order the world. Take the division of labor between experts and political or economic decision makers, with attendant distinctions in our repertoires (e.g., between “risk assessment” and “risk management”). This particular distinction was welcomed as a big step forward – as boundaries that create order in fact are – even while it can be recognized as a political arrangement (Jasanoff 1986). Or the other division of labor, where some actors are excluded from the process and dubbed “irresponsible critics”, as has happened in the forums that handled (and handle) risks of recombinant DNA research and transgene organisms.

Taking a longer term view, the cultural dynamics are easier to recognize. There are definite transitions in our style of handling of chemicals, and, even if accepted as transitions for the better, the outcomes reflect socio-cultural patterns. In medieval times, when iatrochemists introduced chemical “cures” (often with deadly results), this was an important stimulus to start distinguishing between useful and dangerous chemicals, to work toward separation and purification (Rip 1982), and gradually to recognize the possibility of dose-effect relationships (as in the proposition “the poison is in the dose” ascribed to Paracelsus). A very important transition occurs at the end of the 19th century, when hygiene and public health institutions emerge, regulation of chemicals starts (to avoid adulteration of food, of water, and of commodities) and quality of food becomes partly defined in terms of absence of particular, chemical species, which can be tested as such for toxicity (Hall 1974). This transition has set the pattern for all subsequent handling of dangerous chemicals, so that our cultural predilection for bounds and boundaries has become institutionally entrenched. The 1960s and 1970s may be another transition period, characterized, in the first phase, by extensive and strict regulation of chemicals, while we are in the midst of the second phase (see below).

With my emphasis on cultural dynamics, I may seem to condemn standards as “just” taboos, and rules for handling chemicals as “just” rituals, instead of attempts to be as rational as we can. The complex issues implied by the presumed contrast of “rationality” and “ritual” cannot be treated here, but my point would be that there may well be rationality in ritual. Resistance against such a view (apart from the cultural problem that a tidy distinction is made

untidy) is related to a particular view of rationality as *prescriptive rationality*, a rationality that is somehow separate from ordinary practices and can prescribe how they should proceed. (So when actual practices continue to fall short of the prescription, there must be distorting factors at work.) But consider an alternative view:

Suppose we imagine that knowledge, in the form of precepts of behavior, evolves over time within a system and accumulates across time, people and organizations without complete current consciousness of its history. Then sensible action is taken by actors without full comprehension of its full justification (March 1978, p. 592).

Such *emerging rationality* can be articulated to some extent, for example, when practices have to be justified. In this sense, controversies may be a help, rather than a hindrance, because they can force actors to become explicit about reasons (Rip 1986a). Taboos can have good reasons, and one can argue rationally about them. I shall introduce the concept of “danger culture” in order to show that a cultural dynamic, and its pattern of rituals and taboos, can still be amenable to rational discussion.

Industrial society as a danger culture

Danger culture

Cultural transformations occur also with smaller scope, for example in certain habitats or certain occupational groups. For miners and mountaineers, sociologists have analyzed such a transformation in terms of the emergence and maintenance of a “danger culture”. For responses to natural threats in specific habitats, one can speak of “coping styles” (Sims and Baumann 1972).

Both the isolation and the danger which characterize such occupations promote cohesion and self-sufficiency, a sharing of danger and a suspicion of outsiders who do not share it. And all of these characteristics contribute towards the development of an occupational subculture of danger [. . .] which is similar in some ways to the disaster subculture developed amongst those whose homes are frequently exposed to natural hazards [. . .].

The subculture provides shared perspectives which enhance the group’s control over their work situation, which maximise autonomy and minimise dependence upon outsiders. Fear is often, though not always, denied within the group as a way of making the internal environment more predictable, and group norms are very important both in controlling and testing new

members and in encouraging them to behave predictably in the face of danger. [...] Safety may be taken seriously at one level by regarding *all* possible hazards as extremely dangerous (though this may not include all conditions seen as hazardous by outsiders), but these occupational groups differentiate in practice between different kinds of hazard. Miners, for example, give most instruction to newcomers about everyday dangers such as falls and slips, less about dangers of an intermediary kind such as misfired explosions, and in the face of the possibility of major hazards such as fires and large cave-ins they are more stoic and fatalistic (Turner 1981, p. 67).

The basic point that I want to take up is that a subculture evolves in ways that enable the group to continue with its activities. The rules (rituals, taboos) provide containment of danger in two principally different ways: on the concrete level, rules maintain careful and prudent behavior, linked to solidarity rules, while at the level of the subculture, the existence of and obedience to such rules allows participants to forget (or at least be fatalistic) about the fact that their activities *are* very risky. Miners continue to go underground, it is their way of life. People do not move out from a tornado-stricken area when they have evolved a coping style.¹² Outsiders may be struck by the seeming neglect of the fact of ever-present danger – but that's why they are outsiders. And for outsiders, lacking the careful behavior instilled by the danger culture, these practices are indeed more dangerous.

Studies of occupational cultures and habitat styles focus on description of the phenomena. In a more theoretical vein, processes that can account for the evolution and maintenance of such cultures have been identified by the sociologist Norbert Elias, as in his discussion of the transformation of western cultures so that the state gets a monopoly on violence and can lay down authoritative rules for the handling of violence. Particularly interesting is his discussion of *Fremdzwang* and *Selbstzwang*: a change in the environment, or any external threat, forces responses, but such responses are taken up in the form of new styles and rules of disciplined behavior.¹³ Maintaining the discipline may then become as important as recognizing and handling the external threat. This type of analysis has been applied to the way human societies have handled fire (Goudsblom 1984, 1985), and appears to be applicable to our responses to nuclear – “uranium fire” – as well.¹⁴

Although less detailed than the empirical studies of danger cultures and somewhat loose in argumentation, this brief discussion of the approach of Elias does indicate that there may be good reasons to extend the notion of “danger culture” to larger groups, and to society as a whole.

Industrial society

It is possible to view our industrial society as a danger culture at a higher level. It will be less homogeneous as a culture, but some responses to danger are remarkably similar and efforts are exerted, as in the case of handling chemicals, to increase similarity of response. The dangers of pre-industrial society are not ours. Life is not "nasty, brutish and short" anymore in Western societies, and even violence and war may be more contained than they used to be. But our new dangers, say those stemming from the "chemization" of society and of the environment, require their own coping style or danger culture. This will not be the fatalism vis-à-vis disease, bad harvests, and war that was characteristic of many pre-industrial societies. In an entrepreneurial-bureaucratic society, dangers are identified and fought. Thus, we evolve a culture in which identification of and strong responses to the dangers are at a premium. For the danger of chemicals, a strong perception of risk is established, together with the rules to contain such risks. Regulation of chemicals is a prime example of our danger culture, including the two levels of containment of danger: regulation, specifically through standard-setting, is necessary to live a safe life, in our daily practices of washing fruits and avoiding chemical labels, as well as in the absence of too much anxiety about living in a dangerous industrial society at all. To add a further example, the concern about global threats, controversial but very real in the late 1960s and 1970s, has been taken up by national and international bodies (e.g. ozone layer, greenhouse, worldwide environmental contamination etc.) and can be a conversation piece, as in articles in slick magazines with titles like "A layman's guide to modern menaces" (Ebisch 1985).¹⁵

Looking at industrial society as a danger culture helps us in two ways. It provides a heuristic to understand better responses to danger and discussions about risk. And it serves as a model to derive guidelines for action. The heuristic function can be illustrated with two well-known issues in risk perception. Lay people, when asked to rate risks, come up with estimates that do not correlate with actual mortality rates, and they tend to "compress" hazards, overvaluing low-scoring ones, and undervaluing high-scoring ones (Hohenemser, Kates and Slovic 1983, p. 382). The psychometrician's response has been to assume that lay people must judge risks on other dimensions than the mortality rates beloved by the experts, and they have tried to reconstruct such dimensions (Slovic 1987). One could also assume that subjects draw on the cultural repertoire of our danger culture (in its present stage) in order to score the tests. "Compression" of hazards would then not be an individual bias, but a feature of our danger culture. In the same way, risk scores would be an indicator of what has become salient and focal in our danger culture.

Perception studies and controversy studies have also brought up another finding:

Debates over risk are often, at root, debates over the adequacy and credibility of our institutions which manage the risk and not debates over the actual level of risk (Kasperson 1983, p. 16).

In other words, it is a debate over where our danger culture, as reflected in our institutional patterns, should go. Looking at the issue in this way allows one to go further than the conclusion that individuals want safety from their institutions (they do). Individuals want better institutions, in the sense that these should be in accord with the danger culture.

The question then becomes one of which direction our danger culture should evolve. This requires some evaluation of danger culture; it is of little use to put forth expressions of anxiety and hope as the only guidance. Before continuing to attempt some evaluation, it is already possible to draw out an implication from the model of danger culture. Firstly, viability of industrial society is not just a "technical" matter, nor is psychological satisfaction the only addition. There must be socio-cultural viability as well, even if we may still have to articulate what that implies. Secondly, since danger culture is the result of cultural transformations, its further evolution must be seen as further transformations and one can consciously seek to effect such transformations. The view of standards as taboos is then not pejorative (as deregulationists would use the label), but a recognition that standards are culturally embedded and require *cultural engineering* to establish them. Protest movements, symbolic action against plastics, tin cans, pesticides or spray-can gases may be criticized as sectist, as scapegoating, as undermining legitimate interests. They may be all of that, and still be important because they are instrumental in establishing a danger culture that makes life in industrial society viable.

Evaluating danger culture

A sociological detour

The sociological approach of the preceding section seems to be condemned to accept whatever cultural transformations bring us and only study how far it has become socially embedded. Indeed, sociologists cannot produce substantive evaluations, but their insights into cultural dynamics may have added normative value. Such a sociological detour to reach the normative can be followed to grasp the problem of a danger culture paying a price for its daily viability in that it forgets the fact of overall danger. The net of rules is sufficient, and only when

it is broken through by events will there be attempts to mend and extend the network. One might try to anticipate events, but anticipating dangers is difficult cognitively, as well socially: Cassandra's warning is often not heard, or actively resisted. Whoever warns of new dangers has also to break through the net of rules.

The problem of anticipating dangers, seen from a socio-cultural perspective, can be recognized as a form of the problem of change. In order to break through the givenness of a culture, one has to be a bit of an outsider – and even when not, one will often come to be considered an outsider if departing too far from the given. The strangeness of the message makes the bearer of the message a stranger, and strangers are dangerous, so will be disbelieved, ostracized, or otherwise put out of bounds. Rituals will be protected, and so their process rationality (maintaining a “working” culture) may well conflict with their product rationality (keeping danger contained).

For concrete situations, and for specific rules, the heterogeneity of perspectives and relevant groups in our society is often sufficient to ensure some hearing for the critic and some adoption of the warning and improvement of rules will hopefully occur. For the general danger culture of society, the question becomes one of how warnings, criticisms, and adaptations and improvements add up. The same point can be made in a different way by noting that some analysts, such as Renn and Kasperson in chapter 11, have recently started to explore the issue of cultural handling of dangers by looking at accidents as signals (Slovic 1987) and by conceptualizing a social amplification of risk (Kasperson et al. 1988). In these discussions, mechanisms are suggested, but *effects* are still not analyzed. But it is precisely what is stimulated by the signals and social amplifications, and how such effects add up, that makes up cultural dynamics.

Meta-criteria for evaluation

Cultural dynamics are not good or bad by themselves, although participants may have strong opinions about the directions that emerge. If analysts want to contribute to an evaluation without becoming just participants, they must try to evolve meta-criteria for evaluation. This point can be illustrated by discussing the approach of the cultural bias theorists (Mary Douglas, Aaron Wildavsky, Michael Thompson, Steve Rayner, and others).

Seen from the cultural bias perspective, there are only a limited number of general cultural styles, and therefore also a limited number only of strategies to handle risk (in brief: fatalism, exorcism, adaptation, and risk as profit center). Each cultural style is linked to a particular type of social order according to the grid-group scheme, and these socio-cultural clusters are the

only viable ones. The studies and essays that have appeared by now indicate that the typology, especially if used in a flexible manner, is applicable to many situations. The claim about the viability of the different clusters is more ambitious, more difficult to support, but more interesting for my question.

Cultural bias analysis explains how certain social contexts lead to certain responses to dangers of chemicals, because such dangers are always also threats to the social order of that context. The analysis also works in the other direction: if one perceives a conflict or a threat to one's social order, one will see other dangers, and respond differently, than when one is satisfied. To rephrase a risk debate in terms of the links between social orders and cultural styles can be very illuminating, and is also an intervention. Actors will often not see such links by themselves, and may also resist having them identified, because such a socio-cultural "reduction" of their argument will undermine their social and political effectiveness and therefore enhance that of others. The characterization by Douglas and Wildavsky (1985) of environmental groups as "sectist" has been quoted and otherwise taken up by establishment groups as an argument to disregard them.¹⁶

Cultural bias theory, as any sociology of culture applied to risk and danger issues, must therefore take a stand, not on the concrete issues of the debate, but on how to evaluate social interactions, socio-cultural developments, etc. Michael Thompson has recognized this and introduced a meta-norm: perceived threats to the (own) social order must be taken seriously ("the right to one's bias"), so pluralism and some mutual accommodation must be our goal, rather than consensus and/or unambiguous expertise (Schwarz and Thompson 1990).

It is important to have such a meta-norm made explicit. Also, on the face of it, it is not an unattractive meta-norm, even if it is not clear *how* "mutual accommodation" must occur between contending styles. The problem with cultural bias theory is that it is based on cultural constants, so that change can only occur through a change in the presence or dominance of the four (or five, according to Thompson) styles available. In contrast, as I have tried to show, cultural transformations occur across time that are more than just a shift in the balance of cultural styles. One could try to capture what is happening by speaking of a societal learning process.

Flexibility as a meta-norm to support emergent rationality

One could try to save cultural bias theory by developing some meta-norm for an optimum balance between the cultural biases. No explicit attempt has been made to do so, but one could draw upon general sociological theory, especially the structuralist-functionalist perspective which is rooted in anthropology

(Malinovsky) and biological analogy (homeostatic systems). Again, theories in this perspective are well known to have difficulty in analyzing overall social and cultural change. The same problem faces short-cuts with the help of a systems perspective and models using ecological analogy.¹⁷

One had better leave the notion of an "optimum" altogether, and consider the possibility of a different kind of norm, where the situation at any particular moment is less important than the maintenance of openings for change, for further development. Flexibility should be viewed as a meta-norm, and not flexibility in general, but those kinds that would support learning processes. Such a meta-norm can only be entertained if one allows rationality to be *emergent*, rather than prescriptive. Prescriptive rationality has to specify some ideal, assuming that it is possible to create enough distance to do so, and actual practices will then be seen as falling short of the ideal. Remedies then appear as the search for distorting factors and the attempt to counteract them. If one, on the other hand, accepts that actual practices are the only thing we have, we have to work in and through these practices to achieve anything. If it is possible to make progress this way, one could term this emergent rationality.

The perspective of emergent rationality has to be combined with the general point made earlier, that interventions from partial outsiders are necessary. This appears to require a minimum of variety in our cultural pool (across space and across time), and a partial tolerance of "sects" and "esoteric cultures" (Tiryakian 1972). But apart from this sociological point, there is the possibility, perhaps the necessity, for specific types of intervention: which tendencies toward rigidity can be discerned, and how can they be counteracted? This is a task that requires sociologically sensitive participants, or observers that intervene in an interactive way.

For example, I find the present "taboos" around chemicals and the atmosphere of chemophobia becoming too dominant, and especially too unreflexive. Thus, I am prepared to argue for a certain relaxation of standards, and loosening of strict approaches – including the publication of essays like this one, in which our situation is analyzed in terms of a danger culture of industrial society. As with the labelling of environmental groups as "sectists", my terminology (e.g., of standards as taboos) may be misused by deregulationists. But in my overall diagnosis of the situation, such misuse may not be too bad, for the time being.

Fifteen years ago, I tried to argue for strictness, for giving risk perceptions of the public much more weight. Changing this attitude is only being inconsistent if one requires action to follow from a prescription that is constant over time. And my argument to change my attitude derives from the dynamics of the situation: one may not be fully satisfied with the way the perceptions of the public are given weight, but they are recognized as a political force that can be

mobilized. Accordingly, decision makers anticipate on such mobilization and take up a more strict style. By now, it may serve a purpose to call our present risk handling ritualistic. In terms of actual standard setting, a bit of deregulation may be useful. After five or ten years of deregulation, one could assess the situation anew, and perhaps try to change again. The real goal of my analysis, and its presentation to audiences, however, is to induce a more distantiated, reflexive view of our situation. We cannot all of us become sociologists-observers. But reflexivity is the way for a culture to become rational without giving up ritual.

Notes

¹ I am not the only one who attempts to introduce sociological issues into the analysis, but such approaches have suffered from comparative neglect because the discussion about socio-cultural aspects has been dominated by the typology of risk attitudes and behavior drawn from the so-called cultural bias approach (Douglas 1979, Douglas and Wildavsky 1985, Thompson and Wildavsky 1982). Recently, however, studies and essays are becoming available that highlight other important aspects. Three groups of such sociological approaches can be distinguished:

(i) institutional processing of risk (the term is drawn from Brian Wynne and Joanne Lynnerooth, see Wynne 1987), for example when the definitions of hazardous waste differ from country to country (or even within countries), and the differences can be traced to their shaping in and through different constellations of institutions.

(ii) stopping rules (Granger Morgan's term, see Morgan et al. 1985), which are not simply rational prescriptions, but embedded in institutions. The question "How safe is safe enough?" is often answered, not by a choice or a decision, but by following the routines of the (institutionalized) practice in which one lives. Fischhoff (1984, 824) mentions the possibility that individuals establish (general) rules to deal with hazards in their lives, but considers this as similar to standard setting, and thus as an example of individual choice behavior. Embedded routines, although evolving, are subjected to discussion and decision only in exceptional cases, e.g., when something has gone wrong (see Wynne 1988 for an important analysis). The notion of "organisational routine" has been used in other domains as well, including, interestingly, the domain of technological innovation (Nelson and Winter 1977). "Coping styles" prevalent in a geographical region or an occupational culture are an example of such embedded routines. Note that routines are more specific to hazards than the general risk handling typology of the cultural bias theory.

(iii) Problem definitions and risk discourses are structures, rather than rules, but orient behaviour in a similar way. For example, medical risk definitions focus on target groups, while engineers will look at failures of installations. Professionals with the one or the other background will start treating risk problems as if their own discourse was the obvious approach. A particularly important pair of problem definitions is the focus on more safety versus the focus on better decision making, a contrast that is especially visible in debates between industrialists and regulators. Both problem definitions set out to domesticate the danger and chaos of the world. Containment and discipline bring order directly. Regulatory containment requires rules, performance standards etc. which must be supported by estimates of future danger. This gives rise to risk analysis: domesticate the future in order to create an assurance of safety now (Rip 1986b).

² I am using "ritual" here in the cultural-anthropological sense, where rules can function as

taboos, and trespassing becomes sacrilegious (compare Douglas 1966). In sociology, "ritualistic" following of rules is the label for following rules for their own sake, in order to conform to the social order (see e.g. Merton 1968, p. 238). Although my example may contain instances of such sociological ritualism, this is not the main point I want to make.

³ The biochemist would say, that the foam is produced because emulgating substances are extracted from the plant cells. The housewives were not convinced, though, when I put this argument to them. They may have a point, though, in relying on experience as any positivistic scientist does. Fitchen (1987, p. 4) observes comparable stances, although their effect is negligence rather than overcaution:

The confidence that people place in their own senses is also demonstrated in opposite cases, where the contaminant is undetectable by ordinary senses. [...] When told that "routine sampling" has shown their water to be contaminated, people express doubt about the existence or significance of the chemical contaminants. They exhibit rather little concern about health issues because their individual sensors for judging reality give them no reason to worry. Some homeowners whose senses tell them "there's nothing wrong with my water" have declined to have their water tested, even though a neighbor's well has been found to contain toxic contaminants.

Apart from the point about "strong reliance on one's own senses", these stances must also be seen as following from the local character of the task of organizing one's environment.

⁴ Compare the glossy pictures of an orange, an egg, an avocado and a coconut, published in popular magazines, with the chemical names of the main ingredients printed across them. (I have seen them in the Dutch weekly *Panorama* in 1972, and used slides made from them in lectures.) Unbelief and confusion are more usual reactions to such pictures than the realization that "chemistry is everywhere". The latter slogan has been used by chemists to indicate the usefulness of their trade, but may backfire in a period when chemical waste dumps are discovered all over the country.

⁵ Chemists are no better at anticipating consequences than lay people, although they tend to think they must be experts also on this aspect of chemicals. Their behavioral rules derive from their communal order, where chemicals are friends and to be trusted (laboratory chemists, especially academically trained ones, are notorious in their neglect of safety procedures), and the use of esoteric names is not a warning signal, but an indication that one is among colleagues.

⁶ Brian Wynne, for instance, in his excellent analysis of the Windscale Inquiry (on a nuclear fuel processing plant) in Britain (Wynne 1982), makes a point of showing up procedures and styles as rituals. Then, he argues that rituals are endemic in society, and necessary to maintain ordered social life. Although this is clearly a valid observation, it does not allow the analyst to say something about the value of a particular ritual in a particular society, except as a citizen and a political actor.

From a too limited sociological or cultural anthropological perspective, the analyst appears to be condemned to condone all rituals present, or to criticize rituals as such. Changing a ritual may cause disorder, or at least anxiety – but that cannot be a sufficient reason to conserve the ritual, nor the other way around, be a sufficient reason to do away with all ritual.

The deep issues touched upon here can be illustrated with a remark from a Dutch writer (Willem Wilmink), who noted that when the emperor of Japan, after the Second World War, announced publicly that he was not a descendant from the Sun, quite a number of Japanese committed suicide. Still, it had to be said.

The structure of this situation can be recognized in the issue of risk communication, where the dominant problem definition is that risk communication aims at changing "unhealthy" (Plough and Krimsky 1987, p. 4) or "unsafe" behaviours or even personalities. Are the authorities like

Japanese emperors telling the people what is good for them in the long term? Or do they lack privileged access to the truth like any other mortal being?

There are no easy answers. But it is clear that analysis that does not say anything about *when* a ritual (or a belief) can legitimately be undermined, does not treat the full range of questions posed by the social, cultural, and political *complex*.

⁷ An example is the crash of a holiday charter plane at Manchester Airport in the middle 1980s. People waiting for their own planes to their holiday destinations were reported not to cancel their flight. (For whatever reason, including the well-known bias of the mean.)

⁸ As Scholz notes, the reason why agencies like EPA and OSHA take a stricter stance in their regulatory activities lies also in their being established at a time when accountability, and the attendant strictness of procedure, has become a general requirement (Scholz 1984, p. 211). Further analysis appears to be possible starting from Turner's observations about the emergence of "an unwritten insurance contract with the state, which will supply aid when things get too bad" (Turner 1982, p. 73).

⁹ The observation is due to Harry Collins (personal communication).

¹⁰ Anxiety, although sometimes present, is not the main factor in the ritual. Compare Mary Douglas: "There is nothing fearful [in the psychological sense] or unreasonable in our dirt avoidance: it is a creative movement, an attempt to relate form to function, to make unity of experience" (Douglas 1966, p. 12).

¹¹ Advertisements, e.g. in *NRC Handelsblad*, 30 Jan. 1985, took up the theme of cleanliness, as reflected in the extensive use of toilet disinfectants, and warned that danger signs on labels indicated that different disinfectants should not be used together, even by the Dutch who are so proud of their cleanliness.

The significance of this text becomes the more striking when one realizes that a survey of cleaning practices, conducted in the wake of the accident, showed that people are prepared to fight dirt (and smells) in their toilets by any means, throw as many as four different chemicals into the pot, and experiment with all sorts of materials that they suspect will dissolve or destroy (Karel Knip, *NRC Handelsblad*, 2 Feb. 1985).

¹² Note that this is different from cognitive dissonance, which describes a possible reaction of people to an event. People who continue to live in a community with a hazardous waste problem show less anxiety about consequences than those who have been able to move out to a "clean" area. In the case of a danger subculture, in contrast, the option of moving out disappears altogether.

¹³ Note the similarity with the later works of Foucault, who focuses on evolving (and enforced) discipline as a basic pattern in societal development. For Foucault, however, the forces leading to discipline are always human attempts to exert power over others.

¹⁴ The idea, and the term "uranium fire", has been brought up by a Dutch graduate student, Alexander Lagaaij, in a master's thesis in preparation.

¹⁵ The article's sub-titles ask: "Is the *population bomb* a dud? Should we really get all steamed up about the *greenhouse effect*? Is the *ozone layer* overrated? *That depends on whom you ask*". It is inspired by the appearance of *The Resourceful Earth* (1984), edited by Julian Simon, a well-known critic of doomsday prophecies, and discusses pros and cons in a fairly balanced way. The point I am making here is that by now, a repertoire has emerged in which to talk about global menaces, and that one can be flippant about them.

¹⁶ As has at least one of the authors, Wildavsky. Drawing on his contribution to *The Resourceful Earth* (1984), he is quoted as saying: "There's a whole pattern of alarmist stories. The cries of alarm are part of a social doctrine. If you can show that you're running out of something vital, people have to do what you want. This is tantamount to the idea that the world was running out of

oil which we heard after [the OPEC oil embargo of 1973]. Or that if you use vital resources, other people can't use them. That's all junk" (Ebisch 1985, p. 50). It may well be true that a particular alarmist story is "all junk", but the argument about the link between approach to risk and social orders is used here to condemn alarmism generally, without a further argument why a story must be "junk" if it is linked to a social order or a power strategy.

¹⁷ It is possible to draw out the analogy to develop a general frame for standard setting (Zielhuis 1970), and one can even introduce some issues of societal welfare (Nieuwpoort, Rip and Verbeek 1972). Analytically, one always has to fix social and cultural developments to a particular state, in order to define an optimum. Change is then conceptualized as a succession of such optima, but the dynamics of change must remain a mystery.

References

- Brickman, R., S. Jasanoff and T. Ilgen. 1985. *Controlling chemicals: The politics of regulation in Europe and the United States*. Ithaca, N.Y.: Cornell University Press.
- Brown, P. 1987. Popular epidemiology: Community response to toxic waste-induced disease in Woburn, Massachusetts. *Science, Technology & Human Values* 12, Nos. 3 and 4: 78–85.
- Douglas, M. 1966. *Purity and taboo*. Harmondsworth: Penguin.
- Douglas, M. 1979. *Cultural bias*. London: Royal Anthropological Society, Occasional Paper.
- Douglas, M. and A. Wildavsky. 1985. *Risk and culture: An essay on the selection of technical and environmental dangers*. Berkeley, CA: University of California Press.
- Ebisch, R. 1985. A layman's guide to modern menaces. *TWA Ambassador* (October): 49–58.
- Fischhoff, B. 1984. Setting standards: A systematic approach to managing public health and safety risks. *Management Science* 30 (7): 823–843.
- Fitchen, J.M. 1987. Cultural aspects of environmental problems: Individualism and chemical contamination of groundwater. *Science, Technology & Human Values* 12, No. 2: 1–12.
- Foster, D. and M. Dowie. 1982. The illusion of safety. Part one. Poisoned research, *Mother Jones* (June): 38–48.
- Goudsblom, J. 1984. Vuur en beschaving. De domesticatie van vuur als een beschavingsproces (1). *De Gids* 147 (4): 227–241.
- Goudsblom, J. 1985. Vuur en beschaving. De domesticatie van vuur als een beschavingsproces (2),(3). *De Gids* 148 (1): 3–21, (9/10): 714–722.
- Hall, R.H. 1974. *Food for nought. The decline of nutrition*. N.Y.: Harper and Row.
- Hohenemser, C., R.W. Kates and P. Slovic. 1983. The nature of technological hazard. *Science* 220: 378–384.
- Huber, P. 1984. Discarding the double standard in risk regulation. *Technology Review* (January): 10–14.
- Jasanoff, S.S. 1987. Contested boundaries in policy-relevant science. *Social Studies of Science* 17: 195–230.
- Kasperson, R.E. 1983. Acceptability of human risk. *Environmental Health Perspectives* 52: 15–20.
- Kasperson, R.E., O. Renn, P. Slovic et al. 1988. The social amplification of risk: A conceptual framework. *Risk Analysis* 8: 177–187.
- Kunreuther, H. (ed.), 1981. *Risk: A seminar series*. Laxenburg, Austria: International Institute for Applied Systems Analysis.
- March, J.G. 1978. Bounded rationality, ambiguity, and the engineering of choice. *Bell Journal of Economics* 9: 587–608.

- Merton, R.K. 1968. *Social theory and social structure*. New York: The Free Press: Ch. VI. Social Structure and Anomie.
- Morgan, M., H. Granger, K. Florig et al. 1985. Power-line fields and human health. *IEEE Spectrum* 22 (2): 62–68.
- Nelson, R. and S.E. Winter. 1977. In search of a useful theory of innovation. *Research Policy*: 6: 36–76.
- Plough, A. and S. Krinsky. 1987. The emergence of risk communication studies: Social and political context. *Science, Technology & Human Values* 12, Nos. 3 and 4: 4–10.
- Rip, A. 1982. The development of restrictedness in the sciences. In N. Elias, H. Martins and R. Whitley (eds.), *Scientific establishment and hierarchies*. Dordrecht: Reidel, pp. 219–238.
- Rip, A. 1986a. Controversies as informal technology assessment. *Knowledge* 8 (2) (Dec.): 349–371.
- Rip, A. 1986b. The mutual dependence of risk research and political context. *Science & Technology Studies* 4 (3/4), (Fall/Winter): 3–15.
- Scholz, J.T. 1984. Cooperation, deterrence, and the ecology of regulatory enforcement. *Law and Society* 18: 179–224.
- Schwarz, M. and M. Thompson. 1990. *Divided We Stand. Redefining Politics, Technology and Social Choice*. Hemel Hempstead, New York: Harvester Wheatsheaf.
- Sims, J.H. and D.B. Baumann. 1972. The tornado threat: coping styles of the north and the south. *Science* 176: 1386–1392.
- Slovic, P. 1987. Perception of risk. *Science* 236: 280–285.
- Thompson, M. and A. Wildavsky. 1982. A proposal to create a cultural theory of risk. In H. Kunreuther and E. Ley (eds), *The risk analysis controversy: An institutional perspective*. Berlin: Springer Verlag, pp. 145–161.
- Tiryakian, E.A. 1972. Toward the sociology of esoteric culture, *Am.J. Sociol.* 78: 491–512.
- Turner, B.A. 1981. Organisational responses to hazard. In H. Kunreuther (ed.) Laxenburg: IIASA, pp. 49–86.
- Wynne, B. 1982. *Rationality and ritual. The Windscale inquiry and nuclear decisions in Britain*. Chalfont St. Giles: British Society for the History of Science.
- Wynne, B. (ed.) 1987. *Risk management and hazardous wastes: Implementation and the dialectics of credibility*. Berlin: Springer Verlag.
- Wynne, B. 1988. Unruly Technology: practical rules, impractical discourses and public understanding. *Social Studies of Science* 18: 147–167.