

Risk and Response

On the need for a strategic approach to catastrophic risks around the frontiers of technological and scientific development

*"If you want to build a ship, don't drum up the men
to gather wood, divide the work, and give orders.
Instead, teach them to yearn for the vast and endless
sea."*

Antoine de Saint-Exupéry

Jens Drolshammer¹

1. Introduction

This is a birthday greeting, a thank you, and in particular, a request to Jacques Santer. Thanks are due to Jacques Santer for his much-acclaimed Zurich speech in autumn 2000 entitled "The Small States as Masters of Exploiting Action Possibilities - the Future of the Small State In Europe". The request goes to him who was toasted as Honorary Abbot and Patron Saint of the La Claustra monastery. This was formerly San Carlo artillery factory, strategically hidden deep inside the Gotthard, Switzerland's most European mountain landscape. May he help to ensure that it must never again provide shelter from catastrophic risks such as a "nuclear winter" or a bio-technical terrorist - attack. That was the occasion for this not only edifying text.

We present a narrative review of the necessity and difficulty of accessing and

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The German text has been published in: Festschrift Jacques Santer, Luxembourg 2007; Reprint in A Timely Turn to the Lawyer - Globalization and the Anglo-Americanization of Law and Legal Professions - Essays, Zurich 2009, p. 751; since 2014, Prof. Drolshammer is a Faculty Associate at the Berkman Klein Center for Internet & Society of Harvard University. He is an emerite Professor since 2009.

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dealing with major hazards in the category of catastrophic risks, including in the legal field. It is largely about a special and exceptional area of descriptive and prescriptive commitment by technology and science, as well as law and politics, in a border area of predominantly technological and scientific developments in the age of globalisation. In view of the constantly increasing stock of knowledge and hazards, such risks are today part of the necessary concern with a future that can be hopefully shaped, and demand a corresponding expansion of the coverage by law with a strategic perspective. The link to Catastrophic Risks thus serves us as an illustrative sub- and borderline case for the stimulation of repositioning - perhaps also nobilitizing - a specific way of thinking - a strategic one - also in the scope of the law.

For the cognitive, voluntative, emotional and institutional comprehension and preliminary understanding of how to deal with these risk categories, the following incident a few days ago is significant. At this year's annual meeting of the American Society of International Law, entitled "The Future of International Law"², Professor Philip C. Bobbitt³ gave a lecture at the traditional Annual Dinner on 28 March 2007, entitled "The Future of International Security - Four Scenarios". The summary in the conference programme read "In this address, Prof. Bobbitt will present four alternative futures for the next 30 years: These possible worlds - called "American Buffalo," "The Real Thing," "The Spanish Prisoner," and "Otherwise Engaged" - clarify the choices to be made in the coming era of WMD proliferation, multipolarity, and increasing civilian vulnerability to disaster". Of legitimizing interest was also the biography of the speaker - PhD 1983, Oxford, JD1975, Yale and AB 1971, Princeton, with all the insignia of a top American education. A rare combination of legal education and training in strategy, which the speaker also practised in government offices. Philip Bobbitt's areas of interest include institutional law as well as international security and history of strategy. Among other positions, he was Director of Intelligence, Senior Director for Critical Infrastructure and Senior Director for Strategy Planning at the National Security Council, and taught at the War Studies Department of Kings College in London.

Apparently most of the audience - and certainly the speaker - thought they were "in the wrong film". The College of International Lawyers slept, remained silent, and some left the room in protest despite the speaker's brilliant presentation, reputation and professional experience, and despite the future-oriented theme of an international professional organisation's annual meeting including a panel discussion entitled "Tsunamis, Hurricanes, Earthquakes, and Asteroids: Are We Ready for the Next 100 Years?" Obviously not, at least in debate with a jurist trained in strategy who is ready for a legal approach and discussion in front of a juristic professional audience. *Plenus venter non studet libenter?*

That seems to be a basic fact in the field of this topic, although scientific and popular literature attaches great importance to mega-catastrophes. It is significant that the literary bestseller lists of recent years have included books

2 <http://www.asil.org/events/amo7/agenda.html> (as of April 2007).

3 For CV of Professor Philip C. Bobbitt see <http://www.law.columbia.edu/law/PhilipBobbitt> (April 2007)

such as *Oryx and Crake* by Margaret Atwood⁴, Michael Crichton's *State of Fear*⁵ or in that connection Jared Diamond's *How societies choose to fail and survive*.⁶ Such books always present major technological hazards that belong to the category of catastrophic risks, not to mention films like *Deep Impact*, *Meteor Asteroid*, and above all *Outbreak* (1995) and *Armageddon* (1998).

Unusual curiosity, intellectual honesty, incredible creativity and unbiased acumen led Richard A. Posner, the most cited lawyer and judge in the United States, to write a book in 2004 entitled "*Catastrophe, Risk and Response*" - quite an event a few months ago. We named our review after the title of his book and taken up some basic ideas to set a yardstick - admittedly elitist and demanding - for our proposals on strategic thinking in law⁷.

Richard Posner's book is a self-explanatory and self-evident expression of a specific way of thinking - a strategic one - without explicitly addressing and making aware of this beyond the specific way the subject is treated. He writes in the preface: "Certain events, quite within the realm of possibility, such as a major asteroid collision, global bioterrorism, abrupt global warming, even certain laboratory accidents, could have unimaginably terrible consequences up to and including the extinction of the human race, possibly within the near future."⁸ Richard Posner notes with critical distance that law and social sciences, partially excepting economics, do not deal with these possibilities. With understatement he writes: "This seems to me regrettable. I'm not a Green, an alarmist, an apocalyptic visionary, a catastrophist, a Chicken Little, a Luddite, an anticapitalist or even a Pessimist." His conclusion is: "I have come to believe that what I shall be calling "the catastrophic risks" are real and growing, and that the social scientists, in particular in economics, statistics, cognitive psychology and law, have an essential role to play in the design of policies and institutions for combating them"⁹. Remarkably, Richard Posner's book was inspired by Margaret Atwood's novel, which he first examined in a detailed book review. It is the irritatingly uncontrollable technological progress that Richard Posner's attention is focused on by *Catastrophic Risks*. The depiction of *Catastrophic Risks* thus serves as a reason and as a provocative subset of this key social problem. For Richard Posner as a lawyer the underlying problem specific to science and profession is the question as to "Whether the law's conventional methods for resolving science-laden legal disputes were adequate in an area of increasing scientific complexity. The research that I have done for this book has convinced me that the law is indeed lagging dangerously behind an accelerating scientific revolution"¹⁰.

The author of this birthday greeting spent the last twenty years of his military service in Switzerland primarily as an employee of the former Chief of Staff for operational and strategic training, and later as a member of the Advisory Board of the Chief of General Staff and now Chief of the Armed Forces. In

4 Atwood Margaret, *Oryx and Crake*, London 2003 - Shortlisted for the Man Booker Prize 2003.

5 Crichton Michael, *State of Fear*, London/New York 2004.

6 Diamond Jared M., *Collapse: how societies choose to fail or succeed*, New York, 2005.

7 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004.

8 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004.

9 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004.

10 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004.

parallel he also worked with the International Institute for Strategy Studies¹¹ - on scenario imaging for the then still legendary overall defence exercises in Switzerland, in which the entire relevant part of Switzerland was trained in the management of key risks. The insertion of an earthquake, a pandemic, a dam burst or a nuclear power plant related disaster belonged to the free style of scenario imaging at that time. As from the end of the 1980s the opening up and expansion of the concept of security generally focused on safeguarding livelihoods, allowing - at the mercy of the didactically virtual, the politically inconsequential and the militarily dilettante - an amusing examination of the major risks, some of which were recognisable and foreseeable at the time, but which were not yet included in the catastrophic risks of interest here.

Occasional reference in parallel to the ever-expanding library provided further impressions and insights into the unfathomable causes and the variety of possibilities for dealing with these risks at the interface between technology and science. These books include: Lewis Mumford, *Technics and Civilization*, 1934¹², Karl Jaspers, *The Atomic Bomb and the Future of Mankind*, 1958¹³, Hermann Kahn, *Thinking about the Unthinkable*, 1962¹⁴, David Landen, *The Unbound Prometheus - Technological Change and Industrial Development in Western Europe from 1750 to the Present*, 1969, 2nd edition, 2003¹⁵, Hans Jonas, *The Principle of Responsibility: An Attempt at an Ethic for Technological Civilization*, Frankfurt am Main, 1979¹⁶, Ulrich Beck, *Risk Society, On the Way to a Different Modernity*, 1986¹⁷ - not easy reading either - Niklas Luhmann, *Sociology of Risk*, 1996¹⁸ or Yehezkiel Dror, *Policymaking under Adversity*, 1986¹⁹, Hans Küng, *Global Responsibility: In Search of a New World Ethic*, New York, 1996²⁰, and most recently Martin Rees, *Our Final Century, Will Civilisation Survive the Twenty-First Century?*, 2003²¹.

2. What are Catastrophic Risks? And how catastrophic are they?

With a view to the growing debate about risk society, we will leave the sub-areas *crisis management*, which deals with the anticipation and effective

11 Däniker Gustav, *Swiss strategies of self-assertion during the Cold War*, Frauenfeld, 1995.

12 Mumford, Lewis, *Technics and Civilization*, 1934

13 Jaspers, Karl, *The Atomic Bomb and the Future of Mankind*, 1958

14 Kahn, Hermann, *Thinking about the Unthinkable*, 1962

15 Landen, David, *The Unbound Prometheus - Technological Change and Industrial Development in Western Europe from 1750 to the Present*, 1969, 2nd edition, 2003

16 Jonas, Hans *The Principle of Responsibility: An Attempt at an Ethic for Technological Civilization*, Frankfurt am Main, 1979

17 Beck, Ulrich, *Risk Society, On the Way to a Different Modernity*, 1986

18 Luhmann, Niklas, *Sociology of Risk*, 1996

19 Dror, Yehezkiel, *Policymaking under Adversity*, 1986

20 Küng, Hans, *Global Responsibility: In Search of a New World Ethic*, New York, 1996

21 Martin Rees, *Our Final Century, Will Civilisation Survive the Twenty-First Century?*, 2003

handling of a materialized risk²², and *risk policy*, which deals with the systematically planned and well argued handling, both at state and company level, of risks identified in the background and behind the scenes²³.

The starting point is a working definition of risk as a possibility of suffering damage, in the narrower sense a measure of the magnitude of a hazard, as a function of the probability of the occurrence of a damaging event and its extent of damage. This multidimensional concept involves the dimensions of "danger" and "chance"²⁴, whereby the question of awareness and perception plays an important role in this mediated world.

In view of the novelty of the topic and a possible connection with the scientific and political intervention in the context of the current debate on the existence and possible handling of certain extreme and special risks at the frontiers of technical and scientific progress, we are focusing here for now on the question of the nature and classification of certain extreme risks. In categorising the conceptual descriptions of the *causes* and *consequences of crises* in emergencies, conflicts, *wars* and *scandals*, we limit ourselves to major risks that can be classified as disasters.

This is how the category of disaster is described in the traditional view of risk: "An unforeseen and often sudden event that causes great damage, destruction and human suffering. Although often with natural origins, disasters can have human causes. Wars and civil unrest, which destroy homes and force people to flee, are among the causes of disasters. Other causes include collapsing buildings, hurricanes, droughts, epidemics, earthquakes, explosions, fires, floods, accidents during the transport of hazardous materials, nuclear accidents, volcanic eruptions...". Accordingly, disasters usually lead to irreversible damage to life and/or property. The focus here is on material damage. An objective assessment of damage is usually possible, and often the damage is quantifiable. There is a high degree of agreement between subjective perception and objective reality²⁵. It must be borne in mind that these paraphrases of the catastrophic risks to be considered here, which are anchored as "now" or "then" in efforts to grasp them, will certainly recede into oblivion as extremes in the wake of recent knowledge updates and the latest social and political developments.

There is more to it than that. The definition of "catastrophe" in Webster Search New International Dictionary is "a momentous tragic, usually sudden event marked by effects ranging from extreme misfortune to utter overthrow or ruin". Do catastrophic risks belong to the upper extreme "utter overthrow or ruin"? Richard Posner picks out only this area and limits his interest essentially to catastrophes "that threaten the survival of the human race"²⁶, such as asteroid impacts or a sudden climate change. These disasters have two characteristics: on the one hand, very low likelihood, but on the other hand, their very high magnitude and suddenness. These catastrophic risks lead to discontinuities in the chain of historical events. Such events are part of

22 Carrel Laurent F., *Leadership in Crises: A Handbook for Practice*, Zurich, 2004, p. 91 f.

23 Haller, Matthias, *risk management - in society?! In International Public Affairs: Im Spanfield of freedom and responsibility*, Festschrift for Wolfgang Schürer, Bern 2006, p. 249- 264.

24 Carrel Laurent F., *Leadership in Crisis: A Handbook for Practice*, Zurich, 2004, p. 91 f.

25 Carrel Laurent F., *Leadership in Crisis: A Handbook for Practice*, Zurich, 2004

the prehistory of the Earth and of mankind. Mostly they have already happened, and can happen again.

Catastrophic risks can be divided into the following subcategories.

The *first* category includes natural disasters such as pandemics and asteroid collisions. In this area, technology has neither created nor increased the risk (with partial reservations in the area of pandemics). However, this is critical in formulating the response.

The *second category* consists of laboratory or other scientific accidents, for example accidents related to particle accelerators, nanotechnology and artificial intelligence. In this area, technology is the source of risk.

The *third* category consists of unintentional but man-made disasters such as the depletion of natural resources, global warming or the depletion of biodiversity: "both global warming and biodiversity depletion are consequences of energy generation, land clearing, gene splicing and other human activities that affect climate and genetic variety".

The *fourth category* concerns premeditated man-made disasters such as nuclear winter, bioweaponry, cyberterrorism and digital means of surveillance and encryption. Since it is still considered unlikely to be brought about in a global context, this category is currently limited to the effects of "technological terrorism"²⁶.

With regard to the argumentation goal here, certain work distinctions in the analytical training facility are helpful in order to avoid misleading the in-depth analyses.

In order to avoid a negativistic perspective and perception, it makes sense to differentiate between technological funding and technological control.

Furthermore, it is important to distinguish between man-made and natural disasters that can be prevented by technology, and those that are produced or made more dangerous by technology. According to Richard Posner: "Modern Science and technology have enormous potential for harm. But they are also bounteous sources of social benefits. The one most pertinent to this book is the contribution technology can make to the occurring of both natural and man-made catastrophes, including the man-made catastrophes that technology itself enables or exacerbates"²⁷. The same applies essentially in the field of modern sciences as in the field of technology.

A decisive distinction for a meaningful focus of further investigation is ultimately the differentiation "between catastrophes that portend the extinction of the human race in the long run, and catastrophes that may bring about its extinction in the foreseeable future, i.e. before the end of the current century ..,"²⁸.

As we will see, even the categorization and choice of decisions belongs to the sociological approach at a strategic level with a strategic perspective, which uncommon among lawyers.

26 Posner Richard A., Catastrophe: Risk and Response, Oxford New York, 2004.

27 Posner Richard A., Catastrophe: Risk and Response, Oxford New York, 2004, p. 133 ff.

28 Pfister Christian (ed.), The day after: On dealing with natural disasters in Switzerland 1500-2000, Bern, 2002; Pfister Christian, Summermatter Stephanie (ed.), Disasters and their coping: Perspectives and Positions, Bern, 2004

3. What has changed in dealing with Catastrophic Risks? Why is so little done in this area?

With regard to traditional crises, the prevailing opinion today is that we are and will be increasingly affected by the phenomenon of crisis, and with increasing intensity. It is considered possible that crises will increase in the future in terms of frequency, intensity and complexity and that we will become even more vulnerable to crises,²⁹. This is argued under the headings "Growing risks?", "Signs of vulnerability?" and "Diminishing resilience?"

This self-perception and, in part, the self-evident nature of the forecast in the traditional part of the analysis of special events is missing in the area of catastrophic risks. From a compulsion to strategic thinking suggested by the matter and the goal of analysis itself, Richard Posner starts here on a meta-level of analysis, namely the analysis of the prerequisites for analysis and the analysis environment itself, and outlines in the descriptive part the fundamental analysis difficulties in dealing with catastrophic risks.

"Chapter two explores why such risks are analytically, psychologically, politically, economically and practically so difficult to cope with or even to perceive. The obstacles include science fiction, doomsayers (...), politics as seen through the lens of public-choice theory, scientific illiteracy and scientific worship, externalities and the lack of a good theory of technological change, and the cognitive limitations mentioned already that people brush up against in dealing with very small probabilities. This chapter introduces the term "economy of attention" to name the deficiencies in mental capacity and institutional resources that make it difficult to think constructively about all the low-probability disasters at once, and identifies fallacies in previous considerations of the catastrophic risks. (...)"³⁰

As we will see, these analytical difficulties, which are inherent in the very nature of the matter, require access to the topic at a strategic level and from a strategic perspective.

The necessity and usefulness of this strategic approach on the meta-level is shown by the resulting discrepancy to the change in the hazard potential of these risks, which was simultaneously recognized in the area of catastrophic risks.

This aggravating state of the analysis prerequisites and the analysis environment is worrying because situation assessments show that the dangers of catastrophic risks have become greater. One of the reasons is the emergence of apocalyptic terrorism. In another respect, it is also worrying because many catastrophic risks are either generated or increased by science or technology and the corresponding development speeds in both areas have accelerated. An important factor seems to be that the costs of dangerous technologies, especially in the field of nuclear and biological warfare³¹, as well

29 Carrel Laurent E, *Leadership in Crises: A Handbook for Practice*, Zurich, 2004, p. 113.

30 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004, p. 13

31 Allison Graham T., *Nuclear Terrorism: The Ultimate Preventable Catastrophe*, 1st ed., New York, 2004

as the level of knowledge and skills required for their application, are sinking. The simultaneous lack of systematic analyses of catastrophic risks in research and development is particularly worrying. It seems that even major events that change risk awareness, such as the WTC attacks on 11 September 2001 or the tsunami of 26 December 2004, are still not raising the corresponding awareness level required in this top end sector in a sufficiently sustainable manner, despite the fact that in the meantime, much more systematic and differentiated methods of risk management have been developed in non-top-end areas of the risk landscape.

The various factors listed by Richard Posner are differently weighted depending on the culture, especially in the area of modern social science analyses, which in part would have to be carried out on an interdisciplinary basis, but also in the area of legal culture. The creative, future-oriented, anticipating and shaping application of legal theory and legal instruments from a strategic perspective is stimulating in view of the postulated ennoblement and functionalisation of law at the meta-level of strategy, and may also open our eyes and lead to corresponding "transplants" into our legal thinking and legal culture.

Richard Posner cites the following factors as obstacles in the area of analysis and implementation of knowledge in the descriptive area of issue recording with regard to catastrophic risks, each of which is flagged accordingly:

Cultural factors:

One of the main reasons for the widespread indifference towards catastrophic risks is the suboptimal, even insufficient level of scientific knowledge among non-scientists. Scientific ignorance is one of the best known factors in the systematic misperceptions of the public about risks in relation to various hazards.

"If political leaders, lawyers, judges, journalists, and other members of the governing class have no interest in and feel for science, they are unlikely to attend closely to either the dangers or the opportunities that modern science creates. The problem is particularly acute for members of the legal profession because so many of them deliberately turn their back on science when they decide to go into law"³²

Another factor - flagged as *science worship* - is the combination of ignorance with an uncritical admiration of knowledge and scientists. This uncritical distancing gives rise to the questionable attitude: "leave science policy to the scientists". This in turn leads to insufficient controls and misinvestment and miscommunication of scientific knowledge in the field of catastrophic risks.

An additional factor - flagged as *science fiction* - is that the phenomenon of disaster has a great attraction for readers and writers of books and that the relationship between technology and disasters has led science fiction writers to make technologically generated disasters the main theme of their work. This leads to disturbing exaggerations, to prejudiced selections and to misrepresentations of the facts. Popular films such as *Armageddon*, which deals with a collision between a large asteroid and Earth, may play a

32 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004, p. 96.

questionable role.

Under the further flag of *Scientific Doomsters*, Richard Posner notes the interesting frequency at which well-known scientists have made irresponsible statements about doomsday possibilities. The usual polarization of opinions in institutionalized public intellectual debates also promotes optimistic counter-reactions of the main exponents under attack.

A significant cultural factor - called *limited horizons* - is the social failure to take catastrophic risks seriously and to recognize and accept that small probabilities of major damage must be taken seriously.

Psychological factors:

In this area, evolutionary adaptation restrictions of human perceptual capacity in the counterplay of so-called "pattern recognition" and "reputational power" cause too many false alarms about technological risks.

The psychological factor - Economy of Attention - with the psychological concept of Availability Heuristic - causes a tendency to pay disproportionate attention to obvious and superficial events. Even the characterological predisposition of temperaments hinders a rational and constructive handling of catastrophic risks. Optimistic and pessimistic predispositions distort perceptions in this area.

Economic factors:

Among the economic factors of obstacles are the *economics of innovation*, especially since there is no accepted theoretical framework for human activities in the technological field. The economy cannot provide an algorithm for discovery of the secrets of nature and their consideration for the good of mankind, and cannot adequately define the innovative process. As a result of legal unprotection, the inventor is not responsible for the externalisation of inventions. He essentially passes on to third parties the costs of inventions with destructive potential, such as "encryption" and "recombinant DNA". Neither the state nor the market is able to recognize or shape inventive activity. It seems that it is not society that drives the technology, but the other way round. Since the technology is a source both of hope and of great danger, this process is fraught with great uncertainty³³.

Another economic obstacle to dealing effectively and efficiently with catastrophic risks lies in the difficulty of solving problems when problems have to be solved in international cooperation. By definition, most catastrophic risks require this. This primacy of national interests and the resulting difficulty in organizing effective measures is reflected in the way the issues of global warming and bioterrorism are handled. Richard Posner also comments on the question of whether the rational-choice model is able in practice to explain the existence or non-existence of answers to catastrophic risks, and denies this using various examples³⁴.

This issue-specific access to the meta-level in the investigation of the

33 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004.

34 Posner Richard A., *Catastrophe: Risk and Response*, Oxford New York, 2004, p. 133 ff.

conditions for analysis and the analysis environment itself is found through strategic approaches in thinking; otherwise access to analysis itself remains difficult or closed.

4. What is traditionally done with regard to large risks, including catastrophic risks?

The next step in this conceptual sketch will lead to questions about how catastrophic risks can be assessed and possible responses determined, and how catastrophic risks can be avoided. In order to make the distance between current scientific thinking and political action more comprehensible and visible to create a brainstorming platform suitable for dealing with catastrophic risks, we first describe the way in which the small state of Switzerland deals with major risks. We will realise that, with the exception of certain extreme security considerations within the framework of the general policy of securing livelihoods, such risks have not yet been visibly analysed and the consequences of this in the political sphere have not yet been drawn. This approach is intended to show us what still needs to be done at the level of strategic access to and handling of these issues, or would be done if a political community felt induced or even obliged to deal with these risks at all. It may be conceded that the thought and action stimulated lies beyond any traditional understanding of politics and law. As shown, Richard Posner's - unexpectedly - pleasurable and consistent thinking may provide incentives to start here with a new mindset and new methods on the metalevel of strategy.

As a small state, Switzerland, which is supposedly safe and insured for many things, has a remarkable tradition of dealing with major risks, especially since security of livelihood is a central constitutional right and these major risks were systematically managed and exercised in terms of security policy in the 25 years before the fall of the Berlin Wall, insofar as they fell into the category of "power-related effects". Major historical fires such as in Glarus, the plague and landslides such as in Gossau, have played an important role in the development of political communities in Switzerland. Today, historians claim that, even after the founding of the federal state in 1848, disasters and the way they were dealt with have significantly contributed to a nationwide awareness of the importance of solidarity³⁵. The original focus of security policy on power-based "causes with hostile intent" has been extended, due to a change in the concept of security, to further categories of non-power-based effects with no hostile intent, such as natural disasters, health disasters, technical disasters, industrial disasters and financial disasters, and integrated into the respective early warning systems, crisis scenarios and crisis

35 Pfister Christian (ed.), *The day after: On dealing with natural disasters in Switzerland 1500-2000*, Bern, 2002; Pfister Christian, Summermatter Stephanie (ed.), *Disasters and their coping: Perspectives and Positions*, Bern, 2004

management preparations. Switzerland has an above-average developed insurance industry; in particular the Swiss Reinsurance Company, as the largest reinsurer in the world, has a leading think tank with regard to large risks, especially catastrophes, and actively participates in the generation, dissemination and application of knowledge in these areas.

In the alarm exercises, strategic leadership exercises and the overall defence exercises (GVÜ)³⁶ before the fall of the Berlin Wall, major risks, especially catastrophes, were repeatedly built into the scenarios to be worked on, be they nuclear disasters, health disasters, dam bursts, landslides, or pandemics, etc. In the period after the fall of the Berlin Wall, strategic leadership exercises (SFÜ), which were conducted in the meantime under the civilian leadership of the Federal Chancellery, also addressed and practised issues of dealing with major risks of catastrophic proportions on several occasions. These include *critical information infrastructure* - with the participation of experts from Rand Corporation - and *pandemics*. Unfortunately the former combination of interdisciplinary and inter-professional expertise and action knowledge, which was combined in the traditional militia system with general conscription, has largely evaporated and crumbled. The parallel embedding in international efforts and cooperation, on the other hand, has led to the professionalization of various state agencies in these areas. At the Swiss Federal Institute of Technology, tsunamis are simulated and studied under laboratory conditions far away from the action. The distant tsunamis produced effects in Switzerland, especially in connection with the mobility of tourism, and as a result temporarily increased disaster awareness. The dramatically changed world situation in environmental and climate protection shows tangible effects that change consciousness and trigger measures, also in Switzerland. The forests are dying, the glaciers are blanketed to delay their retreat, the lack of snow endangers winter tourism, the permafrost is thawing and increasing the risk of falling rocks during mountaineering. Floods, landslides, avalanches and storms, creeping industrial disasters such as asbestos, or the sudden Schweizerhalle chemical accident outside Basel have become reality in Switzerland.

Switzerland's handling of risks - at least in the civil sector - is most systematically and clearly demonstrated by the "uniform risk policy" for the entire federal administration, which was introduced in February 2002 and adopted in January 2005. It took several years to achieve this. In order to make the scope of risk assessment comprehensible, *risk categories* were defined in advance. They include financial and economic risks, natural disaster risks, personnel risks, property risks, legal risks, technical and scientific risks. These *risk categories* were assigned to the *risk areas* "Assets", "Liability" and "Financial benefits with no strings attached". A *risk inventory* was then drawn up in the Federal Administration. The inventoried risks were evaluated and compiled in a risk profile consisting of two axes, the abscissa "probability of occurrence" and the ordinate "financial impact". Following this evaluation process, various *core risks* were determined for the departments. In an aggregated *risk profile*, a diagram of the core risks at federal level was drawn up.

36 Däniker, Gustav, *Swiss Self-Assertion Strategies in the Cold War*, Frauenfeld, 1995

For a better assessment of whether these core risks assigned to the departments come close to the catastrophic risks mentioned here, we list a few: "Natural event/disaster with damage to infrastructure and life: storm/flood/avalanche etc. (DETEC, risk no. 9), food control/food channel (FDEA, risk no. 21), BSE crisis (FDEA, risk no. 2), scientific risks - e.g. contamination of drinking water (DETEC, risk no. 32), preparation for reaction to suddenly occurring exceptional events (e.g. reactions to large-scale contamination of the environment) (FDHA, risk no. 19), epidemic of livestock (EVD, risk number 1), massive occurrence of pathogenic germs (EDI, risk number 25), (partial) failure of IT infrastructure due to viruses/computer crime (FDF, risk number 13), natural phenomenon/disaster with damage to infrastructure and life: earthquake (DETEC, risk no. 8), central IT structure destroyed by material/elementary event (FDF, risk no. 16), reaction to accident at domestic or foreign nuclear power plants or use of nuclear weapons (foreign countries) (DDPS, risk no. 24), accident in nuclear plant (DETEC, risk no. 12) and war damage (DDPS, risk no. 39).

It should be noted that, based on a reading of the documents accessible to the public, at least the civil overall risk analysis does not address the upper range of catastrophic risks. However, the wording in some core risks may not preclude this. In conclusion, it should be noted that on this basis an *integral risk policy* and a continuous *risk management system* have been implemented by the Confederation.

5. Why does a strategic perspective in dealing with Catastrophic Risks also make sense in the legal field?

What 1

The use of the word "strategic" is not a fashionable ingratiation of the jurist with the doctrine of strategy in the military or management fields, or a kind of reputational assimilation through association with topics and ways of thinking of presumptively special importance.

To the law and lawyers, "strategic thinking", "strategic perspective" and "strategy" tend to be more alien and distant forms of thinking and acting. In our opinion, however, this is an underestimated and unmanaged gap in the action and application-oriented thinking and behaviour of lawyers. The analysis of this suboptimal processing and supplementation of legal thinking - here only a suggestion is given in an admittedly special area - has not yet been carried out, even if this way of thinking becomes modestly more visible in the legal field, as for example in "strategic legal advice", and in the use of the terms 'process strategy' and 'negotiation strategy'. In this sketch, the methodological preliminary question is of interest whether the nature of the issues - here with catastrophic risks - as an object of cognitive description and behavioural prescription itself requires an appropriately methodical approach and handling that is adequate for this object, which in part has a dimension that is described as "strategic" in neighbouring sciences and neighbouring

policies.

Various aspects of the issues involved in dealing with catastrophic risks stand out. They are new and future-oriented, they meet central fundamental values and interests, they are unusually complex, they take more space because of their cross-border character, and they require an above-average understanding of time in various respects. The issues involved demand the most fundamental decisions in implementation and control as well as special ways of achieving the objectives. Dealing with issues relating to the threats posed by technological and scientific change also involves special requirements of reality, such as limited predictability of developments, a diversity of events, simultaneous contradictions and ambiguities in perceptions, and often a lack of decomposability. It is therefore a matter of access to and dealing with the realities of science and technology, which are rather foreign and distant to traditional lawyers in their traditional professional roles.

In the following, we use the term "strategic" as a qualification of thinking and acting in "strategic thinking" and the term "strategy" as a way to describe a goal-oriented approach. The arsenal of corresponding concepts and constructions in the military and in particular in the corporate strategy developed from it is big. Here we examine only two aspects. In strategic management theory, there are multiple uses of the term "strategy" other than the five "Ps of strategy", Plan, Ploy, Pattern, Position and Perspective³⁷. Plan means here a way-target description of what a company wants to achieve and how it plans to do it. Associated with this is the idea of a strategy as (chess move) ploy, namely the associated moves when it comes to competing against competitors. This understanding of the term is opposed to the idea of a strategy as a pattern, i.e. which patterns can be recognized in the decisions and/or actions of a company. Describing a strategy as a "position" refers to the positioning of a company in its environment. When describing a strategy as a "perspective", the question is fundamentally how the company's environment is perceived and reconstructed³⁸.

As far as the *nature and content of strategic management* is concerned - as an example from a sub-discipline of management theory: a look into the arsenal from the point of view of the "*essence*" of strategic management shows that it is a matter of "*shaping the development of companies*". This planning

37 Examples of the function of the strategy in military strategy:

Baron Antoine Henri de Jomini, *The Art of War*, London and Pennsylvania, 1992; De Montbrial Thierry, Jean Klein (ed.), *Dictionnaire de Strategie*, Paris, 2000; Kennedy Paul, *Grand Strategies in War and Peace*, Yale, 1991; Münkler Alfred, *The New Wars*, Reinbeck, 2002; Stahel Albert A., *Strategy and Conflict Studies: Classics of Strategy - an Assessment*, Zurich, 2003; Tzu Sun, *The Art of War*, London, 1995; Van Creveld Martin, *On Future War*, London/Washington/New York 1991; Windsor Philip, *Strategy Thinking: An Introduction and Farewell*, Boulder, 2002.

An example of a game-theoretical examination of strategy:

Schelling Thomas C., *The Strategy of Conflict*, Cambridge MA and London, 1980.

An example for the examination of strategy in management consulting:

Bolko v. Oetinger, Tiha v. Ghyczy, Christopher Bassford (ed.), *Clausewitz: Strategie Denken*, Munich 2001

38 Mintzberg Henry (ed.), *Strategy Safari: a journey through the wilderness of strategic management*, Vienna, 1999; Mintzberg Henry, Quinn James Brian, Ghoshal Sumantra, *The Strategy Process*, European edition, 1995

between the extreme variants "synoptic total planning" and "muddling through" is described as planned evolution in the form of a process. In the following, the term is understood as a specific mindset on how to deal with the development of companies. Strategic management aims to *rationalise thinking and action through explicit awareness*.

As to what strategic management could achieve in this process: it serves to "replace chance with error and, based on this, to initiate learning processes that drive the development of the company, making strategic management a continuous, collective learning process in which ideas are generated, tested, revised by experience, etc. The answer to the key question of what is specifically strategic thereby and which issues deserve to be labelled "strategic" at all, is that *issues of strategic importance are those that determine the direction of companies and affect decisions that are vitally important*³⁹.

These are merely side-glances into one of the various arsenals of the different disciplines in which "strategic" and "strategy" play a central role. The appropriateness of such borrowings and transfers should be further developed elsewhere. This is merely an initial positioning of the requirements of approaching and dealing with thinking and acting in the field of catastrophic risks, as they are partly presented in Richard Posner's book as a yardstick - without explicitly presenting this and making the strategic way of thinking and acting itself the subject - and are given. We do not define, but need this arsenal for the development of first tools to position and characterize these special requirements for thinking and acting.

6. What are the main "strategic" areas of action and operation in dealing with catastrophic risks?

This means first localizing the areas in which "strategic" aspects of dealing with catastrophic risks could acquire significance and impact. They include:

- The matter of issue-adequate thinking in terms of a specific mindset.
- The matter of correct design of the procedure for detection.
- The matter of appropriately goal-oriented linking recognition and action.
- The matter of the necessary policy decisions in strategic decision-making.
- The question of changing or improving the conditions of the analysis and the creation of an appropriate environment;
- The matter of knowledge generation or the creation of an issue-adequate interdisciplinarity.
- The question of social and legal policy decisions on the possible collisions of fundamental rights.
- The matter of defining optimal policies, especially legal policies.
- In dealing with the borderline area of catastrophic risks, it is noticeable that including the strategic dimension may be more important in the establishment and realization of "strategic thinking" in the sense of a certain mindset than in the

39 Müller-Stewens, Günther, Lechner Christoph, Strategic Management: How strategic initiatives are leading to change, Stuttgart, 2001.

formulation of strategic planning. The majority of relevant areas with such strategic issues require a two-way or multiple relationship in which the actors compete and interact with each other to achieve the desired objectives. In the area of approaching and dealing with catastrophic risks, however, such constellations or configurations could become topical, for example in competition with the various issue-relevant academic disciplines and, for example, in the necessary coordination of international analysis and action efforts, in which, by their very nature, a plurality of equal, intermediate or superordinate actors are involved.

7. What are the essential characteristics of the "strategic" in dealing with catastrophic risks?

This way of thinking and acting has characteristics that are also required and important when dealing with catastrophic risks.

In this sense, the following apply here:

- The thinking itself is located on a meta-level.
- Thinking is partly on a meta-level insofar as it is also concerned with creating the conditions for recognition and action.
- Thinking is directed towards the achievement of goals and is therefore focused on both recognition and action.
- The thinking here is fundamentally oriented towards the survival of a community.
- Thinking is geared towards overcoming challenges.
- Thinking is based on a holistic approach to the issue.
- Thinking aims in an issue-specific manner to produce effects over significant periods of time.
- Thinking is open in relation to the issue and not infected and limited by the difficulties of realizing later action in the political process.
- Thinking is cross-disciplinary and cross-border.
- The thinking is so unbiased that counter-intuitive and out-of-the-box methods and solutions are not a priori discredited or discriminated against.
- This topoi list is incomplete and unsystematic. It describes certain characteristics of the handling of catastrophic risks on a "strategic level". It is not only a desirable but, in our opinion, a necessary preliminary and superimposed setpiece in organizing the thought and action process required.

8. Reasons why lawyers are often strategy-averse

Richard Posner wrote "Risk and Response" as a lawyer primarily from a legal

perspective. The role of the law is indispensable in dealing with catastrophic risks. Richard Posner himself, in view of the main topic of dealing with the dangers and blessings of modern technology and science, has harsh reservations about the suitability of lawyers and the inappropriateness of the law in dealing with catastrophic risks. At the same time, the repositioning and ennobling of "strategic thinking" suggested here has not yet been fully implemented in law, although we admit that we are making the suggestions here based on a borderline area. The legal and professional practice of lawyers is usually "strategy-averse". With the risk of being excluded or excommunicated from the guild and churches of lawyers, we add - deliberately pointed and one-sided - a few areas of these suboptimalities in brief to illustrate this. In order to avoid the most insubordinate and gross generalisations, we are essentially looking at lawyers who exercise their professions as judicial officers, judges, corporate lawyers and attorneys, but also as university lecturers and researchers in a continental European legal system and who, according to the principle of territoriality, are essentially focused on their own legal system and legal culture.

These suboptimalities include here, for example, the following:

- As a rule, lawyers work in a past and not future-related manner.
- Their work is mainly of a legal decision nature rather than creative law.
- Certain tendencies towards specialisation and technocratisation narrow their perspectives and have a negative effect on the overall view required of the issue.
- Lawyers have a below-average education in the natural sciences.
- Lawyers are untrained players in an interdisciplinary discourse in the issue-related competition of various social sciences.
- Due to the focus on their legal system and legal culture and the associated narrowing of the geographical and factual professional horizon of knowledge and mindsets, lawyers often tend to be insular and sub-optimally networked across borders.
- As a rule, lawyers are not sufficiently versed and knowledgeable in complex issues.
- The limited predictability given in such issues, the simultaneous diversity of events, the contradictions and ambiguities, and the lack of decomposability into conventional concepts are usually disincentives for lawyers.
- Lawyers often lack a mindset of basic configurability, including of the legal order.
- With a few exceptions, the most fundamental questions in the daily execution of their profession take a back seat.
- Demanding areas of exception from the rules and new extraordinary circumstances are challenges not sought after by many lawyers.
- Lawyers are unfamiliar with many of the policy considerations of a modern legal policy, especially those raised for dealing with catastrophic risks.
- Lawyers, although professionally successful, have become somewhat self-sufficient and unambitious, both intellectually and ideologically.
- The meta-domain of "strategic thinking" is far removed from most legal professional roles.
- The legal professions and the law are uncoupled from these developments as a result of the accelerated pace of technological and scientific change.
- The endowment of research projects in this borderline area of law is small and the theoretical treatment of the corresponding topics is underdeveloped.
- The number of attractive openings for dealing with such issues is small and, in terms of reputation, not integrated into existing professional roles.

To illustrate the likely gap between the above part-caricature of certain

characteristics of law and lawyers, we add some titles under the key question "How to evaluate the catastrophic risks and the possible responses to them" in Richard Posner's "Catastrophe, Risk and Response: The difference cost-benefit analysis can make: the case of RHIC (p. 140), A modest Version of the precautionary principle (p. 148), Discounting to present value (p. 150), Taxes, subsidies, and options: the case of global warming (p. 155), Valuing human lives (p. 165), Risk versus uncertainty (p. 171), Coping with uncertainty (p. 175), Politics, expertise, and neutrality: RHIC revisited (p. 187). Under the heading "How to reduce the catastrophic risks" we add at the same time the corresponding titles for clarity: Institutional reforms, Towards a scientifically literate legal profession (p. 200), A Science court? (p. 209), A center for catastrophic-risk assessment and response (p. 213), Fiscal tools: a recap (p. 215), Some hypothetical regulatory policies (p. 216), an international EPA (p. 216), An international bio-weaponry agency? (p. 218), Catastrophic-risk review of new projects (p. 221), Limiting science study by foreigners (p. 221), Police measures (p. 224), Extreme police measures (p. 234), Punishing hackers (p. 243). All these are legal problems in dealing with Catastrophic Risks which need to be solved in the light of a "strategic perspective".

9. Conclusions

The unleashing of Prometheus through science and technology is, according to current knowledge, largely man-made. It is therefore up to mankind and the various communities to put civilized fetters on this Prometheus. In the simultaneous conflict between the dangers and blessings of technology and science, it should be recognized and - at least - avoided that these people endanger themselves and the earth in an existential way. This paper is about Catastrophic Risks, a borderline area of threats to and by science and technology. We are of the opinion that dealing with these hazards can be better and more quickly recognised and "normalised" by presenting the extremes. We argue that this is a necessary and noble task, and that a political community has a legal obligation to deal with these borderline situations appropriately. It is pointed out that, given the complexity of the issues and the obstacles to recognition and translation into action in this border area, fundamental approaches are required at a strategic level. A strategy for securing livelihoods requires strategic thinking that is up to the task on the basis of a strategic mindset, and strategic analysis and policy methods appropriate to these tasks on the part of the people involved.

We chose the quote from Antoine de Saint-Exupery: *"If you want to build a ship, don't drum up the men to gather wood, divide the work, and give orders. Instead, teach them to yearn for the vast and endless sea"*. On the many seas of post-modern technology and science, this longed-for "vastness" and "endlessness" has been so "conquered" that the longing that was to be fulfilled on this ocean is no longer sufficient as a mere strategic "moving". On these seas "conquered" by mankind, the unleashed Prometheus brings real

new dangers and blessings. And the strategies of old, when wishing still helped, may no longer save us from shipwreck.

Jacques Santer gave a highly acclaimed speech in autumn 2000 at a conference the author organised for the law firm in Zurich where he worked at the time, entitled "The small states as masters of exploiting opportunities for action - The future of the small state in Europe".

After his dinner speech, the author presented him with a gift from the artist, scientist and entrepreneur Jean Odermatt⁴⁰. Jean Odermatt is the winner of the European Cultural Project Prize awarded in Basel on 16 December 2000. He worked for over 25 years on a project about the Gotthard as a transit route, water tower, cultural and linguistic border, watershed, and also as a fortification of the Swiss army garrison in two world wars. In the meantime, the La Claustra project - the visionary cipher for a post-modern monastery deep inside the mountain at the time of Jacques Santer's lecture - has become reality. The disused San Carlo artillery factory with its widely ramified underground spaces on the Gotthard, in the immediate vicinity of the pass summit, has been transformed into a cultural site where the usual notions of space and time become meaningless. In the toast, we appointed Jacques Santer as abbot of honour and patron saint of this monastery.⁴¹

May Culture and Nature - and the depths of improbability - help our patron saint Jacques Santer guard us from catastrophic risks to ensure that these shelters from military threats on the Gotthard - the most European landscape in Switzerland - no longer have to afford protection against any "nuclear winter" or bio-technological terrorism - if, in the worst case, they can still be reached at all.

Carpe Diem!

Cambridge, Fall 2005

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40 The Gotthard Project by the artist, scientist and entrepreneur Jean Odermatt, and Approaches to the outer and inner worlds of a landscape in the Land of Heaven, eulogy by Jens Drolshammer, delivered at the award ceremony of the European Cultural Project Prize on 16 December 2000 in Basel, manuscript.

41 www.claustra.ch