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Frankenfood: Risk and Ritual in Biotechnology

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ABSTRACT

The first Canadian citizen conference on food biotechnology is analyzed as a cultural performance from the perspective of Victor Turner's model of social drama. The limitations of interpreting biotechnology from a risk assessment and risk communications framework are examined and a performative or dramatic approach is suggested as more meaningful in order to make sense of the current conflicting cultural constructions of biotechnology.

The final citizen position is interpreted as a negotiated code of meaning according to Hall's classification system and discussed as an experience of ritual redress and conditional re-integration into the existing social order.

The research discusses the major framing discourses reproduced at the conference: government, industry, consumer, public interest and environmental. The conference text is coded into the thematic areas of regulatory issues, public participation, citizen rights/consumer benefits, farmers' rights/corporate interests, missing voices and meta- themes such as the shift towards seeing nature as complex digital information.

TABLE OF CONTENTS

LIST OF TABLES

FRANKENFOOD: RISK AND RITUAL IN BIOTECHNOLOGY

As I think about the recent citizens' conference, I become increasingly convinced of the merit in looking at science and technology from a performative perspective. We are accustomed to perceiving politics in theatrical metaphors, or the news as entertainment, but more rarely do we conceptualize science and technology as cultural performance. It is probably true that science is an arena of life that for most of us, as members of the public, we feel most removed. Scholars continue to speculate on the degree to which audiences are active or passive consumers and meaning makers in regard to the cultural industries. When it comes to science, however, the public's role has been further constrained and marginalized as an audience comprising irrational thoughts and fears and incapable of sorting complex technical evidence.

When the "citizens' conference model", a means of including public participation in science and technology decisions, is interpreted within a performative framework, we see that as soon as the public is permitted to perform a leading role in the drama, they become extremely competent in interpreting the various discourses and decoding the dominant arguments in regard to public interest. The nature of that decoding and the extent to which those interpretations indicate shifts in cultural beliefs and cultural assumptions about culture-nature boundaries is the subject of this study.

I am also interested in how resistant Canadians may be to a new technology like genetic engineering, when provided with a full continuum of information and a level playing field, so to speak. Multiple approaches to communications thread through this project: risk and constructionist models of communications; public and expert means of decoding and encoding communication; performance as a mode of communication; the representation of nature as information, of genetics as technology, and the resultant blurring of traditional categories of life and social relations.

Since the research discovery of recombinant DNA processes (the transfer of genes across species) in 1973, the commercialization of 'the new biotechnology' has moved swiftly in medical, pharmaceutical and agricultural applications.[1] In 1983, the federal Canadian government identified the successful deployment of biotechnology industries as essential to our global economic competitiveness. The scientific knowledge propelling the biotechnology industry in Canada is supported with major funding initiatives from the National Research Council, and regulated by offices of biotechnology within Industry Canada and Health Canada, as well as five other ministries. Many universities in Canada have formed academic - entrepreneurial alliances with the biotech industry. It is not uncommon for leading academic science researchers to either serve on a firm's advisory board, hold a managerial position in a firm, possess substantial equity in a firm, or serve on a board of directors for a biotech firm (Krimsky et al, 1991). In this way, academic, government and industrial stakeholders have joined alliances in launching this revolutionary technology. In addition, lobby and advocacy groups for the industry, such as BioteCanada, exist to promote Canadian firms and develop international investment alliances.

Canola was the first genetically engineered(GE) crop to be approved for field trials in 1988. By 1996, we had over 700 field tests being conducted in Canada. Genetically altered varieties of canola, corn, tomatoes, flax, squash, wheat, and soy have received regulatory approvals as novel foods by Health Canada, some making their way into the retail food chain, all without label identification in North America.[2] Both industry and government are acutely aware of the potential public opposition genetically altered foods may engender.

In Europe, especially in Germany and the UK, polarization between activists and industry has escalated to such a degree that the ripping out of GE crops as a public act of protest has become the yardstick by which bureaucrats measure the international differences in popular resistance to biotech. (The European Greenpeace web site has uploaded photographs depicting activists 'doing their work' (www.greenpeace.org/~comms/cbio/geneng.html.) In North

America, industry and government have carefully promoted biotechnology as the next post-industrial revolution, as an indispensable high technology for North Americans to gain and maintain economic competitiveness. Nonetheless, opposition among various factions has been mounting, and as genetically engineered products clog up the regulatory pipeline, biotech proponents fear growing public opposition may hinder widespread acceptance of the technology.

As a result of this concern with potential opposition, and the acknowledgement that the manipulation of the DNA code has significant ethical and social implications, our government is seeking ways to incorporate and increase public participation in biotechnology. The 1998 National Biotechnology Advisory Committee and the Renewed Biotechnology Strategy recommended there be a national conversation that addresses socio-ethical issues and facilitates public input into policy.

However, the activism formerly confined to Europe is manifesting itself on this side of the Atlantic. At the end of October, 1998, activists in San Francisco publicly threw a tofu lemon meringue pie in the face of Monsanto CEO, Robert Shapiro as he reassured the crowd at a public fund raiser that Monsanto's Round-Up herbicide designed for GE crops, was absolutely safe! As if in retaliation, Monsanto added an interactive discussion component to their web site which opened with the question; "Do activists promote or hinder open debate about GE foods?" In Canada, we see grassroots opposition to the technology in the formation of environmental organizations such as Canadian Environmental Network, Saskatchewan Environmental Network, Canadian Biotechnology Activist Network, and the British Columbia Biotechnology Circle. While these groups appear to indicate that opposition is confined to the usual margins of society, an October, '98 cover of the New York Times Magazine read "Fried, Mashed or Zapped with DNA?". Four months later, Time Magazine zapped Monsanto Corporation with an article titled "The Suicide Seeds", which disclosed the Terminator Technology[3] to the general public. Prior to this publication, the Internet had been the only media space debating the controversy of patenting

genetically altered seeds which mature into sterility, forcing farmers to purchase new seeds each year.

Pollan's highly satirical and critical New York Times article, "Playing God in the Garden", also focussed on Monsanto, and observed that one of Monsanto's principle metaphors in promoting their patented engineered potatoes is the likening of nature to an 'operating system'. While, in part, appropriating the language of the organic agricultural movement, Monsanto's 'sustainable agriculture' is not a biological eco-system, but an information age 'operating system' in the form of a potato that emits pesticide from inside its cells. As Pollan wryly comments, corporate giant Monsanto is legitimating the technology to the American public by marrying Wendell Berry to Bill Gates. In a detailed history of the biotechnology industry and its word associations over time, Bud (1993) also notes the attempt to wed biotechnology to Silicon Valley. Referring to the U.S. 1980's regulatory framing of genetically modified organsims, he writes:

> "Despite a lack of popular enthusiasm for uncontrolled release, regulators in the U. S. therefore seemed to have been successful in finding a consensus that biotechnology, properly controlled by responsible scientists, could be seen as a latter day information technology" (p 214).

The language of the entire industry is enmeshed in risk metaphors which emphasize the safe management of the technology and the ability of the regulatory system to protect the public. Wider discussion, in terms of the patenting of life forms, the structure of the agricultural production system, diversity of plant species, corporate monopolies, uncertainty and precautionary approaches, or sources of funding for scientific research are framed out of the debate. Instead, we hear about 'smart wheat', 'crop protection', 'competitive advantage', 'new sustainability', 'crop yields', and 'life science' companies. If 'smart consumers' merely have to weigh the benefits and risks of the products of technology, then where and how does the informed citizen speak critically in a debate with predetermined boundaries?

In Europe, participatory technology assessment (pTA) has been used for

over ten years to inform policy decisions about highly contested science and technology issues. One model of pTA is the citizen conference, which is a focused public dialogue between a panel of citizens and a panel of experts. The process is citizen driven as a means to incorporate citizen input into policy decisions on contested technologies.

Past citizen conferences in Norway(1996) and France(1998) on genetic engineering, food and agriculture have challenged the dominant framing of food biotechnology as a safe consumer product choice and addressed broader social-ethical and environmental uncertainties. Norwegian citizens concluded biotechnology food products were not in the public interest at the present time, and French citizens called for a moratorium on new field testing of GE crops. Current public opposition in the EU has reached such intensity that the possibility of a moratorium on GE field crop trials looms ever nearer, sparked most recently by the scientific evidence that the monarch butterfly is fatally affected by pollen from GE corn crops.

The more highly individualistic American free trade temperament saturates our Canadian policy making decisions. How will Canadians interpret the multiple issues of globalization, corporate patenting of plant genes, world food production, and specialist knowledge versus informed citizen knowledge? Is there a space, here, for public interest to be expressed or perhaps 'decompressed', amidst the strategic launching of biotechnology in the information society?

The first Canadian citizen conference took place at the University of Calgary on March 5 - 7, 1999. This event is the research project of Dr Edna Einsiedel who chose the topic to be food biotechnology. Agricultural applications of food biotechnology comprise 25% of the industry in this country. Economically, the stakes are high for both government and business. Any yet, food and the daily practice of eating represents one of the most personal, and ritualized aspects of our everyday life. The communication of information about biotechnology has been maintained in the style of expert dissemination of

technical facts. Printed matter aimed at dispelling irrational fears that the public may conjure up about "Frankenfood" is made available from government ministries, or communications organizations supported by industry. The information is presented within the framing of scientific risk assessment as a precise, safe, technology which will inevitably benefit us environmentally, nutritionally, and economically. The citizen conference challenges not only the implicit reification of the technology but, the model of communication utilized to propel the technology forward.

In this paper, we view the citizen conference as an aspect of *social drama* as theorized by Victor Turner (1982) and Richard Schechner (1993). Social drama is a four fold dramaturgical metaphor and model for interpreting social phenomena. Turner and Schechner argued that the stages of breach, crisis, redress, and reintegration or schism were characteristic of not only Western theatre forms, but Western societal dilemmas, in general.

The citizen conference is a performative, social and political event. Within this tradition of research, cultural performances are something produced *by* culture, but which also produce culture. Performance theory and social drama allow us to view the political dramas of biotechnology as symbolic communication. Just as rhetorical analysis views language and text as a symbolic mode of communication, performance studies allows us to frame the conference and its context in a wider symbolic range. Theories of ritual and performance acknowledge that cultural performances may conserve and reinforce existing social practices, or may provide a public space where cultural norms and assumptions are contested. Symbolically, this citizen panel stands for the public. Symbolically, science and technology have been called before the jury. Viewed as a performative ritual, are the conditions present in this process for new ideas and a creative negotiation of differences to occur? Are traditional cultural beliefs about the boundaries of culture and nature shifting, being challenged, or changing? What can we learn about the cultural territories of industry, government, science and the public interest when a dramatic metaphor

is employed?

One may wonder at the pairing of science and technology with an anthropological and theatre based concept of performance. And yet recently, I read a news story detailing the latest biotechnology attempts to have a mouse accept the embryo of an elephant. The research was 'seriously' heralded as a solution to biodiversity and a means to combat species extinction. For most of us, this is pure fantasy, if not entertainment. What is spectacle, and what is science? We mistrust industry, government and their insistence on communicating only the facts of risk. For in the media and information society, we learn in one broadcast that our government has banned DDT, only to have it pointed out by another news anchor that all the third world fruit we consume is growing in countries to whom we sell these same banned pesticides. Science and technology are performed globally on a daily basis. This project represents an unusual opportunity to look at a local performance of biotechnology at a citizen conference in this community.

Sometimes, I wonder at how I have ended up writing a thesis which one might reduce to an argument over genetically engineered potatoes![4] Musing on this, I realized that I am a Canadian whose ancestors came to North America to escape the Irish potato famine. If only the Irish had biotechnology and the New Leaf potato, you say? I would respond that if the Irish had grown biotech potatoes, the patents would surely have been owned by the English and the cost of seed might have reproduced Irish poverty, just as well. Which is another way of saying that technology is embedded in social relations, an aspect of social practices, constructed by and constructing our culture.

THE LITERATURE OF RISK

> *...the existence of dangers is largely invisible and is mediated principally through argument...consequently, in danger situations the things of everyday life turn, metaphorically speaking, into Trojan horses, out of which the risk experts jump, quarrelling with each other, and announce what one has to fear and what not....*Ulrich Beck, *Risk Society.*

Introduction

Contested readings of science and technology, such as those emerging in the biotechnology debate, immediately place us into the field of risk research. Technical risk analysis, cognitive risk models, and risk communications while relatively new fields, have been embraced by industry, government and regulators. For the most part, they still characterize the predominant mode of interpreting the technology and communicating about biotechnology to the public.[5]

We will find that risk assessment and risk communications models are unsatisfactory in understanding the meaning of biotechnology in terms of the public interest. Risk assessment and risk communications continue to rely on the message transmission model derived from engineering and mathematics. Leiss (1994) in acknowledging the public mistrust of risk communications, goes on to insist that " a model developed long ago has been applied recently in a number of very important arenas of public policy debates" (p.137). Rather than question the model of communication, Leiss carries on with the demand that the public simply *must* come to understand the place of scientific and technical expertise in policy decision making about risks. Let's emphasize 'communication' rather than 'risk' he suggests. Instead of preaching, Leiss suggests that risk communicators learn how to use the model incorporating persuasion. Despite his insistence that this 1949 model of communication is useful, he explicitly recognizes the breach which has occurred over communication about environmental hazards to the public. Political actions based on the transmission model of communication have resulted in increased distrust of institutions by the public (Waddell, 1996; Katz & Miller, 1996).

As a result of this continued breach between the public and expert

institutions, we will show that when opportunities for redress are provided, the public does not accept the meaning frame which risk experts in industry and government have worked to substantiate. This is in line with the Hornig-Priest studies (1995) which argue that public perceptions of biotechnology are not replicas of short term media agenda setting. While a long term media cultivated understanding of the world may be operative, participants in her study indicated much broader interpretive frames for biotechnology than was coded in recent media coverage.

This chapter argues that risk literature from the social sciences, beginning in the early 1970's, has dominated discussions of the potentially hazardous applications of science and technology. The results of the citizen conference, however, show how risk assessment and risk communications constitute one script and one voice only, which the public are willing to consider alongside several other circulating discourses. In addition to reviewing the risk literature, this chapter will look at other literatures most often associated with new technologies and public interest.

Cultural theories of risk perception, such as Douglas (1992), Rayner (1992) and Thompson (1990) are often termed the 'most well developed' of all the risk theories. Since the mid 1980's, cultural theory has been the focus of much scholarly and policy debate, however it has rarely been applied to make decisions in technological disputes (Rayner, 1992). While attractive, we will subsequently abandon cultural theory for shortcomings in its interpretive capacity.

Social theories of risk, in particular those of Brian Wynne, and theories of reflexive modernity from sociologists Ulrich Beck and Anthony Giddens, have contributed much to the understanding of science and technology debates. These writers have critiqued the linear risk discourse, developing a broader social constructionist perspective. Wynne's (1996) work bridges the backdrop of reflexive modernity with literatures on public participation, articulating the conditional nature of both public and expert forms of knowledge in framing risk

perceptions.

Literature from science and technology studies (STS) emerged in the eighties along with other constructionist approaches to understanding science and technology and might rightly be a literature base to examine for this topic. However, as Hess (1995) argues, while social constructionists produced convincing discussions and field research depicting the nature of science as a social process, culture in the wider sense relating to political power, or race, gender and class differences is curiously absent. Social constructionist accounts must be acknowledged for undermining the simplistic model of an expert authority and a naive public (who risk analysts were busy attempting to wed), however, they have preferred to avoid subjects like social justice or participatory democracy, which would be aligned with a more critical approach.

Despite their merit, theories of reflexive modernity and social constructionism are limited in assisting us to understand and organize the qualitative and interpretive data I gather locally, observing and participating in the citizen conference. While the citizen conference is a phenomena of reflexive modernity and in this way cannot be divorced from that literature base, I will show how performance studies provide an alternative theoretical framework and corresponding methodology to better understand the complex interactions between diverse social groups disputing the meanings about a risky technology.

Risk Communications and Risk Analysis

The field of risk communication is the youngest sibling in the risk field family, and in many respects emulates characteristics associated with theories of birth order.[6]

Risk communications first appeared in the academic literatures in 1986, making a debut appearance in *Risk Analysis* that year. The journal itself began publishing in 1981, and was known to be the official voice of the Risk Analysis Society, whose first conference held in Washington, DC, published proceedings titled *The Analysis of Actual versus Perceived Risks* (Golding, 1992). It wasn't until the 1980's that risk researchers began to acknowledge that the public

perceived risks differently than experts. However, this realization was still framed against the assumption that public perception could be measured against a discrete technical measurement of risk. Given that the field of risk emerged out an engineering and natural science background, this is not so surprising. The meaning or academic notion of 'risk' originated in an interdisciplinary collaboration between engineers, biologists and health scientists. It was originally a concept related to the statistical probability of mortality, in regard to a risky activity. (We are all familiar with estimates of risk cited for automobile deaths in comparison to fatal plane accidents, which demonstrates how fully the language of risk has penetrated popular vernacular).

Technical analysts puzzled, however, over why citizens did not adjust their behaviour or opinion in response to the communication of statistical explanations of risk. It was the famous psychometric studies of Slovic et al. (1982) at Decision Research in Oregon which introduced technical risk analysts to the idea of perception being related to causative cognitive attributes, such as dread or familiarity. Although Slovic was novel in that he investigated public concerns, they were framed as discrete, objective variables, which could be factor analyzed from quantitative survey responses.[7] By the mid 1980's, the positivist branches of psychology and sociology became appropriated by the field of risk research.

Risk communicators now had a job to do and set about bridging the gap between the public and science & technology authorities in a context that was void of cultural or social issues. Although the idea of a concept or value such as 'dread', in regard to nuclear power development, was now addressed by risk perception studies, the technical assessment and communication of risk was still assumed to be value-free. In other words, the public now had values and feelings to be reckoned with, but the experts still operated in an 'objective', neutral and culture - free zone.

Katz & Miller (1996) use the term 'contempt' to capture the over-arching attitude risk communicators hold about the public. Without reducing risk to purely

social factors, Wynne (1992) exposes risk analysts as suppressing the institutional dimensions of the issues and denying that any technical risk formulation occurs within a context of prior assumptions, experiences and definitions. In other words, the universalistic technical risk assessment model can be interpreted to be a frame that avoids the larger issues of the social relations of technology. It does so by pitting popular knowledge against expert authority. The strongest criticism of risk research is that it assumes risk to be an objective natural value that we are able to measure and rationally agree on, without explicating the underlying assumptions implicit in the model.

In the case of biotechnology, the principle underlying assumptions are cultural and include the notion of nature and the environment as a resource for human use; the ability to solve societal problems with more technology; a faith in the progress of material science, and more recently due to the free trade climate, the return of the economic index as the primary measure of worth for an activity or social practice. At a deeper level, or at a higher level, (depending on your preferred metaphors), biotechnology is also shifting and playing with long held assumptions in Western culture about the boundaries between culture and nature, and between human and animal, now that genetic engineering has made it possible to create new life forms. With the advent of international free trade agreements and patent law, consumer capitalism has turned technology not only in the direction of the mastery of nature, but the private ownership of life. Ironically, a technology which sells itself by proclaiming that precision is integral to rearranging the 'building blocks' of physical life (DNA) for material gain, unwittingly raises boundary questions of a more metaphysical or philosophical nature.

Risk communication, in extending the elitist agendas of risk assessment approaches to technology disputes has, for the most part, relied on a one way model of communication. Technical expertise is conveyed to a naive, emotional public in order to inform and educate us as to the benefits of science. Within this model, the only questions that can be raised are things like how safe is the

technology? What are the chances of an accident occurring? Who will be responsible in the event of a problem?

Waddell (1996) proposes four models of risk communication operating over the last few decades in regard to disputed environmental issues. Early approaches were "technocratic", with expert and the public in divided spheres. Information was transmitted to the public, and no input requested back. The second he calls the " one way Jeffersonian model", wherein experts disseminate information and believe the public will change irrational beliefs once they have the facts. The third is "interactive Jeffersonian" where the public is invited to give back their values and beliefs about the technology. However, still, in this model, the expert technical camp does not operate in a context of values or assumptions. They provide facts and may consider what are perceived to be less rational forms of information. Waddell argues that this has become the predominant model for risk operating in science and technology decision making at this time.

The fourth model, the social constructionist approach, is an open exchange of technical and non-technical knowledge between experts and public, effectively blurring the traditional distinctions of expertise. Waddell cites the 1992 Rio conference on the environment as indicative of a move towards this kind of communication. This was the first time NGO's were invited to present technical data on environmental issues generated by their own organizations, in an international context.

In terms of the direction of the Canadian regulation of biotechnology, this would appear to be accurate. This partly interactive approach can be seen operating inside both Industry Canada and Health Canada. The Canadian Food Inspection Agency and Health Canada provide the guidelines for the risk assessment criteria and for the safety assessments of novel foods. The actual technical data, however, is supplied by the proponent - industry, seeking approval of the genetically modified crop or food. The product, not the process is what comes under scrutiny. If a food derived from genetic engineering is shown

to be 'substantially equivalent' to a traditional food, (in terms of composition, nutrition etc) it is likely deemed safe. As mentioned earlier, the 1998 Biotechnology Strategy states the public is going to be included by the acknowledging of socio-ethical concerns. The model of participation is as yet unknown. What type of labelling do vegetarians require for gene modified food? Issues beyond the definition of 'consumer concerns' such as patenting, farming structures, and seed diversity are not the kinds of issues government is seeking input on. In this respect, the communication model might be described as controlled interaction with a preference for information dissemination to educate (persuade) the public.

While sociological, cultural anthropological and philosophical evidence and arguments continue to pile up contesting this narrow definition of risk, nonetheless it flourishes as the rhetorical basis for the industry in Canada and the US, and is reproduced by nervous regulators and bureaucrats left responsible for answering to the public's queries about the safety of genetic manipulations.

The citizen conference model, which is the focus of this project, is an example of this constructionist approach to communication and decision making involving the public. Citizens exposed to the conference process also muddy the distinction between expert and public. As the panel facilitator said, reflecting back after a trial run cross-examining experts during a preparatory weekend, "We've now moved closer to the experts and away from the public." This was meant in terms of understanding the key issues, the points of contention among different stakeholders and being able to construct useful questions. For obvious reasons, government, industry, and environmentalists are all anxious about a process such as this which permits the citizen, representing the public, to guide the framing of the issues and the control the manner in which they will be performed publicly on stage.

Risk communications and risk analysis, however, remain stagnated in a linear transmission model of communication and as Wynne (1992) aptly noted,

provide "a legitimation ritual" for regulators. Rayner (1992) describes conventional risk theory as an engineering formula with some social considerations attached. Despite these limitations, they remain the choice of regulators and industry. Other well developed models of risk, which include a social context, may be found in the literature, so we turn to these.

Cultural Theory

While conventional risk theorists were defining risk as a probabilistic entity, Mary Douglas (1982, 1992) was addressing the attempt by risk theorists to "obfuscate danger" (p.40) and reduce the degree of uncertainty inherent in technological changes to the environment. She objected to the language of risk itself and observed how the language, the trading in of words and concepts like 'danger' and 'hazard' for 'risk', had been sanitized to reflect the stance of an apolitical and acultural framing. Douglas' anthropological training enabled her to see how this new language of risk assessment protected the individual, but was unable to account for cultural differences, and unwilling to protect the good of the community.

The central tenet of cultural theory is that an individual's perception of risk is mediated by the social organization or institution of membership. Douglas (1992) defined individual beliefs and values in terms of social structures and emphasized the community's place in interpreting and filtering attitudes to risk-taking behaviour, authority, and boundaries of action. Risk, in cultural theory, is of a whole system, not a part to be measured in probabilities.

Rayner (1992), Wynne (1992) and Levidow (1998) all suggest the categories of this cultural theory to be simplistic and needing development in a more complex direction. Despite this drawback, the Douglas theory did assume the perceiver (public) to be an active agent in the definition and communication of risk. Cultural theory always charged the risk research to be guilty of casting the public in a passive role and perseverating on information transmission theory.

Douglas developed cultural theory as an explanation for differences in risk

selection in regard to technological controversies. A social theory first, one concerned with human relationships, it is also a theory used to explain differences in our belief about society's relationship with nature. For this reason, it makes sense to look at cultural theory and the conflicts in agricultural biotechnology.

Cultural analysis of these political cultures claims that a group will perceive risks in terms of protecting the interests of its own structure. It will also perceive the technology in terms of a specific myth of nature it has constructed about the environment. Ostrander (1982) and Thompson (1990) extend Douglas on this point. If cultural analysis is useful to explain the differences in culture among organizations and groups, then it may be employed to explain a groups's belief about nature and the relationship to nature held by that group.

Cultural theorists were attempting to understand environmental activism and the conflicts between environmental groups and dominant authorities by using this theory. Cultural theory analyses a group along two dimensions: grid and group. The degree of high or low *group* explains to what extent individuals will be bounded or contained by group membership. Are resources, time, leisure, and work determined by group controls? The further one moves along this axis the more the individual is separated from others by the boundaries of the group. The *grid* axis refers to social conventions, roles, practices and codes which control or regulate the individual. The further one moves along the grid axis, the more things like speech style, dress, and codes of conduct for that structure constrain behaviour. By looking at where a group falls along each axis, a cultural profile may be generated. Grid/group theory poses four types of group structures: egalitarian (collective), hierarchical, individualistic and fatalistic.

If we ask how certain groups or nations come to hold these beliefs about nature or the environment or biotechnology, Levidow (1998) points out that cultural theory answers any questions with its own theory. Individualist organizations act the way they do because they are upholding individualist myths of nature and society. CT's major flaw is this tautological tendency.

A second shortcoming is both theoretical and methodological ambiguity. The theory is so flexible that the classification may be a variation within an existing political culture, or a completely different culture, or perhaps a tension within the organizational culture (Levidow, 1998). As complexity increases, where scientists dissent among themselves, and oppositional groups may be comprised of various classifications, and citizen groups act in a myriad of ways from coalitions to litigations in environmental disputes, the usefulness of cultural theory to accommodate this multiplicity of social identities diminishes substantially. Sociologist Wynne (1992b) also argues that cultural theory's major weakness is that the "cultural terms are not differentiated enough to accommodate the complexity of late modern society or reflexive modernity " (p121). In the case of biotechnology risks, the relationship between the public and experts is even more complex because, both the technical and social dimensions of the risks are uncertain, contingent on contextual factors, ambiguous and based on conditional knowledge (Jasanoff, 1990).

Grid-group classifications do not seem helpful in understanding how different stakeholders frame risk and how various audiences take up, circulate or contest these interpretations. For instance, cultural theory is unable to explore how popular representations of nature might contribute to how environmental groups align on a biotechnology issue. The long history of nature writing in a personal, transcendental vein, epitomized by Thoreau and Emerson, has been said to contribute to discourses on nature, natural law, and mystical experience amongst environmental protection groups (Herndl & Brown, 1996). A model of communication which considers such circulating representations falls outside the domain of this cultural theory.

Social Constructionist Theory

Sociological and anthropological accounts of risk have underlined the point that risk communication and risk assessment fail to address the multiplicity of interpretations or meanings people may associate with a risky technology. Since the 1980's, a growing body of work from sociology, the sociology of

scientific knowledge (SSK) and science and technology studies (STS) have discussed the reluctance of scientific authority to reflect on its own institutional authority and knowledge claims. Wynne (1995) discussing public participation in science and technology research, and the area known as public understanding of science (PUS), exposes these disciplines as ideological programs attempting to alleviate the anxiety which has arisen amongst specialists ever since science began to encounter a public audience. While publics were expected to show support for a non-problematized science and technology throughout the 1980's, constructionist accounts of science demonstrated how science, itself, was a social process and how science research agendas were embedded with ideological narratives. (Pickering, 1992, Hess, 1995).

While SSK and related constructionist accounts in science studies have produced many histories, laboratory ethnographies and descriptions of practice to make their case, the public is essentially missing from these accounts. Wynne's work (1996, 1995, 1992a, 1992b), however, has gone on to explore the place of the citizen or lay public in conflict interactions with expert authority. Both the fields of risk and public understanding of science appear to be reluctant to approach the public as legitimate knowledge carriers, or as capable of articulating relevant social observations concerning technological applications of science. Citizens have been classified as ambiguous, naive, ignorant or resistant when found not to accept the expert framings of an issue. Perhaps this is why Leiss (1999) in a discussion of what constitutes good risk practice, recommends organizations "invest one dollar of risk communication effort for every dollar devoted to risk assessment" (p 12). In recent public surveys of attitudes to biotechnology in Canada, increased levels of scientific knowledge or education did not necessarily correlate to increased levels of acceptance of the technology. What increased knowledge, understanding and involvement through channels such as media exposure contributed to was an increased distrust of technology, current regulatory frameworks and institutions (Einsiedel, 1997).

As an audience of science and technology, public cultures may decode

the meaning and value of biotechnology in ways different than that encoded by government and industry. Einsiedel (1997) demonstrates this difference in her ironic discovery that moral acceptability of a biotechnology application is a stronger predictor of public support - stronger than the utility or risk factors involved. Regulators, however, continue to focus on issues of risk almost exclusively.

Wynne (1992a) gives the explanation of 'degree of trust' as one of the most significant factors in predicting attitudes to S & T. Not a technical definition of risk, but perception of the controlling institution and its management is at the core of understanding the public response to new technologies.

> ".....people judge risk according to their perception of the controlling agents; if these agents have a social track of secrecy, arrogance or incompetence, or if they appear to dominate supposedly independent regulatory bodies and the policy-making process, it is hardly surprising if people treat the risks as greater than those recognized in calculations of physical magnitudes of risk which are based on tacit assumptions that the institutional context does not matter" (p. 122). [6]

Silence on the part of the public then may have different meanings in different contexts. When nuclear industry regulators appeared committed to unlimited technological expansion, and uninterested in alternate technological solutions, public trust was also withdrawn. In the nuclear debate, the experts' framing did not include public concern with an industry that was clearly planning massive expansion. This refusal by the institutions to articulate such pre-commitments results in further public alienation. Wynne is placing the responsibility on the institution, not blaming 'arrogant' experts. In this regard he is very close to Douglas and admits his perspective is most in line with cultural theories. All the variants of cultural theory agree that,

> "...all rationalities of risk definition are shaped within more holistic complexes of social experience and the defense of familiar social identities" (Wynne, 1992a;p. 291).

And yet our identities are not closed, determinate and complete, as they appear

in Douglas' framework. The English sheep farmers who dealt with radioactive fallout from Chernobyl in Wynne's ethnography (1992, 1996) displayed both more openness to reflexive learning than the experts, and revealed 'multiple identities' in their interview responses. Observing radiation symptoms in their flocks, the farmers held one set of critical beliefs about the science handed them, but in terms of recognizing friends and family who worked in a nearby nuclear plant facility, they held a different and distinctly tolerant perception of nuclear science. Wynne explains this inconsistency not by labelling contemporary individuals as irrational or fragmented, but by realizing people develop multiple social identities dependent on context. This being the case, then identity can be viewed as changing, formative, and open-ended, and a complex aspect of how contemporary individuals and groups interpret risk.

Even from a commonsensical perspective, we can argue that specialists and regulators need to adopt a more reflexive stance and develop a knowledge of social context in evaluating science and technology. However, that falls extremely short of creating a critical space for public interest to engage scientific authority. Jasanoff (1993) equates the two cultures of risk with the two different world views of quantitative science and interpretive sociology. She asserts that community participation studies have shown citizens are able to bridge these two approaches by becoming experts in a short time frame and thereby effectively integrating technical knowledge with local knowledge. Whether acknowledged or not, a specified technological direction frames the social and natural order in a particular fashion, and social justice and social goals are contingent on that framing. Jasanoff recommends risk communicators combine the approaches from sociology, cultural theory and contemporary communications to re-establish institutional credibility and build interactivity into their linear transmission model.

Public Participation Literatures

Much has been written on citizen involvement in science and technology, from government and industry top-down information dissemination approaches to local grassroots activist networks. Just as a wide continuum concerning

degree and method of participation or citizen control exists in the published domain, so too does the range of critical stances taken in evaluating these mechanisms for participation and the implied model of communication.

In Europe, citizen conferences or consensus conferences, often operate as activities planned by parliamentary arms for technology assessment, which seek to incorporate public values into decision making. Einsiedel & Eastlick (1998) report that citizen conferences in Denmark, Netherlands, the UK, France, and Switzerland have developed a high degree of credibility with both the public and parliaments and are said to contribute to learning and changes in perceptions from expert and citizen alike. The final report, or document produced by the citizens as an outcome of the conference, has often been used to influence decision-making and policy setting in these countries.

North America is a different situation. In the US, litigation and intervention through the judicial system have been used extensively by environmental organizations to force a decision in an apparently unreconcilable conflict between citizens and authorities. Higher levels of mistrust and skepticism of public participation exist in American populations, where public participation is believed to be nothing more than solicitation of public consent. Canada, situated between the Europeans and Americans, and known for our agenda-setting round table discussions, has not displayed the same propensity for litigation disputes, but nonetheless is harmonizing with economic technologically driven problem definitions. How the public interest and public discourse will be represented and defined at this first Canadian citizen conference is an unknown.

Zimmerman (1995) in a literature review of the relationship between citizen autonomy and technology concludes that present technological, political, and economic structures are authoritarian and represent a crisis orientation to technology management. If citizen participation does not answer broader questions of who we are as a society, then participation cannot be expected to produce a more democratic technology. In this critique, the actual structures of existing technologies, such as nuclear power regulatory commissions, would

have to be dismantled to allow for an alternative evaluation of a technology which expands beyond the economic model. In a similar vein, Capek (1992) in a case study of environmental activists and toxic waste disposal in Arkansas, shows how government programs designed to increase public participation actually favoured industry, an industry prepared to overlook toxic waste. This essay also challenges the ability for the structures of mainstream culture to essentially self-critique. Capek's social interpretation of technology concludes long term social change depends on counter culture resistance to establish alternative resources.

Lambright and Rahm (1987) examine public participation in terms of the stage of technology deployment at which it is invoked. Using the nuclear and biotechnology industries as examples, the authors posit that citizen participation is often at odds with the early application of a new technology. While pluralist agendas, which relied on agencies and government regulation, successfully launched both of these industries, the incorporation of citizen input can effectively halt deployment. In the instance of biotechnology, a self governing scientific elite originally halted application of genetics research in the 1970's. By the 1980's an enormous push to reap economic benefits from recombinant DNA knowledge was inaugurated by government agencies, and now in the 1990's, anxious bureaucrats seek public input to strategize public support.

Nelkin, as early as 1982, charged participation mechanisms to be a means to circumvent public criticism of new technologies and shape opinion. Unless the public are included at the level of science research and early applied applications, then participation may merely assume a form of obtaining public consent.

The above references are admittedly highly critical. At the same time, they acknowledge that in a democracy, when research is often funded by public monies and the continuous expansion in scientific research produces more often contradictory choices, it would seem obvious that public participation in decision making affords an opportunity to explore all the options and perspectives of an

issue. In addition, those who are both affected by a technology and end-users of a technology, deserve some say in the social application (Sclove, 1996).

Waddell (1996), in arguing that a social constructionist model of risk communication is emerging, uses the example of the International Joint Commission on the Sixth Report on Great Lakes Water Quality. This 1991 hearing was novel in that it permitted public testimony firsthand from a significant number of individuals. However, in analyzing the final published report, Waddell makes some important observations. Firstly, public input was seen to have a significant impact. However, public comments were reframed as *originating* from a scientific source and having the *support* of the public. Risk researchers, in making recommendations to legislators, find it more expedient to interpret conclusions as not being derived from the public, but having the support of the public. This would indicate the persistence of a transmission model of communication in a climate of social constructionist claims.

Public participation may be seen as constitutive of a healthy democracy, but we are currently living with a plethora of stakeholder groups who remain fractured in the wake of corporate interest, and messages delivered on behalf of those industries via risk communicators.[9]

Reflexive Modernity

Giddens (1991) in America, and Beck (1992) in Germany, developed a similar thesis concerning the modernity/post modernity debate. Since their writing addresses the question of risk in the context of the legitimacy and authority of science and technology in contemporary society, it cannot go unmentioned.

We can accept Beck's (1992) contention that in late modernity we experience two apparent means of social change; one is the parliamentary democracy of industrialized nations, which presupposes citizen involvement in the political-economic system, but which has come undone. The other is the presence of a techno-economic elite, which is non-political, non-democratic and pre-supposes objective constraints to rational progress. The institutions of the

former become permanently changed by the project of the latter, although this agenda and its goals remain, for the most part, silently veiled as non-political. However, it is in the realm of this non-political arena that the massive, revolutionary social transformations we are living in, originate (biotechnology, information technology, nuclear technology). When the non-political becomes the more potent political force, what is the role of public participation in biotechnology, and where is the space for public interest? Is a citizen conference a set of administrative choices for pre-committed technological changes we never really planned or participated in, or is it a variant of the new decentralized political culture epitomized by citizen activist and social movements of recent years?

Giddens and Beck both appear to believe that the social sciences and sociology, in particular, can transform what Beck (1992) terms "the emancipation of science from its self-inflicted fate of immaturity and blindness with respect to risks" (p.180). In reflexive modernity, as opposed to postmodernism, an alternative future for a rational science is possible. This will only occur, however, if science becomes reflexive and learns from itself. Becks sees two options. One is removing the causes of risks which arose out of primary industrialization and the construction of objective constraints. The other is industrializing further the symptoms and consequences of primary industrialization which will create ever expanding markets. In the case of biotechnology, this may mean developing a gene fix for a chemical herbicide based agricultural industry, which in turn creates more markets for research into plant genetics, herbicide resistance crops, and further gene fixes if environmental accidents occur, such as resistant weeds and super insects. If science, on the other hand, looks at itself and realizes it has created these threats or risks through its own choices, then science may transcend its current irrational practices. Beck makes the salient observation that risk in modernity or postmodernity is a market opportunity and that the gap between who profits and who is afflicted becomes bigger and bigger. However, he also wryly notes that environmental threats are largely

democratic: nuclear fallout and genetic pollution affect us all. Risks can be seen as situations which potentially cross boundaries of class, ethnicity, gender and occupation.

In reflexive modernity, people come together in communities based on anxiety about risks. Beck sees the international global nature of risks, with their invisibility, their shielding from accountability as almost a fateful quality. He asks how can a community formed out of a sense of fated anxiety act politically?

Giddens talks about the socialisation of nature in conjunction with risks and trust in late modernity. The massive technological intervention into nature has almost resulted in the 'end of nature'. While, in some ways, this intervention has produced more security and reduced risks by managing the natural environment, in other ways, we have created greater uncertainty because, just as often, we have no idea how nature will respond. Giddens cites the global warming debate as evidence of this new level of uncertainty, and I would add genetic manipulation as another example, in the same order of magnitude.

In reflexive modernity, the increasing number of experts or specialists available creates ever widening degrees of choice for individuals, and the argument is then that individuals are able to consciously construct new social identities based on these ever changing choices. In fact, it becomes increasingly difficult to avoid these choices. Will I purchase genetically modified foods, once I know they are available? Whose political agenda do I become part of, as a result of that choice?

In reflexive modernity, the body and self must respond to the impact of global technological interventions, as we become "thoroughly penetrated by the internally referential systems of modernity: reproduction" (Giddens, 1992; p.219). Late modernity collapses the biological and communicative meanings of the term 'reproduction'. Citing medical biotechnology as an example, Giddens expands Beck's insistence on the 'end of nature' to include the 'end of reproduction as fate';

"The 'end of reproduction as fate' is closely tied to the 'end of nature'. For

until now reproduction has always been at one pole of human involvement with separated nature - death being at the other. Genetic engineering, whose potentialities have only just begun to be tapped, represents a further dissolution of reproduction as a natural process. Genetic transmission can be humanly determined by this means, thus breaking the final tie connecting the life of the species to biological evolution. In this disappearance of nature, emergent fields of decision-making affect not just the direct process of reproduction, but the physical constitution of the body and the manifestations of sexuality. Such fields of action thus relate back to questions of gender and gender identity, as well as to other processes of identity formation" (p. 219).

Increased risks, the mastery of nature and the consequent expanded choices are bound to the question of political participation in ironic and circular forms. In primary industrialization, the benefits and risks involved in the control of nature presupposed democratic control of the process by citizens. In reflexive modernity, where increased risks offer greater opportunities for wealth creation, the object of control, 'nature', ostensibly becomes the citizen, for technical mastery now reaches the body of the subject, that mass of humanity technology was meant to serve. In this way, the centralized democratic industrial project has solicited silent consent to an ever-growing body of techno-experts.

Over twenty five years ago Leiss (1972) was attempting to get at this same idea in his discussion of the mastery of nature, science and technology, and political control. Leiss separated science from technology to argue that it is technology, not science which, as a tool of domination, is instrumental in promoting power among certain classes in society or nations in the world. This early critique took issue with the long held notion that the project of industrial capitalism extends mastery and domination over nature in order to reproduce itself. Leiss observed that domination of external nature actually means domination and control over other men. He writes at that time;

"The concepts of power and domination, which do not make sense with respect to scientific knowledge itself, may be quite appropriately employed in connection with the technological applications of scientific knowledge. Advances in technology clearly enhance the power of ruling groups within societies and in the relations among nations; and as long as there are wide disparities in the distribution of power among individuals, social groups, and states, technology

will function as an instrument of domination. .....If the idea of domination of nature has any meaning at all, it is that by such means - that is, through the possession of superior technological capabilities - some men attempt to dominate and control other men" (p. 121-122).

This quote becomes more intriguing in light of genetic engineering capabilities and the gene patenting of higher life forms. But then, given Leiss's subsequent conversion to risk communications, he appears to prove the thesis held by Marcuse that individual critical rationality has been subsumed by technological rationality in the industrial capitalist era. (Thorne, 1996; Leiss, 1972). (It also demonstrates the underlying assumption that in either capitalism or critical theory, the anthropocentric and presumed utility of nature is a given).

However, recent years have seen the development of a critical citizen movement outside of traditional parliamentary processes. The environmental movement, citizens' coalitions, the nuclear resistance groups, the women's movement - these are all examples of a new political culture based on participation which avails itself of what Beck terms the sub-political systems of media publicity and judiciary options. In many instances, this political sub-culture, or sub-political culture, is comprised not only of luddite, naive citizens but scientists, experts, academics and professionals who are able to compose counter arguments and negotiate media and judicial systems.

In many respects, the Europta participatory technology assessment model and citizen conferences, in general, are based on appropriating, structuring and formalizing these social movements. However, if the social consequences of technology continue to be read as merely unfortunate, but separate aspects of apolitical technological improvements (now it is 'enhancements'), rather than aspects of the conjoined policy agenda of a society based on technological progress in the first place, then public participation in these formats may only butt up against the invisible, unreflexive wall of political parties manipulated by techno-experts. As risks increase in magnitude, it becomes more absurd for the technology itself not to become part of the problem definition, as well as problem

solution. At the same time that this technological critique is becoming more vocal, the actual technological transformation of society continues to accelerate (Beck, 1992). In this sense, McLuhan's metaphor of new technology being visible only in the rear view mirror is exemplified by the present existence of biotechnology, a revolution for which no public ever gave consent.

Kieran (1998) concludes that Beck's thesis heralding the advent of institutional reflexivity is premature in his recounting of environmental hearings in Ireland over the Roche pharmaceutical company's toxic waste incinerator. Although the local community opposed the incinerator and provided substantial evidence of deformities and animal deaths, the EPA there went ahead and licensed the plant. Instead of looking for solutions to the conjoined exposure to global environmental risks, Kieran cites evidence for how corporate actors proliferate a system of distorted communication in order to advance their own power and interests. A reliance and privileging of technical language and framings of risk throughout the environmental hearing is a primary way industry and regulators avoid reflexivity and maintain expert authority. Like Wynn(1992) and Bauer (1995), Kieran observes that the result of such communication styles and narrow risk framing is a breakdown in trust and increased polarization between the public and environmental regulators.

The literature of reflexive modernity makes it possible to ask, will the citizen conference present a technologized science extending a hand through political channels to solicit public support, or is this process able to demand that the kind of science practiced in our society be open to cultural criticism? Will citizens recognize the discourses of the changing boundaries between nature and society and between public and private spheres which this technology invokes? Or, will the citizen concerns remain at the level of consumer safety and a belief in the free market with an emphasis on individual choice?

Reflexive modernity underlines the circularity and diversity of discourses available to individuals and the complexity of choices the introduction of new technology creates. In the risk society, linear models of communication collapse

as the sheer diversity of opinion and beliefs competing for our support force the necessity of developing a more complex interpretation of communication and communicated meanings.

Even technical risk experts appear to have splintered into a plethora of competing expertise as documented by Cambrosio, Limoges & Hoffman (1992) in a discussion of the release of genetically modified organisms into the environment and the notion of 'expertise'. Treating expertise as socially constructed within networks, the authors argue the science of risk assessment is also not a specified body of knowledge.

"The problem in establishing risk assessment procedures for the release of GMO's is not that there are no pre-existing bodies of knowledge and practice which could be used to bring about a robust closure of the controversy; rather it is that there are too many potential candidates for such a role!.....The persistence of the debate provides an exceptionally good opportunity to observe construction of risk assessment expertise. This will enable us to show that 'non-technical' issues, such as regulatory schemes, are present from the very beginning, and are indissociable from the construction of 'technical expertise', the latter being recognized as such only when it corresponds to a stable network." (p. 348)

Participatory technology assessment (pTA) as practiced by the originators of the citizen conferences in Europe has recently come under consideration for theoretical articulation. Theorists and practitioners of pTA state a theoretical base in literatures of Beck, Giddens, Wynne, Luhmann and Feenburg , to name a few (Europta, 1998).

The reflexive nature of modernity is acknowledged in their work; that is the ever increasing innovation in science and technology produces a de-legitimation of science, as more and more specialists fail to reach agreement over knowledge. Similarly, risky technologies produce greater uncertainties, for which politicians look to experts to address, but from whom no consensual answers are available. Governments face increased mistrust of science, experts and technology, but are also in the position of being responsible for the deployment, regulation and management of these innovations and products.

With the other hand, politicians attempt to assure the public of the safety and legitimacy of the new technology.

Conceptually, pTA recognizes participation as important in providing input in the form of informed knowledge and of values and interests from those affected, (citizenry) to support public decision making. The Europta team defines the purpose as follows:

"Participation then, is a feature of the political function of TA, namely to provide a basis for socially rational (that is, legitimate) decisions under the conditions of a dynamic process of technological development, the uncertainty of knowledge and contested values....It is however by no means clear whether pTA is able to fulfill these functions....Additionally, the status of pTA is problematic since decision makers often see pTA either as a means of creating public acceptance, or as a menace to their decision-making power. From the point of view of special interest groups, pTA is either seen as an opportunity to participate directly in decision- making ,or (more negatively) simply as a strategic instrument to bring about decisions that have already been taken" (p. 9).

Proponents of this model, (wherein citizens dialogue with experts to reach conclusions representative of the wider public), are acknowledging a conflict in the perceived communication model the process reproduces. Rather than dispute the efficacy of pTA, this study will examine the competing discourses on biotechnology emerging in the conference process from the perspective of performance as a cultural and communicative mode of action. The literature of reflexive modernity does not assist me in the analysis of the citizen conference as a local performance and site of symbolic communication.

Critical and Cultural Perspectives

Constructive technology assessment (CTA), science and technology studies, and constructionist accounts of science, in general, have preferred to avoid issues of social justice or a discussion of cultural politics (Hess, 1995). Sociologists of 1980's science confined their arguments to a view of 'social constructedness', without addressing socio-cultural differences and political power in science policy or science applications. In terms of biotechnology today, existing social theory allows us to dismantle the simple, but entrenched view of

an expert science and a naive public, but how can this be extended in a culturally critical manner? How are meanings about biotechnology framed and reproduced by both the public and experts?

Cultural anthropological approaches have looked for such meaning, rather than theories of causation. Technototemism is a concept Hess develops to talk about culture and power in science and technology debates. "A totem is a means whereby social groups achieve distinctiveness by virtue of identification with a natural symbol or natural phenomena" (p.21). Technototemism then, he goes on to say, is the co-production of technical and social difference, but causation is not implied. Rather, Hess would read these differences as a cultural text. Examples of technototems are the social science construction of I.Q. testing which mapped onto racial differences; academic debates in cellular genetics which corresponded to national allegiances in the Cold War; and sexual reproductive science which became extended explanations for gender behaviour differences. Nelkin & Lindee (1995) have argued that the idea of the gene, as a biological explanatory framework, has thoroughly infused popular culture, social institutions, and political agendas as a naturalized code.

Looking at biotechnology from this cultural perspective, it offers an opportunity to understand how various groups in the public and amongst specialists might construct, reconstruct, or reproduce scientific and social meaning. If Hess is correct, then both the science behind biotechnology and the social ramifications of its use, are co-constituted as a cultural narrative. Different groups holding different relationships to the technology may produce varying texts. These texts remain open, constantly shifting, contributing to culture and informed by culture.

Seeing the relationship of science and culture as nonlinear, discontinuous, complex, and convoluted is echoed by cultural anthropologist Martin (1998):

"Rather than being produced in an isolated, privileged realm and trickling out to inform the rest of us about what is "true", science is made throughout -

bubbles up from many places within- historically constituted human culture. Culture is also made throughout - bubbles up from many places within - science. Perhaps this is what Fleck meant when he said that the image from popular culture of the evil bacilli in the shape of little devils flying from the open mouth of a sick person "haunts the scientific specialty to its very depths" (p. 40).

Several questions arise out of this anthropological approach. What are the cultural narratives about biotechnology being communicated by the citizen panel and by the experts of this citizen conference? How do these different groups frame their reading of the biotechnology text? Is there space for public interests to bubble up within the dominant scientific representation of biotechnology?

Cultural studies theorists known for highly critical accounts of society and culture, particularly in terms of gender, ethnicity, socio-economic class, and/or sexual orientation have, in recent years, begun to turn towards the environment in discussions of knowledge, power, and identity. (Slack, 1994a, 1994b). Slack, writing in *Communities, Environments and Cultural Studies*, aligns what she terms the "comparatively new (to cultural studies) issues" of environmental struggles, for which cultural studies is able to provide more "culturally attuned analyses" (p26). Suddenly environmental activism around the globe, be it North American aboriginal land claims, or East Indian reforestation projects, are shepherded under the cultural studies banner as worthwhile "politically potent interventionist strategies". The meaning of community, identity politics, nature and the environment, taken as a whole, may be long overdue for credible academic consideration. However, within this 'green' cultural studies approach the attention is only just recently turning in a direction which acknowledges nature and environmental issues as legitimate aspects of cultural analysis. Cultural studies, springing from critical theory, perhaps inherited and reproduced Marxist attitudes to nature, which privileged human needs and technological development at whatever cost to the environment. Ferkiss (1993) points out that it was within this dualistic framing of nature as a "resource other", subordinate to humans, that the roots of Marxism and capitalism touch. Although Marcuse theorized about the "revenge of nature", postulating interior psychological

alienation as the outcome for our exterior Western technological dominating ways, nature still remained separate. It will be interesting to see how cultural studies resolves what they see as essentialist views of nature in eco-feminist and environmentalist camps within a capitalist critique of culture, while legitimating this turn to nature.

Performance Studies and Risk

The field of performance studies allows us to look at the biotechnology citizen conference as a cultural text which is produced by culture, but which also contributes to the production of culture. Palmlund (1992) suggests viewing the 'real' social-political world as a spectacle offered up as a performance with the risk controversies enacted centre stage. Schechner (1985), as well, expanded the notion of performance to include the spectacle of political action.

The post 1960's environmental movement initiated the uses of performance as a powerful communicative mode to contest dominant notions of, and policy on nature as an objective resource for human utility. The 1970's and 1980's saw the emergence of much ecological debate politicized using the medium of theatre. The obvious Canadian example is Vancouver's Greenpeace staging of environmental direct theatre on the world stage (Carlson, 1996). Originating in Vancouver in 1971, Greenpeace made grassroots opposition to nuclear testing leading news by a strategic use of mass communications structures, media image construction and direct action. Dale's (1996) history of the controversial environmental organization attributes their impact to the fact;

> "its Canadian founders took seriously McLuhan's early pronouncements about the power of the media in the new globalized world.....[Greenpeace] has the established media-clout and logo recognition to get picked up in the international media alongside the official sources; and it has even been able to lift the shroud of secrecy surrounding a number of normally impermeable international bodies, helping to bring about changes in international conventions" (p. 14- 15).

This melding of performance and political concerns has continued as a Canadian tradition into the 1990's, with the parodies of *Royal Canadian Air Farce* and *Double Exposure* enjoying immense popularity, minus the intensity of

heated political demands.

While, technological risk debates have been popularized employing a performative strategy, they also lend themselves to analysis in terms of a dramatic and performative approach. But why study the biotechnology debate and this citizen conference from the perspective of performance studies?

"The theory of theatre and drama provide categories for analysis of social conflicts over technology neglected by mainstream risk literature. It provides a critical perspective on the discourse and the symbolic action in societal risk evaluation and also on the field of risk analysis" (Palmlund, 1992; p. 212).

Theories of performance allow us to look at the citizen conference as a public drama, a site of negotiation, where disputed cultural texts of science are engaged for an active audience. A large body of theoretical work exists which considers political events as cultural performances or social dramas (Carlson, 1996; Schechner, 1993; McLaren, 1986; Turner, 1986; Goffman, 1974).

Fuoss (1995, 1993) has applied the concept of cultural performance to understanding social-political conflicts. In the latter study, he describes the 1936 Workers' Alliance of America seizure of the New Jersey State Assembly. This event is analyzed as a cultural contestation occurring between unemployed workers and legislators at a time when relief benefits from government were being withdrawn. The study determines whether or not the performance changes the direction of status quo power relations, the strategies employed to effect change, and the spheres these strategies operate in; spatial, textual, and conceptual. His later research extended the analysis of a cultural performance to describe how it impacts on community identities. Using the 1936-1937 Flint, Michigan auto workers' sit-down strike as a case study, the contestation in a cultural performance is framed as negotiation over the meaning of 'community'. Fuoss (1995) sees community as "contested, inscribed, and enacted in cultural performances" (p. 80).

When the citizen conference is theorized from this perspective, we see the event as moving in one of two directions. Either it reinforces the status quo,

or it 'loosens' the status quo and moves things in the direction of a redistribution of power relations. The recommendations of the citizens' report are arrived at through public discussion of the issues. The recommendations are publicly read to the audience, much like the closing scene of social performance or ceremony. In many ways, this citizen recommendation is seen as a verdict for industry and regulators. A citizen panel may endorse the current regulatory framework, or move the public debate into a more critical political position.

Strine's (1990) review of performance studies cites examples of how public performances during times of social unrest may influence legislative action to be enacted in response. Performances may function as sites of social commentary or even more directly as sites of political action. Taylor's (1997) ethnography of nuclear activism at the Bradbury Science Museum demonstrates the use of narrative and metaphor interpretation in performative conflicts between opposing cultural groups. While his study relied on extensive interviewing, participant observation and field notes as data collection, the museum as the site of the performance study became the contested ground from which differing interpretations of history could be enacted.

In a similar approach, Levidow (1998) discusses the London Science Museum as a hegemonic performance site for a specific framing of biotechnology to the public. While Levidow relies on a textual analysis and some interviewing of staff and visitors rather than ethnographic detail, he convincingly argues how the exhibits frame and maintain the dominant discourse on plant biotechnology in the UK.

Goffman's (1974) definition of performance as, "all the activity of an individual which occurs during a period marked by a continuous presence before a particular set of observers and which has some influence on the observers" is extremely broad and open-ended, inclusive of the performance of everyday activities, but one which acknowledges the participation of the audience. One of the goals of citizen conferences is to enhance the public debate on the chosen issue. Theoretically, a well organized conference presents the entire continuum

of perspectives on the topic, from critical activists to dominant corporate arguments for the audience to consider. Performance, itself then, provides a specific frame for analysis, allowing the audience to witness and consider the metaphors and beliefs about biotechnology being represented. How do they differ, if at all, in meaning from the dominant interpretations we find represented by regulators, promoted by industry and circulating socially?

Underlying assumptions about biotechnology exemplify Goffman's theory of primary frameworks as being essential to understanding social conflicts. Goffman asserted that one of a culture's primary frameworks structures the beliefs we hold about the relationship of society and nature. He articulated one of these primary frameworks as a belief in the idea of respect for nature's design and a limit to the degree of guided human intervention in natural design, or what he termed 'the unguided activity of nature'. Perhaps, biotechnology challenges this primary social framework for many cultural groups? Do stories or testimony presented refer to presence of this boundary?

Cultural performances are often sites of political rivalry. For many experts, especially those from government regulatory departments, participation in a public performance such as the citizen conference becomes a means of engendering public support, simply by being present. That is because by being there one has surrounded herself in the appropriate public symbols (Kertzer, 1988). As Kertzer argues, political battles are often fought ritually. A dramatic public appearance is concluded to be more effective than substantive action or lengthy dialogue. Kertzer cites the example of Three Mile Island, in this respect.

Immediately after the reactor broke down, dozens of committees and subcommittees competed with each other to address the crisis and demonstrate to the American public political and social concern. Most of these committees, points out Kertzer, had nothing to do with nuclear regulatory policy or change. Most would have no impact on nuclear regulation. Most hoped to symbolically associate themselves with public interest and the technological accident.

What Canadian regulatory player would not want to be associated with

the first Canadian citizen conference? Granted, if the outcome had produced recommendations suggesting a moratorium, regulators would have been pushed into a difficult position. But, the modus operandus among government and industry appears to be better to be there to defend and represent one's own territory.

Performance studies lets us ask what are the predominant frames the characters in this drama choose for expressing their argument at the citizen conference? Is there space here for the public to reconstruct an alternate framing of biotechnology? How does the citizen panel interact with the various character roles on stage? Do certain narratives being expressed lead to greater conflict than others? What is the relationship between the experts' performance and the response of the panel? Does the citizen panel, acting as public advocates for citizenry in general, frame the issues in biotechnology differently than regulators and proponents of the industry?

When we put the risk situation in the context of performance, we are not limited by quantitative or economic debates central to risk and safety arguments. The extent and degree of social interaction becomes more emphasized. The nature of the symbolic communication inherent in contestation between different characters on stage becomes evident to the audience. Actors may be seen to adopt specific gestures or roles to put forward their own interests or gain audience sympathy. In a performance context, the audience is aware of being a target of the actor's communication strategy, since all stage action is made complete by the presence of the audience and the need to hold the attention of the spectators. Both actor and audience know certain things must happen, and certain things may not happen, in order to stay on stage. And yet, the dramatic context allows for the role of emotion to be a component of the debate. Related to this is the idea that the degree of audience involvement in the drama, (cognitive and emotional) correlates with the degree of public participation viewers may then demand as an outcome. A tragic genre, for example, wherein innocent victims of technology play a role in the risk drama, is more likely to elicit

catharsis, identification and demand action from the public/audience. Then, the theatre of politics may become a means of motivating desire for greater public participation in decision making. (Wagner-Pacifici, in Palmlund, 1992).

Cultural performances emphasize the "doing", the "making" or, the reproducing of culture at a local level of action, rather than the traditional approach of viewing the specific as a ritual reflection of more universal cultural categories. Bell (1998) discusses this distinction between established theories of ritual and contemporary uses of performance theory.

"The notion of performance became popular in the late 1960's. At that time several well-known sociologists and anthropologists began to embrace such terminology as a means of sidestepping the mind/body and thought/action dichotomies that previous approaches to ritual appeared to impose.....Before long, there were enthusiastic suggestions that the notion of performance was a conceptual and methodological "breakthrough" possibly able to reintegrate the bifurcated disciplines of the humanities and the social sciences". (Bell, 1998; p. 206).

Rather than viewing performance as the decoding of a pre-existing text, performance shows how actors or subjects actively create aspects of culture such as authority, or in this instance categories of nature/culture. Earlier views theorized ritual to be a conservative force in society and interpreted ritual activity as a reflection of larger universals in the culture. Performance studies is more prone to see how actors use ritual activity to shape their world reality amidst a more complex interplay of forces. This demands a specific, ethnographic example wherein actors are not merely enacting and expressing the larger system they are constituted by, but actively shading, playing with, altering, re-interpreting or contesting this cultural system (Bell, 1998).

Summary

Beck's (1992) observation that in the risk society, creation of wealth is tied to the production of risks, is demonstrated clearly with our federal government's description of biotechnology as a strategic innovation necessary for wealth creation. The production of new risks from the dilemmas posed by genetic engineering and genetically altered foods, provide new opportunities for risk

managers and risk communications. In their language, "acceptable levels of risk" must be ascertained and communicated to the public. This public includes many who depend on the production of new risks to be employed in the information technologized society. In the words of the Office of Biotechnology, CFIA, regarding agricultural products; "safety does not imply the absence of risk, but rather a level of acceptable risk. Risk is further reduced through the application of risk management procedures". (http://www.cfia-acia.agr.ca/english/ppc/biotech/safety.html)

To borrow from Stuart Hall (1994), this is the dominant or preferred meaning about biotechnology we find circulating. It is communicated, for the most part, in sender- receiver fashion, the subtext to its messages transmitting a familiar technological rationality (Thorne, 1996). Within this dominant coding of biotechnology, the revolutionary practices of recombinant DNA are simply improvements on traditional agriculture with extra safety assessments attached.

The science of risk analysis attempts to provide increasingly more rigorous standards for causal validity before a risk is considered unmanageable. In this way, more and more risks are left unrecognized by the authority of science, as the technical definition becomes more exacting. Ironically, this results in regulation becoming less stringent in a terrain where outcome is, in many instances, an unknown. Additionally, Thorne (1996) points out another significant implication of framing biotechnology solely in terms of risk:

> "Exclusive attention to the risk discourse may enable the industry to avoid scrutiny areas such as morality and social justice where its operational criteria do not hold sway - areas that one corporate respondent described as "quicksand". Nevertheless, the industry's own public opinion research reveals a dissonance between the industry's focus on risk and actual public concerns, which are apparently more broad based." (p. 79)

This dissonance can be traced back to not only public discomfort, but scientists' discomfort, when in 1974, Paul Berg a molecular biologist, published a letter in *Science* appealing for scientists to stop and reflect on the implications of

recombinant DNA research. Within months, however, Berg was also publicly debating the *great benefits and risks* of genetic engineering at London's Royal Institution. This brief sixteen month moratorium on research in the U.S. was lifted in 1976 with the publishing of NIH guidelines (Bud, 1993). We might say the last public debates on genetic engineering in terms of the nature of the science and its social implications ended in 1976 when, at the National Academy of Sciences debate, students sang "we shall not be cloned". That same year, the U.S. House of Representatives held congressional hearings to clarify the nature of genetic engineering and explore science policy connections. However, industry had already moved to frame the debate in terms of the language of benefits and risks. Irving Johnson, of Eli Lilly pharmaceuticals, focussed on the practical future promises of biotechnology and the effective safeguards in place. The Kennedy administration's idea of a national commission to regulate the new biotechnology was dropped. Instead, futuristic industry promises of new crops like 'pomatoes' and the creation of new food animals with improved taste and nutrition crowded out a broader discussion of science and the public interest. Bud describes the subsequent decision by Congress to leave aside new regulatory approaches as an event which "represented the victory of the metaphor of the silicon chip over the parallel with the nuclear industry" (p. 180).

Despite the dominant discourse of biotechnology being linked to conventional risk management, alternative discourses are circulating and being debated. In the wake of reflexive modernity's fractured dialogues, how might the performative and dramatic aspects of the citizen conference permit contestation of, or reproduce, dominant meanings of biotechnology? How critical of biotechnology are Canadians when offered the opportunity to cross examine experts? What does a performative approach to biotechnology and citizen knowledge allow us to understand about communications, technology and these relationships to nature/culture?

METHOD: DESIGNER GENES AT THE DINNER TABLE

The method I chose to adopt for this research is one of participant-observation. While I was part of the *Designer Genes* planning team throughout the project, I was not responsible to citizens or experts in a primary capacity. Although I was present at all meetings associated with the planning and production, I acted as a note taker, research associate and background person. Officially, I was responsible for the web site associated with the project (www.ucalgary.ca/~pubconf/) and liasing with the media as we moved closer to the conference date. Everyone became accustomed to my presence, as I was introduced to the citizens as a graduate student and assistant on the project. I was included as a researcher on the ethics consent form which all the citizen participants signed at the outset of the project.

In this chapter, I will describe and defend for you how I obtained and managed the data. First, I will explain the primary research project I based my own work upon and then I will review the method I used to develop an analysis.

Background - *Designer Genes at the Dinner Table*

The first-ever Canadian citizen conference was held at the University of Calgary during March 5 -7, 1999 at the Rosza Centre. Food biotechnology was the topic of the discussion. The conference was directed by the research efforts of Dr. Edna Einsiedel from the Graduate Program in Communication Studies and was supported by funding from the Social Sciences and Humanities Research Council, as well as Agriculture Initiatives Alberta. Dr. Einsiedel's research is a case study of the citizen conference as a public participation mechanism in Canada.

A citizen conference is a focused public dialogue between a panel of citizens and a panel of resource specialists on a chosen topic. Citizen conferences are a mechanism for including public participation in decision making on complex science and technology issues. This form of participatory technology assessment has been practiced for over ten years in Europe, notably

in Denmark, Holland, Norway, France, and Switzerland. The debate or dialogue takes place in front of an audience who is composed of interested members of society, as well as stakeholders from industry, government, consumer groups and the media. The Canadian conference followed closely the Danish model of consensus conferences but which, unlike our experiment, operates through a parliamentary arm, known as the Danish Board of Technology. The Danish model involves specific steps which were modified for a country of this size.

In September 1998, the planning team (director, project manager and myself) began the recruiting of the citizens' panel, placing ads in all the major Western Canadian city daily newspapers, as well as a large number of weekly rural papers. The CBC radio co-operated by reading the text for the advertisement on a number of radio shows attracting a good deal of interest. Cable television stations across the Western provinces all ran the same ad with their community announcements. Within three weeks we received over 350 letters of introduction and application to participate in the project. Applicants were asked to write a letter, agree to attend the three specified weekends of involvement, learn about the technology, and have no ties to the biotechnology industry or special interest groups. The project manager and project director created a short list of forty applicants who both filled demographic criteria and wrote a convincing letter.[10]

During the third weekend of October, 1998, the planning team met with the advisory committee, director Dr Einsiedel had assembled for the project. The advisory committee's task that weekend was to come to consensus on the selection of the citizen panel. This committee was comprised of six individuals including government heads in Health Canada and Industry Canada; consumer representation from Consumer Association of Canada and the National Institute of Nutrition; an environmental voice from the Canadian Environmental Network; and the Canada Grains Council representing industry. At the end of two days of discussion, the group was able to agree on fifteen individuals, eight women and seven men who satisfied the demographic criteria and the selection

characteristics of "open-mindedness, willingness and ability to learn, neutral attitude with little or no prior knowledge or preconceptions of biotechnology, and no advocacy ties". These characteristics were developed jointly by the advisory committee.

The citizen panel received two preparatory education weekends where they learned about the topic and formulated the questions to put to the experts at the conference. In December, 1998 the panel was sent their first reading package for preparation to meet in the first weekend of January, 1999. At that meeting, the group received a binder of articles we had assembled reflecting all the various positions on food biotechnology. They heard from two presenters, one being Eric Grace, the author of *Biotechnology Unzipped*, which was core reading material. The other presenter was a specialist in agriculture and food production from the University of Alberta, Dr. Michelle Vieman.

By the second preparatory weekend in February, the group was conversant with the main issues and were formulating their questions for the conference program. To assist with that process four more presenters were brought in giving the citizen panel an opportunity to hear diverse perspectives on biotechnology and ask questions. The four presenters were Maurice Moloney, an academic research scientist specializing in canola modification; Karen McIntytre, a regulator from Health Canada; David Dzisiak from industry; and Katherine Barrett, an environmentalist and PhD student from the University of British Columbia.

During this weekend, the pool of over 150 questions, generated as a result of the January meeting, had to be reduced to a manageable level and organized into topics for a conference program and speakers agenda. By Sunday February 6, the key issue areas of Consumer Health & Safety, Economic & Social Impacts, Ethics, Legislation, Environment and Public Interaction were developed with two key questions in each topic area.

The other task dealt with at the February meeting was decision making concerning the selection of experts to appear and publicly answer all the

questions. The project manager and director had assembled a pool of possible experts willing to participate. At the close of the February meeting, the citizens prepared a list of expert profiles they wished to have present for the conference. For instance, they requested an expert who could answer free trade questions and legislation of biotechnology products. The actual invitation and sourcing for those persons was entrusted to the project director and manager. To meet the demands of the questions, seventeen experts were invited.

During the month proceeding the conference, the citizens continued their own research activities on the Internet, by email with each other and often making requests of the planning team for specific types of biotechnology information. In the space of three months, they encountered and considered a massive amount of information.

The conference agenda itself is citizen driven and occurs over three days. The first day is filled with expert presentations and cross examinations of experts by the citizens. On the second day of the event after further discussion and questions, the citizens retire to reflect on the answers they have received and seek consensus in the writing of a report outlining their recommendations on the technology. In this instance, the report is then circulated to the federal ministries responsible for setting biotechnology policy. In addition, due to the intended media coverage, a wider public debate is also stimulated.

As a research assistant and member of the conference planning team, I worked on this project from May, 1998 until May 1999. Present at all meetings of the advisory committee struck by Dr Einsiedel in May 1998, the selection of the citizen panel, the selection of expert specialists, the preparatory weekends, the media strategy and the citizen conference itself, I learned about the process and the technology, and became familiar with the arguments, organizations and influential individuals on all sides of the biotechnology debate.

The outcome of the conference and the policy recommendations the citizens made on this important issue were watched closely by government, industry, environmental groups and the media. Dr. Einsiedel's purpose in

directing a citizen conference was to consider it as a social experiment in public participation mechanisms for Canadians.

My interest in the project is in terms of its symbolic communication. While on the one hand, biotechnology is a billion dollar industry led by North American transnational corporations, the debate around the technology offers a perspective beyond the political instrumentality of policy making. The citizen conference may also be theorized as a cultural mirror, a text not unlike any theatrical or cultural performance we see enacted as expressive of our cultural selves. There is a strong element of public reflexivity in an event such as this. When citizens and experts dialogue before a public audience a cultural review or inventory is taking place. As a ritual process, it is set apart from the everyday and the ordinary. It is a struggle over symbols, and over the meaning attached to symbols, which may or may not find resolution as a result of the political participation exercise.

Research Questions

I was interested in finding out to what extent a citizen based discussion of food biotechnology would produce a different framing of the issues and the science, than that reproduced by industry and government regulators. Would citizens contest the dominant meanings and metaphors inherent in the language of risk assessment or simply reproduce them in a lay form? Did the event show citizens producing a cultural meaning of biotechnology congruent with particular experts or discourses? Which discourses and territories of biotechnology would be contested and heard here? In terms of Turner's notion of crisis and redress, what are the major themes and issues citizens identify as problematic in this technology? What is the value of Hall's model of communicative codes, in terms of understanding how the citizen panel interpret the competing biotechnology narratives?

How does this cultural performance contest or reproduce dominant meanings about biotechnology? Conceptually, in terms of symbolic communication, what is it that citizens and experts are contesting in this

discussion? When I began this research I wanted to look at how biotechnology represents a possible cultural shift in our relationship to nature. Would the conference narratives indicate a particular cultural construction of the utility or purposes of nature and other non-human species? Is a shifting boundary of nature/culture represented in the biotechnology debates?

Victor Turner's Dramatic Structure

When cultural performances of the social-political variety, such as this conference, are placed in a dramaturgical structure, a four fold pattern of analysis emerges (Carlson,1996; Palmlund,1992; Turner,1974). Turner developed this model of "social drama", which I am applying to the interpretation of the conference. Such a model provides a structure for looking at how a society copes with conflicts over technological risk. Turner's four phases of public action are breach, crisis, redress, and reintegration or schism.

The first stage is one wherein a *breach* from established order is recognized. The ability for science to cross species barriers with genetic engineering at its inception in the early 1970's constituted a cultural breach, and was recognized as such by the sixteen month U.S. moratorium on research at the time. In Canada, the introduction of genetically engineered foods without labelling or identification may be construed as breach by members of the public.

The second stage is *crisis*, one wherein Turner says factions are formed and 'threshold rites' are performed. Various camps or oppositional groups begin to form in response to anxiety about a new technology, regulatory rites being passed, an accident due to the technology, or an ethical crisis identified.

Redress, in this model, is the third stage in which I initially theorized the placement of the citizen conference. The word *redress* insinuates a judicial context, and practitioners have likened the model to a citizen jury, wherein science and technology stand trial before the public. Redress allows citizens to hear the expert testimony and make recommendations or demand changes in the application of the technology.

Finally, *re-integration*, adjustment or the recognition of a *schism*

concludes the social drama, if it runs its course. The outcome of the citizen performance may be in either direction of the status quo. For many stakeholders, they will look to the performance as either a yea or nay ballot casting. The effects of the citizen final report and the nature and degree of media coverage afforded the project may also constitute this fourth stage or represent an extension of redress.

I will show how the text of the conference indicates the stage of crisis, but that the outcome satisfied a form of ritual redress and marked re-integration in this model, and that participants experienced a sense of "communitas" as a result of their deliberations.

Qualitative Research and Coding Conference Themes

The thematic coding is a reorganization of the raw conference data; - the textual sphere of the citizen-expert discussions reassembled into new categories.

The principal source of this data was collected during the three days of the citizen conference itself. As I watched and listened to the conference proceedings I wrote notes on all that was happening, filling up several notebooks. Since I was also working as a member of the planning team during the conference, in addition to watching from the perspective of my own research, there were admittedly moments when I was called away by media inquiries. However, fortunately, the entire conference was also video-taped (by commedia) and the week following the conference I took the thirteen video tapes and reviewed the event once again comparing my original raw notes to the taped version. This not only helped refresh the discussions, I was able to check my notes for accuracy against the video taping.

Thirdly, my work on the project involved the production of a shortened, one hour video version of the conference. To choose and edit the material for this final product, I spent another sixty hours viewing and replaying scenes from the collection of taped footage. I can say with confidence that I became extremely familiar with the contents of the discussions and debates.

To code the conference material I used the analytic format from Kirby & McKenna (1989). This coding schema classifies the research material into bibbits, properties, categories and themes. A bibbit is simply a piece of raw data from the conference notes. It may be a short phrase or an entire passage or exchange of dialogue between parties. Within these 'bibbits', one identifies the property being referred to,- that is the element of meaning in terms of context and content. Eventually all of the notes were marked as exhibiting a property. These properties I grouped into related categories, and put everything that belonged by associative meaning into the same category file.

Coding in this fashion allows the researcher to put a bibbit in as many category files as its labelled properties will allow. To cite an example, take one category file that I labelled *"Public Interest"*. What properties and bits are in there? A bibbit example would be the statement by the environmental expert on March 5, the first day of the conference, in a cross examination question from a citizen,

"there is fear with agri-biotech companies that non-GE seeds won't be available...we need to take control of the genetic material of seeds in the public interest".

I labelled this bibbit with a property name "public interest & non-GE biodiversity". I can also cross reference it by labelling it "public interest & monopolies". Then it would be filed in both the Public Interest category file and the Monopolies category file.

Also from March 5 notes during the Social-Economic discussions, the following passage is recorded from the farmers' union advocate,

"...the market is a tool, not a conscious, credible source, - it works on supply and demand, not public interest. If industry wants to make money they have a right, but who's going to regulate in the public interest'. A portion of the reply from industry was, "*....competitiveness brings diversity into the marketplace...profit doesn't jeopardize the public interest*". This combined bibbit represents two properties based on content and speaker context. One is "profit vs. public interest" and one is "farmers' and industry". They would be found in

the respective category files of both Public Interest and Farmers' Rights.

How were property meanings and categories derived? In using this analytic sorting method, I was looking at the raw bibbit to interpret what was being contested in the data. Since my research interests are concerned with the different competing narratives and discourses in food biotechnology, the content and context of contestation is the major criteria I used to generate categories.

Working through all the conference data, I identified these properties and associated them with a common category. Then I continued to work with these nineteen categories and distilled them into four major categorical themes. These themes discussed in the analysis chapter are Regulation; Public Participation; Farmers' Rights and Industry; Citizens' Rights and Consumer Benefits.

The following five charts demonstrate the coding process from bibbit through property, to category and finally to themes.

Bibbits	Context	Speaker	Property
"we've moved ahead in good faith....very comfortable with the products today...."	Legislation expert presentation	Doug Mutch, Cda Grains Industry	*legitimating product regulation*
commends citizen panel adding, "I'm shocked regulators aren't asking these questions"	Legislation expert presentation	Edward Hammond, NGO critic	*contests regulatory integrity*
"Canada has well established regulatory framework....."	Cross exam of legislation segment; answer to Q on formulation of legislation	Peter Pauker Government	*legitimating regulation*
"this proves the system works..."	Expert Rebuttal re:brazil nut gene in soy controversy	Paul Mayers, HC	*legitimating regulation*
industry is "certainly not self policing, proud of regulation, endorse caution..."	Expert rebuttal: response to idea of corporate power	Margaret Gadsby, Industry	*industry legitimating regulation*
"may need 'park status' to protect them like endangered species.."	cross examination 2nd day: response to Q on GMO's and biodiversity of plants	Margaret Gadsby	*regulatory solution for biodiversity*
"this is not a technology issue, it's a public good issue, need policy from the farm gate....."	cross examination 2nd day : response to Q on biotech increasing demands on farmers	Cory Ollikka, Farmers' Union	*GE okay with strict regulation, contests present system*

Samples of Properties & Bibbits from the Category of Regulatory Issues

Bibbit	Context	Speaker	Property
"Global issues and the common good, that is the issue in biotech"	environmental expert presentation	Raphael Thierrin, Environmental voice	*Need to protect public interest*
"the organization I represent is neither pro or con"	social-economic expert presentation	Cory Ollikka, Farmers' Union;	*middle ground and public good*
"I'm pro citizen, not anti-biotech"	ibid	ibid	
"How can we take control of genetic material of seeds in public interest?"	cross examination of environment segment (concern that non-GE seeds will not be available)	Raphael Thierrin, Canadian Environmental Network	*Public good threatened by GE technology*
Promises audience that biotech will be used for public good by stabilizing food prices.	cross examination of social economic segment	Margaret Gadsby, Industry	*GE argued to be in the public good*
" Industry has a right to make money, but who's going to regulate in the public interest...."	cross examination of social economic	Cory Ollika, Farmers' Union	*Regulation protecting public good*
"Profit doesn't jeopardize public interest, public ensures diversity thru tax dollars....."	cross exam of social economic segment (response to citizen Q)	Margaret Gadsby, Industry	*Industry interests are in public interests*
"If citizenry directs government , nothing is impossible..."	cross exam of social economic segment(response to Q on corporate concentration)	Cory Ollika, Farmers' Union	*Regulatory solution for public good*

Sample of Bibbits & Properties from Category of Public Interest

Bibbit	Context	Speaker	Property
"if biotech can improve the profit margins for farmers, cool, its still a very, small margin, ..."	cross exam of social economic segment	Cory Ollika, Farmers' Union	*farmers' rights and profit margins*
re: Terminator Technology.."will be lethal for peasant farmers"	cross examination of social-economic segment	Cory Ollika	*farmers' rights in developing world*
"we have plant breeders rights, no such thing as farmers' rights"	legislation expert presentation	Edward Hammond, NGO critic	*farmers' rights*
"farmers will just rent germplasm.."	cross examination of Legislation re: legal patents	Edward Hammond	*negative impact of GE on farmers*
"farmers need more drought tolerant crops... financial opport. not far off"	cross examination of 2nd day (re: second generation crop products of biotech)	Margaret Gadsby, Industry	*industry promise of farmers' benefits*
"genetic products are at a 50% adoption rate, about 57% of total acreage pattern"	audience Q & A re: demand for genetic products	Margaret Gadsby	*farmer demand*
"dangerous trends to a food system of fewer and fewer players..."	social economic expert presentation	Cory Ollika	*monopolies*
"we are approaching high levels of corporate concentration"	cross exam of social economic segment	Cory Ollika	*monopolies*

Bibbits & Properties from Categories of Farmers' Rights and Monopolies

BIBBITS	CONTEXT	SPEAKER	PROPERTY
"benefits to producers and consumers"	Social-economic expert presentation	Margaret Gadsby, industry	*consumer benefits of GE*
re: labelling of GE food, "personal right for consumer knowledge"	consumer health expert presentation	Corinne Eisler, nutritionist; Vancouver non-profit org;	*labelling of GE food as citizen right*
"labelling is fundamental right for variety of reasons"	cross examination of consumer health segment	ibid	*ibid*
"I'm already eating both" ! (transgenic & conventional food) ....*applause*	cross examination of environmental segment (refers to no labelling)	Raphael Thierrin; Canadian Environmental Network	*audience support for labelling of GE*
"we have chosen to live in a free market, the consumer can make social-ethical decisions.."	expert rebuttal segment; in context of free trade & consumer	Peter Pauker - Gov't; Dep't Intl Affairs	*ethics framed as consumer choices*
"cost should go down for the consumer as we get better at it.." consumer benefits	expert rebuttal segment (paired with comment on comfort with the technology to go up)	Margaret Gadsby, industry; AgrEvo	*consumer benefits of GE food*
"good, safe, cheap food is what people want....if I can get cancer fighting agents in food, people interested"....	audience Q & A 2nd day refers to farmer benefits vs consumer benefits; consumer promise	ibid	*ibid*

Bibbits & Properties from Category of Consumer Rights, Choices,Benefits

CATEGORY	THEME
Balanced, Middle Ground	REGULATORY THEME
Precautionary Principle, Product Approach, Process, European Union	
Regulatory Issues, Legitimation	
Safety of GE Technology and Regulation	
Precision and Improvements of GE	
Traditional (nothing new with GE)	
Public Education, Information, and Communications,	PUBLIC PARTICIPATION THEME
Public Interest	
Public Interaction	
Consumer Rights, Choices, Benefits	CITIZEN RIGHTS and CONSUMER BENEFITS THEME
Ethics and choices, Ethics and Trade, Ethics and Trust	
Farmers' Rights and Interests	FARMERS' RIGHTS AND CORPORATE INTERESTS THEME
Developing World	
Monopolies	
Patents	
Economic & Corporate Interests	
Sustainability :Industry as Stewards	MISSING THEME: CRITICAL SCIENCE VOICE/POSITION
Environmental: Middle position	
Technology and Culture	META-THEME: ETHICAL DOMINATION OF NATURE

Coding Categories into Themes

Framing Discourses

Another way of looking at the conference text is in terms of the circulating discourses about biotechnology which were reproduced there. The framing discourses are a discussion of the major discourses found reproduced at the conference.

When discussing these discourses, I refer to different 'framings' of biotechnology that different groups or individuals construct. I use the term in the Goffmanian sense, that is, the way in which social actors organize information and experience to communicate a particular picture of reality.

Working throughout the summer and fall of 1998 and winter of 1999 for this project, I became extremely familiar with the major streams of competing discourses on food biotechnology. By assisting with the collection and organization of material for the citizen reading packages, and the production of the website which presented all sides of the arguments, we were in effect delivering to the citizen panel the full range of argumentation and discourses on the topic. These reading packages represented a range of positions and information including dominant, negotiated and oppositional interpretations of biotechnology. For instance, an environmental paper by Anne Clark, a PhD scientist and academic from University of Guelph opposing biotechnology for endangering biodiversity was posted under reading materials on our web site. Next to that title a paper by PhD research scientist Maurice Moloney, from the University of Calgary, advocating biotechnology and proclaiming its environmental safety was also made available. Each argument was complimented by a differing perspective. This large body of research material, some academic, some from magazines, others from library books, was organized into thematic issue areas. We presented the articles under the following headings we called regulation (labelling and legislative), corporate/industry, environmental, consumer health and safety, public interest, ethics and animal welfare. The citizens then received this reading package at the first preparatory weekend in January, 1999 in Calgary. While in many respects,

these are arbitrary and heuristic divisions, since overlap is inevitable, they do serve to categorize the major approaches, argumentation and discourse practices around biotechnology.

Similarly, in constructing and posting resource links for the web site, I divided the linked sites into four categories of resources I labelled; government or advocacy sites; industry and corporate sites; critical or oppositional sites; and public interest sites.

Our categorization of material reflects the major discourses on biotechnology we find socially reproduced at large in all media and communication forms. For example, one of the best known corporate arguments for defending biotechnology is that the technology is a necessity and the only way we can help feed the developing world. It is a moral imperative to accept and propel the technology from this industry perspective. Would industry really fall back on this argument? After working with the information and materials for close to a year by the time of the actual conference, I was interested to know to what extent these identifiable discourses would be relied upon and reproduced during our conference. Were any of these themes or discourses absent from the Canadian debate? Using the narrative data I gathered, I will organize it from the perspective of discourses heard at the conference.

Participant-Observation Notes

Throughout the duration of the project, I also recorded other research notes which I use in the analysis as direct quotes at times to demonstrate an idea. Principally, these are notes I recorded during the preparatory weekends with the citizen panel. During these weekends I took extensive and complete notes, whereas sometimes after these meetings, I would simply write a few reflections or subjective interpretations about what was happening. These journal style notes were useful in recalling aspects of the content and process of the project.

After the project and conference was completed the project manager conducted evaluation interviews with each citizen and with each expert.

Evaluation questionnaires were also completed by audience members. While these data were necessary for evaluating the project as a public participation mechanism, I accessed and treated the raw evaluation data much as field notes to support my own analysis. These field notes are not included in the thematic coding of the actual conference data, but used to support and expand upon the analysis of biotechnology as social drama where appropriate.

Other Analytic Frameworks for Interpreting Cultural Performances

Fuoss (1993) has suggested an analytic framework to guide an interpretation of a cultural performance. He identifies three dimensions of performance contestation: the direction of effectivity (whether the performance moves towards the status quo or challenges relations of power); mode of effectivity (the strategies actors utilize to move in a certain direction); and the spheres of effectivity (the specifics of text, spatial relations, and conceptual strategies). Fuoss uses the term 'effectivity' because he wants to emphasize that "cultural performances have effects, that they make things happen that would not have happened in that way, to that extent, in that place.....among those persons had the cultural performance not occurred" (p337).

The *direction of effectivity* may vary along different axes rather than being seen only as a binary moving towards either a pattern of existing dominant relations versus a resistant and oppositional enactment. The final recommendations of the citizen panel will indicate the direction of the performance, however multiple axes may exist within that document and within the conference. The citizen cross examination after they hear from the experts will also provide a reading of the degree of contestation of the biotechnology status quo. For example, is there a discussion of a moratorium on genetically engineered crops or does the debate remain focussed on regulation?

Of the three *spheres of effectivity*, or "spheres of contestation" as Fuoss terms them, the textual sphere constitutes the larger area of focus in my research. This sphere refers to the above discussion of competing discourses we heard narrated at the conference, as well as the analysis of themes. I will

also look at the significance of the spatial sphere in the research analysis.

A discussion of the conceptual spheres of performance contestation "occurs at a meta-level" (Fuoss, 1993) and will be taken up in the concluding chapter. Disputed concepts such as the role of religious belief or metaphysical arguments in biotechnology; the relationship of biotechnology to information technology; the tendency towards a reclassification of categories of nature; the shifting classification of public and private ownership of these categories; competing means of communicating this changing information; cross cultural considerations of citizen conferences, and alternatives to biotechnology are discussed in the conclusions.

Alasuutari (1995) in his discussion of qualitative culturally based projects reminds the reader that research method is not simply about making observations and reporting findings. It is the findings that become the starting place for unravelling different meanings about culture. For this reason, he says it is more fruitful to choose a broad umbrella framework,

> ".... because the answer to a certain concrete why-question often has more general interest-value only when it is examined in a broader framework as a model of explanation that, mutatis mutandis, is applicable to many other phenomena as well" (p.142).

By treating the research topic broadly, the results will less likely become self-evident, trivial or banal interpretations.(Alasuutari, 1995).

In my concluding chapter then, I will discuss the meta-themes or themes which are more distant from the categories of discussion we heard publicly discussed by expert and citizen. These help explain the assumptions operating for biotechnology to be accepted or resisted in our culture.

Hall's Three Communicative Codes

We can apply Hall's theory of a communicative event being a "complex structure in dominance" to the analysis of the biotechnology conference.

Hall (1994) proposes understanding communication as a structure produced and sustained through the articulation of linked but distinctive

moments in production, circulation, distribution, consumption and reproduction. At the production moment, which includes technical infrastructure, professional knowledge, and institutional framings about the message, as well as larger socio-political influences, meaning must somehow be made intelligible using language rules and codes. Similarly, at the level of decoding, viewers must employ frames of reference, subjective knowledge and beliefs to interpret the meaning. There is no guarantee that a given viewer will employ the same set of codes utilized in production to assign meaning to the communication. Discursive knowledge, then, can not be seen as a transparent representation of something real. There are always codes operating and reality becomes a socially constructed articulation of 'the thing' and 'the thing represented'. The choice of connotative codes available are not equal among themselves, however.

> "Any society/culture tends, with varying degrees of closure, to impose its classifications of the social and cultural political world. These constitute a dominant cultural order, though it is neither univocal nor uncontested. This question of the 'structure of discourses in dominance' is a crucial point" (p. 207).

Hall identifies three positions from which a decoding of meaning may take place. The citizen final report will be interpreted in light of these three positions. The *dominant hegemonic position* produces what he terms "perfectly transparent communication", where the subject employs the same codes as the global dominant discourse uses to encode messages.

The second position is a *negotiated* code. Negotiated meaning is a mixture of adaptation and opposition. Within the dominant discourse, the negotiated position seeks a local exception, exemption or condition for itself.

The third position is an *oppositional* reading or code. The viewer or public may fully comprehend the literal and connotative aspects of the dominant meaning attributed to biotechnology and simply decode it in a contrary way.

Hall notes the greatest misunderstanding or conflict actually occurs in the interaction between dominant and negotiated positions. Sometimes negotiated positions are given an oppositional reading by others, thereby initiating a

'struggle in discourse'.

While I will look at the citizen panel final report in light of Hall's codes, I will also apply his categorization to the expert framing discourses heard at the conference.

THE PERFORMANCE OF THE CITIZEN CONFERENCE

> *Suddenly, it is not the dangers, but those who point them out who provoke general unease and hostility. Isn't there always visible wealth to hold against invisible risks? Isn't the whole thing an intellectual chimera, the product of the intellectual scaremongers, the stage manager of risk?* Beck, Risk Society

In this chapter, I will first describe what happened at the citizen conference. Briefly, I will also summarize the process and activities which were part of the planning and preparations for the conference, as well. Next we will return to the model of social drama and demonstrate the presence of breach with respect to biotechnology in Canada. Thirdly, we will examine the major themes that circulated in the conference discussions, followed by an analysis of the biotechnology discourses reproduced by the experts, and those voices or positions which were absent or missing. Finally, I will contextualize the results of the analysis in terms of social drama, addressing the stages of crisis and redress.

1. THE CITIZEN CONFERENCE

Preparation and Performance of the Event

The conference opened on Friday morning, March 5th, 1999 at the Rozsa Centre, a performing arts facility on the University of Calgary campus. A panel of fifteen volunteer citizens and a panel of sixteen experts sat on stage facing each other across the stage. Between the two panels was a speaker's podium and downstage left was the moderator's podium.

The program began with the director, Dr. Edna Einsiedel, explaining the role of participatory technology assessment and giving introductions. The first day of the program was organized into issue areas. Under each issue area an eight minute presentation was heard from each expert in that section. Consumer Health and Safety was the first session wherein four experts presented sequentially. Within those four presentations, government, science and consumer positions were heard. After all experts had presented, the citizen

panel had approximately 30 to 45 minutes to cross examine those presenters. The day continued in this structured fashion with expert presenters and cross examination by the citizens over and over again. After Consumer Health & Safety, sessions on Environment, Social & Economic Impacts, Ethics, and Legislation were also run in the same format. Each section always included both a proponent and critic of the technology. Moderator, Anne Tingle from the Alberta Science Foundation, kept time, announced speakers, and directed the flow of the program with minimal intervention.

The tone was formal and serious. There was a sense of being present at a trial and the weight of the outcome pervaded the theatre all weekend. Audience, which numbered about one hundred individuals, followed the debate carefully and one had to listen closely to understand, because the citizens had done the research and were now using the language of citizen-experts. They traded freely in the jargon and language of genomes, risk assessment, and terminator technology. To close the first day, citizens and audience sat and listened to the moderation of an expert rebuttal period between 5:00 and 6:00 PM. The program then closed at 6:00 PM, at which time all the experts went to dinner together and all the citizens gathered on their own without social contact from experts or the planning team.

The second day began with the morning divided in two sections. The first half of the morning was devoted to further cross examination from the citizen panel to any experts they chose to ask follow-up questions. The second half of the morning provided an opportunity for members of the audience to ask questions of any expert on the panel. After lunch questions from the audience were scheduled to continue until 3:00PM at which time the citizen panel adjourned to write their report. An unusual example of reflexivity happened over lunch, however.

The citizens took lunch each day with the experts and by the second day the social setting became an opportunity to engage in less formal conversations about the participation process and the technology. At the close of lunch that

day, the citizens made it known they had more questions and wanted more time to ask questions before beginning the writing of their final report. Suddenly, an impromptu meeting was being conducted, wherein both citizen and expert were strategizing a way to best utilize the remaining time. Some of the options put forward by the citizens were interesting. The most popular suggestion for many present was to change the afternoon program by eliminating the audience question period and give that time to the citizen panel. A vote was taken, but two citizens took objection making the argument that a public participation exercise which takes away the public's time to ask questions goes against the spirit of the entire process. A second suggestion was that perhaps the citizens and experts could continue their discussions informally after the formal program concluded. This plan was also abandoned given the severe time constraints. Lunch ended and the program continued as printed in the program.

Upon adjourning in the hall reflexivity vanished and a couple of stakeholders engaged in a classic frame dispute instead. Members of the conference advisory committee had attended this lunch and listened to the discussions put forward by the citizens concerning more questions and lack of time. Despite this awareness, once back in the theatre, two advisory committee members continued to go to the audience microphones with long winded questions and comments, each representing opposing perspectives.

At 3:00 PM Saturday, the citizen panel returned to the hotel to begin the report writing. At 6:30 AM the next Sunday morning, after working through the night, they finished and signed the report signifying consensus and the project manager and director ran to make photocopies for the 9:00 AM conference opening.

Between 9:00 AM and 10:00 AM Sunday, the exhausted citizens read their seventeen recommendations on stage to the experts and audience. We held back the print copies until the oral presentation had been completed. The experts then had the first chance to respond and then the audience was invited to give comments or questions, as well. The conference concluded with

comments from the citizen panel Chair and one of the facilitators conducted a short conversation with the audience. By 12:30 the program was formally concluded and the media were onstage looking for interviews and pictures. By 2:30 PM, both citizens and experts were getting in cabs to make afternoon and evening flights all over the country.

2. Physical Space and the Conference

When one entered the Rozsa Centre theatre, one saw a stage with two long skirted tables of people seated with microphones. The fifteen citizens filled stage left and the sixteen experts filled stage right. Between all these bodies and microphones was a white overhead projection screen and downstage a speakers podium. The two groups of panellists faced each other across the stage, a huge expanse of empty hardwood flooring being open at the centre. Despite the lushness of the maple wood interior, sitting in the house one was acutely conscious of the gulf of empty space between the citizens and experts. Plain name cards sat in front of each individual. Despite the civil formality created by the seating on stage, a display of citizen and expert territories was marked. Just as Schechner talks theoretically about ritual performance making clear different territories and hierarchies, the audience became immediately aware of those territories upon witnessing the seating arrangement. In this way, the gap in the citizen-expert relationship was physically and symbolically displayed for the audience.

Sitting in the house, we also felt the enormous tension and pressure placed on the citizens to intelligently and critically confront these experts as equals on behalf of the public. Rappaport (1992) talks about how messages which are signified by symbols in ritual become immediately perceived by the senses, how distant abstract concepts become a sensory experience. Staring at that seating arrangement for the duration of the conference, reminded all present in the audience, how rare such a form of communication is in our culture, and how wide the gulf is between the two camps.

Experts who were not part of the current presentation segment were still

asked to sit on stage. This means that since each expert presented once for eight minutes and endured a public cross examination for about an hour of so, the rest of the day she or he simply sat on stage as part of the panel. By physically sitting on stage, these experts communicated a symbolic willingness to dialogue with the public, but simultaneously also performed sentry duty and protection of their own territory.

Citizens, experts and audience made mention of the physicality of the event in evaluation questionnaires at the close of the project. An audience member from the media wrote, "the separation and distance between panels give it the feeling and tone of a judicial inquiry and/or performance". A citizen evaluation response included the remark that the space needed, "less physical distance between panellists, experts and audience". Another citizen wrote that they, "needed to meet/shake hands before the start of the conference, relationship building and trust would gain here". An NGO expert responded to the space and tone writing, "The structure was horrible. The distance separating everyone, the lack of...any heated give and take made the whole event very impersonal and cold....The exchange between citizens and experts was far too distant and formal".

Objections to the formality of the physical space and seating arrangement of citizens and experts is a material means of objecting to the premise and theory that cultural performances contest dominant power relations. Many of the same individuals who objected to the formality of the physical space, suggested more informal chatting sessions removed from the audience were what was needed. As one expert pointed out in his evaluation comments, "the citizen panel was formidable and had to be taken seriously.....the demeanor and mood set by the moderator, [which was] measured, formal; properness clothed the citizen panel with authority".

This dispute over formality, which was a key tone in the conference and reflected in the physical space, was instrumental in allowing the pattern of communication to posit the citizen as expert. In terms of Fuoss's 'mode of

effectivity', the performance mode was strongly formal and serious, and this impersonal effect was a necessary ingredient making the event credible as a citizen led exercise.

Conceptually, however, performance is often contested as an effective means of changing dominant power relations. Fuoss (1993) discusses this "anti-theatrical prejudice" which often operates to discredit the performance phenomena or event as seriously significant. Ironically, one citizen wrote afterwards; " I think a lot of our discussions/questions/presentations would have been more effective without the audience being there...when there isn't an audience, we may have more candid discussions rather than the posturing that experts needed to do to represent their organizations".

Performances are composed of dramatic and rhetorical strategies, yet it is in their enactment that the nature of the crisis and the stage of the social drama are communicated.

2. BREACH IN CANADA

The first stage of social drama assumes a breach of some kind has occurred, and I contend this is the case with food biotechnology. Turner (1974) describes breach as a break from regular, rule governed behaviour between individuals or groups within a shared social system. Breach, or this disruption of the normal structured and expected interactions between parties, is the first processual stage towards crisis, and public acknowledgement of this tear in social relations.

Although agricultural biotechnology is a 250 million dollar industry in Canada, the public is relatively unaware of the trend towards a genetically modified food supply. Internationally, we are a 'leader' in the world in terms of the number of field tests of genetically engineered crops. Since 1988, there have been over 4,000 field trials of GE plants. Environmental releases have been granted for thirty one different plants, including canola, soy, corn, wheat, flax, and potatoes. If one realizes that soy lecithin and corn syrup are ingredients in a huge number of manufactured foods, it is not untrue to state that we are all

eating genetically modified food on a regular basis, but most of us have no idea the food and agricultural experiment is this all encompassing. The introduction of genetically modified foods without public debate or product labelling constitutes a breach of trust between government and citizenry. The European public have declared breach on this issue and are refusing unlabelled GE food, thereby escalating the possibility of a trade war. In North America, the public is still uncertain as to whether GE foods constitute a breach. We will see how our citizen panel interpreted regulators to be in breach, by avoiding a commitment to labelling. To demonstrate the discomfort felt by industry and regulators in terms of an implicit breach, I will recount for you my queries to Canada Safeway last December.

The Safeway Story

On December 3, 1998, I decided to phone Safeway and find out what corporate food retailers were telling the public about genetically altered foods. In Canada, labelling is principally voluntary, and Canada accepts the American and international Codex position which argues against providing the consumer or public with a label marking a product as genetically altered. As this argument goes, what advantage is it to the consumer to mark 25% of the possible 10,000 products in a grocery store with information that says this product "contains genetically modified ingredients"?

So, I started by placing a call to the Safeway customer service department. Presenting myself as a consumer, I said I had read some magazine articles about biotechnology and the genetic engineering of food and I wondered which foods Safeway carried that were altered in this way. Judy, the customer representative, told me she had never heard of genetically altered food and that someone from corporate headquarters would have to call me back. Sure enough, two weeks later, on December 12, Joanne, who looks after the Lucerne label inquiries, returned my call. After explaining again what biotechnology and genetically altered foods are, Joanne assured me that any product of that nature would, of course, be labelled in Safeway. "Anything biochemically altered has a

label", she declared confidently. "Like Olestra", she added. I pointed out that olestra, while controversial as a food product, was not actually a GE food. She hesitated. Then laughing, she offered up an imaginative popular example of Frankenfood. "How about boneless chicken, maybe that's been genetically altered?" We both laughed. "I'm not sure how chicken gets boneless," I admitted, "but it's not GE either". Joanne, having reached the end of her information resources offered to refer me to Public Affairs. That was exactly who I'd love to speak with I countered pleasantly. To myself, I figured this might not be unlike talking with a risk communicator, so I looked forward to the interaction.

Sure enough, later that afternoon Liz Berman of Safeway Public Affairs rang. Her initial greeting oozed concern. I stated, for the third time, my query. "Are you a reporter?", she barked back at me. "If you're from the media, I'm passing you off to someonelse". Mentally, I berated myself for allowing my character of 'the public' to be less than believable. I back paddled hard. I responded with pleas for information. Of course, I wasn't a reporter. I was worried. I had read this article last week about new foods and I had been wondering about such things in Canada. I knew she'd ask which magazine. She wanted a citation. I groped around about the New York Times piece on potatoes. It had to do with potatoes, I said submissively. She rallied. Convinced now that I was a confused, female family shopper, she lowered her tone to a whisper. A whisper. (I wondered about the office design). "Now don't get upset", she breathed, prefacing the blow, but *"everything*, just about everything now a days has been genetically altered". "It's been happening for a number of years, but it's *safe*, absolutely *safe"*. Rustling through an Agriculture Canada newsletter of some sort, she began reading to me. She read out loud about soy, canola and corn. She underlined the superb Canadian regulatory system. Not wanting to put her on the defensive, I refrained from pointing out that Safeway labels are primarily American foods. What about the US regulatory system, I thought? I must have momentarily abandoned my character, for suddenly the hiss returned to her voice. Now she was whispering and hissing. "Oh, I bet your 're one of

those organic growers", she charged me. I made an overture in defence of organics. "I buy organic produce sometimes, that's all". "Organic food on a large scale, that's ridiculous! - there's no clean soil left anywhere now", she corrected me. At this point, I was nothing less than stunned. In her public relations world everything was genetically altered *and* toxic. Here was biotechnology being defended by acknowledgement that industrial agriculture had polluted the entire planet, anyway. Here was a new spin on globalization and food safety. "So, you're telling me we have no alternatives, that we should just give up and live in a cesspool?" I didn't care anymore if she won the drama contest. The toxic rhetoric was begging to be blown out of the PR water. She faltered, stumbled even. Liz took a breath and then calmly proceeded to explain the structure of the food wholesale industry to me. Large scale. Big. Big accounts, big farms, big money, big numbers of customers. Big science. I remained unconvinced. She held the trump card. Safeway is only doing what Health Canada tells them to do. It's the law. That's all there is to it. So, that's where Liz and I left it. It's the Canadian law.

Gwynne Dyer, ex-CBC journalist, writing on biotechnology this year in a piece he titled *Frankenstein Foods*, didn't bother with attempting to present balanced journalism. In his words,

"Whatever the real problems with GM foods, the strategy for their high-speed introduction throughout the world is shaping up as one of the great public-relations disasters of all time. Public suspicion outside North America is reaching crippling levels, and the reason is not at all mysterious. It is because the biotech firms literally tried to shove the stuff down people's throats without giving them either choice or information".

Clearly, this reflects a breach of trust between government regulators and citizens. The North American public, however, unlike many Europeans, as well as Iceland, Norway and groups in the developing world remains relatively accepting. In Canada, government and industry search for ways to achieve closure and stabilization of the technology, bypassing breach, crisis and social drama altogether. If our citizen panel does in fact represent Canadian culture,

and I think for the most part it does, the breach may never become outright crisis as it has in other parts of the world. In fact, I argue that Canadians perceive the breach not as a concern over the changing boundaries of nature and culture the technology is introducing at high-speed into our everyday lives, but a breach of communication and trust between government and public and between expert and citizen. As Wynne(1992) contends regarding societies, technology and trust in late modernity, Canadians may be more concerned with the communicational and institutional breach a controversy brings to attention, than the existence of the technology itself. Therefore, if the issues of public participation, input and control over launching of the technology are satisfied, Canadians may never find grounds to refute the familiar domination of nature and future colonisation of nature that biotechnology practices represent. In other words, as much as biotechnology may appear to expose our cultural assumptions, it is not these assumptions or practices which people want to challenge given an opportunity. As many of our citizen panel recited over and over again throughout the project, "the genie is out of the bottle", or " the horse is already out of the stable". We assume that we must find the good in the technology tube and manage to squeeze it out.

In February, during one of the preparatory weekend dinners with the group, one of the women who subsequently became a co-chair for the citizens remarked to the table,

> " We can't stop this thing, it's everywhere now. All we can do is direct it" (notes, Feb 5'99).

Because the breach in Canada has been so silent, I think much of what occurred in the panel's preparatory experience was finding and articulating the breach in order to know how to proceed at the conference. For example, during the formulation of questions for the experts, the concept of breach became suddenly apparent to the group. They were working in one large group word smithing about ethics, corporate influence and government regulation. The flip chart read, "To what degree does corporate funding of government agencies

influence decisions and the direction of such agencies? A smaller working group had brought this question back to the entire panel for approval. As they tinkered with the wording, one of the men spoke up and reflected with the words, "...it implies breach, - the money is a breach, but it could be other than money though, - lobbying,...how can we ensure autonomy of government agencies?" (notes, Feb 7, '99).

It was during this preparatory meeting in February that the extent of the breach between government, industry and the public became clear for the group. The need to establish trust between regulatory bodies and the public subsequently became a major theme and line of questioning during the actual conference.

Breach and Crisis in the Citizen Question Formulation

A major task of the second preparatory weekend in this model of citizen consultation is the formation of the key questions to pose to the experts during the conference. Not only will these questions frame the inquiry and form the dialogic content of the event, they will determine which expert bodies end up sitting opposite the citizen panel. We can look at the key issue areas and the nature of the specific questions formed during this weekend, as a means of determining how the group perceived the nature of the breach and the direction the social drama might take.

The February meeting began with the pooling of the groups initial questions. Among the fifteen citizens, they began with over 150 questions. The questions were sorted into eight areas: consumer health and safety; ownership and control; economic and social impacts; environmental sustainability; animal welfare and commercialization; ethics; legislation and public interaction. One fifth of the questions pertained to public interaction, which was by far the largest category. The second area of most concern was legislation and regulation of the technology.

ISSUE AREA	# of Questions
Economic and Social Impacts	16
Animal Welfare and Commercialization	16
Environmental Sustainability	17
Consumer Health and Safety	18
Ethics	18
Ownership and Control	21
Legislation	23
Public Interaction	32

Feb 5, 1999 Potential Questions for the Experts by Issue

The category of *Ownership and Control*, which primarily addressed issues of patenting, was eventually subsumed under the two key issues of Legislation and Ethics. Even some of the original questions sorted into categories other than Public Interaction were cast in a public participation light. For example, a question under Legislation read *"Are public comments and concerns adequately incorporated into the regulatory decision making process as it pertains to food biotechnology?"* From the *Ownership* category, *"Do all the research material and findings become property of the funding entities or will findings become public domain?"* Or another question, *"With corporate influence and funding, will there be a free flow of information and findings?"* In other words, in addition to the strict definition of Public Interaction, questions from other issue areas crossed over into this domain, echoing the concern of public involvement.

From the outset, this group appeared to focus the inquiry on public interaction, legislation and regulation, and control issues. Public control and input into the technology, rather than the technology itself, seemed to be the topic of the breach from the beginning of the second meeting in February.

Bauer (1995) in his discussion of the three major post World War technologies, (nuclear energy, information technology and biotechnology),

makes this point about just what is being resisted on the part of the public.

"Bureaucracy is the target, rather than engineering or science itself.....Current technological resistance equally fights the process, not the product, of technological development. The issues are often public deceit and lies; manipulation and exclusion; pollution and exploitation; expert conspiracy; and unequal distribution of risks" (Bauer, 1995, p 12).

From my own notes after the February workshop I wrote;

"I think they feel the need for redress in terms of both the content and the process. In terms of process there is a belief that the lines of communication between expert and public are inadequate. In terms of content, the citizens saw this weekend the conflicting evidence presented to them - as an audience and as a symbolic citizen; they realized it was their own responsibility now to weigh the evidence and look at the technology in a broader frame" (notes, Feb 8,'99).

The initial question formation of the citizen group certainly bears out Bauer's claim. There is a search for trust in the regulatory framework and a hope or belief that redress is possible through improved public participation mechanisms. This would not be evident simply by looking at the finalized questions in the conference program.

For purposes of the public program, a reassessment of the questions, and the need to reduce the question load, the citizens decided on a final list of six broad key questions in the areas of consumer health and safety; the environment; social and economic impacts; ethics; and legislation. The sixth question pertaining to public interaction was not presented on by experts or cross examined like the others, but addressed by the panel in their final report as a question and found threaded throughout the cross examination of the other five key areas.

There was a discussion of and concerted effort to have the final question draft be worded in a neutral tone. The group agreed that, "We have to be careful, that our credibility could be compromised if our questions sound too critical from the beginning"(notes, Feb 7, '99).

In other words, there was a sense of constructing a public group identity which was characterized by strong, but neutral questioning, and which would withhold

judgement until all the evidence was presented.

Despite the evidence of breach having occurred, despite the contradictions and rhetoric in all the information and research materials, I believe this desire to remain neutral was genuine. Their belief in the existence of some unbiased neutral information somewhere in the world was authentic. The discovery of experts in collusion and conflicting bodies of information was, I think, a frustrating dalliance with reflexive modernity for many in the group. Most believed they might find the truth about the technology, thereby resolving the breach and avoiding crisis, if everyone wasn't so biassed. One of the members summarized this frustration at the February meetings, referring to the presenters they had engaged in the cross examination "rehearsal" that day;

"They [the experts] know the evidence is conflicting but they still choose to present their own evidence, ...until I know how they rationalize all the positions in their own minds, I can't take them or their position seriously" ....(notes, Feb 6, '99).

This search for a middle ground, what the citizens always called a 'balanced' position with which to assess the technology, became a feature of the entire process and project. Several of the citizens proclaimed at various junctures in the project that being balanced and knowing a good middle ground position is a Canadian attribute. In casual conversation that same weekend, two of the women agreed with each other that there had to be a reasonable position somewhere between Monsanto and Greenpeace.

Recognizing breach, the citizens early on in the process were indicating the belief that it is a public middle ground position that will resolve the crisis of competing discourses over the technology.

3. CONFERENCE THEMES

The original thematic categories I derived by coding my own conference notes (observing the three day discussion and the videotapes) were nineteen in number. From this nineteen, four major thematic areas emerged. (The fifth, alluded to only few times at the conference, I named *technology and culture*. It is a meta-theme and I will discuss it in the concluding chapter). The predominant

themes I identified are 1) the Canadian regulatory system - safety and integrity of the system; 2) public participation in policy making; 3) farmers' rights and corporate interests; 4) individual (citizen) rights and consumer benefits. These themes demonstrate both the citizens' investigation to decide if in fact breach has occurred, and a dramatic representation of existing crises between various stakeholders in Canada over genetically engineered foods.

The Canadian Regulatory System

This theme included discussions which explained, legitimated, applauded, defended, proclaimed and criticized the federal regulatory framework for GE foods and crops. Citizens asked for evidence of the safety of the Canadian regulatory system and queried at length the precautionary approach versus the product approach to regulatory approval. The safety of the regulation spilled into the safety of genetically modified foods, the argument that GE is an extension of traditional agricultural production, and therefore must be regulated by the same system.

The industry spokeswoman from AgrEvo introduced her presentation with the unabashed statement that *"we are operating under the assumption that the checks and balances are in place" (personal notes, March 5).* The scientist from Agriculture Canada stated confidently that, *"there are no known problems with GE foods or crops, no unexpected impacts...."* And from the Health Canada expert, we heard that, *" there is a "history of safe use as compared to the existing food supply, conventional foods have certain risks....."*

Suddenly, when it came to regulation and safety, the boundaries between government, industry and biotech scientists dissolved. I imagine for audience members unaccustomed to the debate and unable to read the name cards from a distance, the ability to discern one voice from another proved challenging. Wherever possible, these three legitimated the regulatory system as part of their argument, teaming up, so to speak.

When queried on the soybean research which inserted brazil nut genes into soy, and the significant problems this potential manipulation represents for

nut allergy sufferers, Health Canada reframed the concern by arguing this shows how well the system works. (The product was researched, tested and abandoned, and did not go commercial). Our "well established regulatory system", was commended over and over again by different parties bound to each other under the biotech industry umbrella.

Industry assured the panel that they are *"certainly not self-policing, but proud of regulation and endorse the cautious regulatory climate in Canada"*....Even the ethicist expert in response to a question on genetic discrimination said, *" this is not a big problem, we can regulate this."*

As well as being scrutinized for safety, the regulatory system was held up as a potential means of problem solving undesirable aspects or risks of the technology. The speaker from the National Farmers' Union, ostensibly a critical voice, hitched his arguments to regulation and active citizenry in a democracy. Winning heartfelt applause from both audience and panel, his opening statements made it clear he was not pro or con the technology. The issue for him was informed active citizenry in directing the technology. He skilfully adopted a middle ground liberal position, stating that *" it is not a technology issue, it's a public good issue and we need policy from the farm gate..."* Going on he charged that this is, *"up to government, and if they don't do it, it's up to citizens to make sure they do...everyone has to take responsibility..."*

Another NGO critic opened by emphasizing regulation checks and balances by saying, *"I'm shocked the regulators aren't asking these questions."* The pro-biotech farmer from the expert panel referring to biotech as *"nature's way"*, meshed regulatory praise with sustainability asserting, *" in Canada biotechnology is a way of clean, high-tech products, safe from the farm gate to the plate."*

In regard to regulation and risks, the scientist expert from the University of Saskatchewan, argued that genetic engineering is no different from conventional agriculture, pointing out that we all ingest foreign DNA everyday in the act of eating. If, we as humans eat other species' DNA everyday, then how is that

different from altering an organism by *inserting* foreign DNA at the cellular level, he asked? As a result there is no need to change existing regulation. He went on to remind us that, *"potatoes are naturally toxic, and conventional food has certain risks, too."*

Government, industry and industry scientists insisted that if there are any risks, which there are in conventional agriculture and plant breeding, then our superior regulatory system with all the checks and balances will guarantee safety.

In the citizen final report under *Environment*, the recommendation was made that *multi-disciplinary peer reviewed research be incorporated into the risk assessment process.* While this indicated that the panel did not accept a narrow technical definition of risk, suggesting risk assessment practices be expanded in scope, there appears to be a consensus that the technology will yield benefits with modified regulation and policing of regulation by an independent body such as the new Canadian Biotechnology Advisory Committee.

The citizen final report states under *Legislation: "we discovered....Canada has some of the highest industry standards for Food Biotechnology. Therefore we are looked upon as a role model by the international community".* This statement infers the extension of public trust in the Canadian regulatory system.

Public Participation

Under public participation, I included the discussions of public good, public communications, and public interaction, as well.

This theme demonstrated a high degree of reflexivity in the process and the event. Citizens might well have performed the task of assessing the technology, put forward their recommendations and given thanks for the opportunity to participate. What happened instead was a continual reference to the process that was occurring and a public reflection on what that participation meant.

The only exception to this observation was from the industry expert who, during heavy questioning at one point, announced that the panel couldn't

possibly come up with a question she hadn't heard, since she'd been doing these things for ten years and she'd heard everything. The notion of two way dialogic communication was perhaps most difficult for industry, of all stakeholders, to grasp, since a risk communication and one way transmission model is most familiar. Until recently, industry has been able to rely on government to communicate and legitimate the technology and products to the public in focus groups, opinion surveys or media releases.

Government and NGO's anxiously guarded territories on the nature of legitimate public participation. The Canadian Food Inspection Agency director informed us that *"there is no previous precedent for the amount of public consultation over biotechnology"*. In regard to a question on the new federal advisory committee on biotechnology, the Health Canada expert said there is a *"commitment to public participation in the new committee, the past one was not representative of citizenry"*. The harshest biotech critic in Canada, suggested at the conference what we need is, "*an independent body that has regulatory ties, is informed by good science and is a critical, broad based public body*". The industry ethicist summarized with the opinion that *"in Canada we have a poorly developed advocacy system - this is an experiment to establish ground up policy input"*. While a government scientist lamented the usual public apathy criticism, expanding on that point to describe the public as not able or interested to understand a technical subject, the farmers' union NGO bravely said, *"we need someone to regulate the regulators, in terms of exercising democracy, is this panel a possibility?"*

During the audience turn at the microphone, after hearing the recommendations, a government bureaucrat in attendance enthusiastically endorsed consensus conferences to the entire audience, while her Industry Canada colleague sat by exasperated by the expansive boundary crossing over to participative democracy. But, when the report recommendations were seen as non threatening, many hurried to the microphone to endorse more public input mechanisms such as this. It was in the domain of public interest and public

communications debate, as opposed to public participation, that territories were more aggressively carved out.

The farmer's union NGO who described himself as pro-citizenry, not anti-biotech, added that *"nothing is impossible if citizenry directs government"*. More specifically, he argued, *"in terms of policy and plant breeders rights, we have enshrined corporate rights over the public interest"*. Industry covered this point with the notion that, *"profit doesn't jeopardize public interest, the public ensures diversity through tax dollars"*. Later this NGO position acknowledged that *"industry has a right to make money, but who's going to regulate in the public interest?"* The moderate environmentalist voice, asked, *"how can we take control of genetic material of seeds in the public interest?"* This position posited the central issue of biotechnology to be the public good in a global context, but specific examples of this possibility or likelihood seemed lacking.

Once again, in looking at the debate from this context, (as there was no section termed 'public good', it arose of course under all the key issue areas), there was the recognition that public interest was not protected enough at the present time, but with the affirmation that it was possible to proceed with the technology given good regulation and strong public input. The only exception to this is the ethics critic who at one point argued biotechnology emerged out of a culture of capitalistic, technological determinism and must be stopped. But on another occasion, he suggested an independent public governing body, which would presuppose regulating the technology, albeit differently.

The reading of the final report seemed to clarify the meaning the citizen panel attributed to public interest and public participation. The report made several mentions of the new Canadian Biotechnology Advisory Committee in regard to reviewing patents, resolving labelling, and securing public involvement for the direction of the technology. Once again this suggests that the political process, rather than the technology, is the focus. The hard issues were passed on to this not yet existing committee to address. In this regard, it is difficult to untie regulation from the theme and issue of public input and participation.

The sub-theme of public communications provoked the liveliest emotional moments and constituted the strongest display of overt rivalry and framing disputes among experts and stakeholders. The following account demonstrates how a cultural performance is also the site of political contestation, a public struggle to control the meaning of symbols. The symbol being fought over in this instance was the Food Biotechnology Communications Network (FBCN).

The second day of the conference involved a general cross examination of any issues heard the first day. The idea of this segment was to give the citizen panel a chance to follow-up areas that needed further clarification or debate. One citizen panellist innocently requested industry to explain how they go about communicating with the public about biotechnology. Industry rose to the occasion noting that one-to-one communication is impossible but they support organizations financially such as the Food Biotechnology Communications Network (FBCN). She then gave the FBCN a plug and set down the microphone. Our ethics expert-biotech critic picked up the microphone disagreeing, *"Let's be candid about this, it's one way communication, the questions come in, but dialogue is a misleading term - FBCN is a propaganda organization funded by industry to promote industry interests".*

Prior to this point in the conference, experts in antagonistic positions had sat next to each other listening, as a rival perhaps claimed biotechnology would save the rainforest or feed the developing world, but any evidence of emotional disagreement was extremely difficult to discern. Integrity over communication with the public, however, seemed to arouse feelings on both sides. Industry grabbed the microphone, visibly furious, and attempted to do damage control. The director of FBCN quickly approached the moderator and requested special permission to address the citizen panel and audience on the matter. The panel chair acquiesced. It is not inaccurate to say that the duration of the public conference on Saturday, which was approximately one and a half hours, consisted primarily of a government bureaucrat and a consumer advocate debating the motives of FBCN at the audience microphones. What the audience

didn't know was these two were on the conference project's advisory committee. Is FBCN a one-way risk communications tool for industry or, is it an organization struggling with little funding to educate the public about biotechnology? The citizen panel sat by and listened to this battle as the time for questions ran out.

Then the nutritionist expert took a turn commenting on communications and ended up with audience applause. *"I've seen conflicting reports"*, she complained, *" and I don't know what to believe. I don't know what to tell the public - they have a right to know"*. Her point struck a chord for some in attendance.

When that topic was finally exhausted, Industry Canada still returned to the microphones on Sunday to ask the experts (many of whom he sees all the time in Ottawa) how we can best *"calm the fears of the public?"* Of course, one expert immediately responded by noting that the question is a way of trivializing legitimate concerns. On stage, even the strongest proponents of risk assessment knew better than to speak about 'public fears' in a public policy forum.

The degree of rivalry and conflicting positions that emerged around the issue of public communications increased further the citizen panel's frustration at finding what they termed in their final report " biassed information" wherever they turned.

What I find difficult to understand is the concerns they voice in the report under public interaction. Certainly it is fair to express concern that public participation avenues may not exist, that their recommendations may be ignored; however, to be concerned *"that available information is highly biased"* seems an inability to recognize the social roles being performed. To recommend that *"a comprehensive public communications plan be developed by industry, producers and government"* assumes neutral information is conceivable, and that behind biases one finds the truth about biotechnology. A body of information about biotechnology which is unbiassed became the goal of this citizen group.

The FBCN skirmish indicates that the control over information and

communications impact is the area expert stakeholders recognized as imparting the most leverage to effect public support or resistance and therefore, the most politically sensitive. This same area is the one citizens appeared to want to neutralize.

By April, a month after the conference, eight of the fifteen citizens had been nominated for a position on the new federal Canadian biotechnology advisory committee to which their final report makes so many references. At the present time of writing, it appears one citizen has successfully been elected.

Farmers' Rights and Corporate Rights

Farmers' rights obviously deserve a voice in the biotechnology debate in Western Canada and they had two at this conference, one critical of biotechnology and one a user and producer of biotechnology seed and crops. Two of the citizen panel members had farming lifestyles, as well. The impact of biotechnology on agricultural production, on concentration in the agribusiness sector and the changing role of the smaller size farm in Canada were strong concerns of the citizen panel throughout the project. The competing farmer positions revolved around the relationship between industry and agricultural communities.

As was voiced by the farmers union spokesman, *"if biotech can improve the profit margins for farmers, cool, it's still a very small margin though,..."* Concerns from this side of the argument centre on corporate control and the *"dangerous trends towards a food system of fewer and fewer players"*. As another NGO warned in the discussions of rBST, the milk hormone Canada refused, *"they'll [U.S.] be back again....and decisions go towards the corporate"*.

The clearest adversarial line between industry and NGO's was drawn over the terminator technology.[1] Terminator technology *" will be lethal for peasant farmers"*, said one NGO. Another agreed, warning that, *"peasant farmers will end up just renting germplasm"*. Interestingly enough, it was the pro-biotech farmer on the expert panel who took issue with the plant sterility prognosis, claiming farmers were free to buy seed from whomever they wished.

Turning beet red in anger at that claim, the farmers' union expert (who had earlier described himself as pro-citizen, not anti-biotech) leaned into the microphone and, almost shaking, retorted, *"not if the only sources for peasant farmers are corporate monopolies selling sterile seed!"* The audience spontaneously applauded in one of the few applause scenes of the weekend. Here was a prairie farmer versus a prairie farmer duelling over the influence of corporate power.

In discussions of farmers' rights and biotechnology, corporate control is the site of contestation. This is one recommendation the panel did not back down on. Under Social and Economic impacts, the final report clearly recommends the federal government assess the impact of concentrated control of the food industry. However, it falls short of asking for a ban on technologies which develop seed sterility, such as terminator technology, despite the NGO claim that *"90% of the biotechnology market, three companies, are all working on seed sterility... the idea of choice is an illusion"*.

Industry promised financial opportunities in drought resistant crop modifications very soon, and argued for the presence of demand by the apparent 50% adoption rate of genetic products.

On patenting, swords were also drawn between corporate and NGO farmer interests. *"Is there any part of the DNA that is sacred? I'm not willing to put this in the hands of the private sector"*. Industry arguments are multi-faceted to this common sense patent objection. Defending patents; *"I, as an industry member must protect my investment and recoup my costs"* and *"we don't own the seed, we have a patent on a couple of genes and a few promoters..."* and, the most intriguing defence for patenting of life forms; *"science moves forward by building on the ideas of others.....as scientists in industry we read awarded patents for ideas.... patents force openness in science"*.

The citizen panel fell short of developing a recommendation on patenting of life forms, patents being the necessary and lucrative ingredient which drives the biotech industry. Instead, they deferred again to the federal government,

recommending the new Advisory Committee review patenting laws. Although monopolies and patents are clear public concerns in the report, the request for a redress is through the filter of the federal government, not direct public voice.

Individual Rights and Consumer Benefits

The individual or the consumer, depending how a person is defined, was the site of many arguments for and against biotechnology. These emerged clearly in the public debate. Both industry and government promised to deliver future consumer benefits from biotechnology. So far they have been very few. The panel heard from scientists about the improved oil content and ratios in canola, and from industry simply the overarching promise of *"good, safe, cheap food... and if you can get cancer fighting agents in food too, people are interested."* Since canola oil, the subject of major research dollars and investment in Canada, is not terribly compelling, industry is also careful to promise that, *"cost should go down for the consumer as we get better at it".*

When the opposition cites the right of the individual citizen to choose *not* to eat genetically altered food, the consumer choice argument is quickly rolled out. As the government international trade speaker said, *"we have chosen to live in a free market, the consumer can make social-ethical decisions".* In other words, the consumer is voting at the checkout counter on biotechnology, according to the federal government.

But genetically modified food is not marked in North America and co-mingling of GE and non-GE food crops is the norm. The major issue then, under this theme, is the labelling of foods derived from genetic engineering. The consumer nutritionist advocate passionately stated over and over again, *"labelling is a fundamental right for a variety of reasons"* and *"the labelling of GE foods is a personal right of consumer knowledge".* Redress of the labelling policy for genetically engineered foods is likely the issue which will capture the most public attention. The personal choice argument, so commonly invoked in the face of resistance to just about anything in our culture, falls flat when the individual is unable to discern GE products from non-GE products.

In Europe, public resistance has resulted in a redress of labelling in some countries, and recently in April, 1999, major retailers like Tesco and Unilever announced a decision to ban GE products from their shelves. Industry and government here in Canada have hoped to avoid mandatory labelling, and instead promote voluntary labelling. It gets further complicated when negative labelling is introduced. In the U.S. small companies attempting to attract a consumer niche market by labelling with information such as "this product contains no genetically modified organisms (GMO"S)", have reputedly ended up in court, chased down by corporations such as Monsanto.

The citizens heard from the federal government that focus groups had shown a symbol signifying genetic modification might be confused as a chemical additive. How to label, without simply relabelling 25% of the entire grocery store with inadequate information? Once again government and industry are united in objecting to labelling. The right- to- know position is left for citizens and NGO's. Concerns about allergic reactions, unknown toxins and unintended consequences over time are part of this issue.

The cross-examination of the Consumer Health and Safety segment contained twenty-five citizen questions to experts. Almost one-third of these were about labelling policies. This issue and the use of antibiotic marker genes which may increase resistance to antibiotics were the strong focus of a demand for redress. In the report recommendations, it was stated, *"alternatives to antibiotic resistant marker genes must be used"* and *"that labelling issues must be resolved by the Biotechnology Advisory Committee.* However, a definitive labelling suggestion or recommendation was not reached in the consensus.

4. FRAMING DISCOURSES

The conference text is also a local expression of the more widely circulating biotechnology discourses. A cultural performance provides the opportunity to consider how these competing interpretations construct varying accounts of social and techno-scientific reality. We can identify distinct reproductions of government, industry, environmental, consumer and public

interest discourses in the narratives during the conference. These five discourses can also be categorized according to Hall's communicative codes.

Government Discourse

While the approach to biotechnology is certainly not uniform or homogenous across ministries and departments charged with regulating and legislating the technology, it is officially acknowledged as a strategic technology, framed in terms of global economic value. The conference heard from Health Canada and Canadian Food Inspection Agency directors who are most closely involved in the regulation and safety of new biotechnology food products.

The government discourse, communicating the dominant hegemonic code, relies on scientific risk assessment which purports to be able to measure and quantify the risks associated with genetically modified products. Within the risks-benefits framing, the government professes to access good, sound science in order to deliver safely the economic and consumer benefits of technology to the Canadian public. A key principle of the federal framework is that existing legislation and institutions are adequate to regulate biotechnology products. Departments regulating products from traditional methods and techniques, are now required to regulate the newer biotechnology products. [2]

This concept was extended in the presentations by government experts at the conference in their assertion that all food products, conventional or otherwise, carry risks, and that the federal government is able to identify health and environmental risks within the existing regulatory framework. The notion of 'substantial equivalence', the cornerstone of regulation, simply purports that if a food or product is similar enough to a conventional counterpart in composition, it is safe. The end product, not the process of changing genetic structure, is the focus of regulatory scrutiny.

With respect to communication and public participation, government professes a renewed commitment to involve citizenry and social ethical concerns, but without specifying how that will occur. However, what if public input exercises counter industry demands? This expected pledge to the public is

what makes the government discourse so conflicted, since it is more closely articulated to the demands and interests of industry. As one government expert admitted in the evaluation interview after the conference, "policy people try to chart a course in the middle between the two extremes of industry and environmental NGO's, but nobody articulates it.....the citizen panel came up in the middle and government people cheered them on".

Industry Discourse

The most widely communicated and debated claim made by the biotechnology corporations is that biotechnology is a moral imperative and the only way the problems of food supply in the developing world will be addressed. A widely circulating claim now in popular media, it is fascinating that industry developed a discourse based on moral and ethical grounds to legitimate and naturalize biotechnology.

The industry spokesperson at the citizen conference presented a far more complex justification for the technology. And since the expert on developing world issues cancelled, the claim was not addressed directly. Instead, industry focussed on consumer arguments, arguing that products not useful or not wanted will "die a natural consumer death". Acknowledging that benefits thus far have been primarily aimed at the producer, the promise was made that consumers will shortly see benefits in the form of safe, cheaper products. When circumambulating the developing world, industry was careful to point out that new crop strains from biotechnology are not simply transferred to Asia without consideration of climactic and geographic details of the local area.

The notion of precision in the practice of the technology and the deployment of the technology was strongly voiced and appears to be one way industry articulates itself to science in the broader discourse. Industry and industry scientists both rely on the notion of biotechnology being a more precise means of introducing changes into the agricultural system. These changes are reputed to be the same as traditional plant breeding techniques but which take many more generations to achieve. The notion of technical precision in conjunction

with nature and biological processes is common to both risk assessment dialogues and industry scientists. Because the technology is theoretically more precise, it is then also deemed to be more safe.

While the industry expert speaking at the conference was also a trained scientist, the industry expert who spoke to the citizen panel in February was strictly a business person. That industry presentation did rely on the argument that biotechnology is the only way to feed the world's population, the more popularized discourse. The significance of this difference is that during the conference the industry expert recognized she was addressing a highly informed public and the world hunger argument would not stand up. She also knew there were NGO's present who would immediately contest that claim.

Instead of relying on the solution to world hunger argument, industry articulated itself to environmental concerns in eco-capitalist fashion. The goal of sustainable development in agricultural biotechnology, the recurring use of the term 'stewardship' of resources, and the promise that biotechnology will reduce pesticide and herbicide use figured prominently in industry responses to citizen questions. In this narrative, supporting biotechnology industry practices, the public is contributing to environmental solutions.

So, while industry is leading the communication of the dominant hegemonic code, the rhetoric of this position has been forced to address environmental concerns which were formerly associated only with marginal positions. In this way, the local social drama of the citizen conference exposed the industry position adjusting its communication strategy in response to the expected demands of an oppositional environmental voice.

Consumer Discourse

The consumer discourse is centred around the idea that an individual has the right to choose whether or not to eat genetically altered foods and to trust that the food supply remains safe. It is an individualistic argument which has effectively mobilized opinion in Britain against GE foods. Health and safety fears and the right to know arguments may possibly bring some form of labelling to

Canada and result in a segregated food supply system. Organizations demanding this information, or redress if you will, are beginning to circulate petitions in Canada. The topic of labelling and consumer rights certainly drew applause and interest during the conference and was written into the citizen panel recommendations under both topics of Consumer Health and Legislation. Since the argument supporting labelling does not necessarily discount biotechnology in general, it is akin to a local exception and therefore a form of negotiated code.

Public Interest Discourse

The public interest discourse is, ironically, the one least heard in the public domain. The purpose of a citizen conference is to give voice and consideration to these less publicized arguments. The central idea to a discourse of public interest, with respect to biotechnology, is in regard to ownership and patenting issues. What was once assumed to be public knowledge and communal ownership in the domain of agriculture and a community's food supply is rapidly becoming the object of private enterprise, as biotechnology companies are awarded broader and broader patents on gene sequences and future generations of patented seed varieties. Proprietary rights now, in some instances, extend to the future generations of a soy crop, for instance (Shulman, 1999) The notion of the seed as intellectual property is the crux of this critical discourse and was spoken to by an NGO from Rural Advancement Foundation International at the conference. However, patent law is so complex and so specialized that experts hesitate to speak to the issue. In Canada, the discourses of government, industry, and consumer concerns overshadow this more conceptual and oppositional critique of biotechnology.

However, it is curious that even this presenter (Rural Advancement Foundation International (RAFI)), was found 'guilty of contempt' by some of the citizens. RAFI is an international public interest organization which acts on behalf of peasant farmers and is currently opposing Monsanto's terminator technology. Edward Hammond, the last presenter of the conference on March 5, in his

opening remarks, congratulated the citizens on their questioning and added that "he wished the regulators were asking these same questions". Some citizens interpreted this as a backhanded political compliment which was more about using them to poke at the federal regulators who were sitting on the panel. In this way, without knowing it, his message impact was diminished, which is unfortunate given that this organization is renowned for its international efforts on behalf of citizenry. This scenario underlines the problematic communication between critical NGO's, governments and citizenry. Because the interaction was interpreted as non-genuine, as political strategy in the eyes of the citizens, the critical position associated with this organization was jeopardized.

In addition to the trust issues in communicating that this event raises, public interest discourses must face the culture of individualism in Canada, where possible allergic reactions to GE soy are of greater concern than the loss of public ownership of many plant species. Conversely, it is more manageable for individuals to demand food safety, than articulate redress of an issue resulting from systemic structures and networks.

Environmental Discourse

This discourse is critical of biotechnology due to the expectation of unintended consequences, as a result of introducing genetically altered crops into the natural environment. The terms 'genetic pollution' and 'gene flow' have evolved as a result of this position. The environmental discourse employs an oppositional code by recruiting scientists who have produced research documenting hazardous phenomena such as horizontal gene flow between GE plants and other organisms in the natural environment. This has resulted in negotiated positions whereby GE users are requested to create buffer zones around their crops to prevent gene transfer. Environmental positions typically call for the precautionary approach to regulation, protection of biodiversity, long term impact studies, and refute the claim that the technology will reduce pesticide use.

In Canada, there is no clear united environmental position. Fragmentation is

more the norm and we experienced this in attempting to find experts who were willing to represent this position. There was the sense from the environmental community that the citizen conference process was not to be trusted as legitimate and may serve to negatively frame the critical and environmental position publicly.

What is also interesting about the environmental discourse is that it is not attached to a critical farmer's discourse at present. The gap between the environmental movement and the farmers' rights position is typical of the gap that exists between labour unions, social democratic capitalism, and the idealism of the environmental movement, in general. The protection of the environment and a wilderness ethos (an oppositional position) is usually at odds with the goals of union workers and resource based jobs (a negotiated position).

5. MISSING VOICES AND THEMES

There were two major absences in the conference worth noting. Both, the argument opposing biotechnology on religious or spiritual grounds and the arguments based on critical scientific data were lacking.

Missing Critical Science

Due to professional scarcity and lack of trust in the political process, the conference lacked a critical scientific voice. Not only was this voice sorely missed at the conference, the larger public discourse in Canada suffers in the absence of this information and perspective in the debate. A body of literature exists, such as that published by the Union of Concerned Scientists, which challenges the dominant view on biotechnology and provides alternative scientific studies to those used by regulatory and industry bodies. The principle difference between these differing bodies of science is over the notion of whether or not genetic engineering introduces entirely new risks, or is in fact simply an extension of conventional breeding techniques. This distinction is extremely important because it determines the logic of the resulting regulatory regime.

Even the three out of five NGO's who did attend to speak on various social

and ethical aspects of the technology were not able to stay for the entire program. By Saturday at 2:00PM, on the second day, there were only two remaining NGO representatives left sitting with a panel of experts from government, industry, and science promoting biotechnology. These three were forced to leave due to their hectic schedules.

Missing Religious Thought

The other missing position was a religious or spiritual argument about biotechnology. The objection that genetic engineering is tantamount to playing God and therefore morally wrong is an argument one does encounter and yet, we heard no discussion of this kind during the conference questioning. After the conference was over, one citizen did report in the evaluation feedback that she/he was of strong religious convictions. S/he had decided to remain quiet about that and had not shared it with the other panel members.

Religious objections point to the existence of natural biological categories in life and a discomfort with the way the technology manipulates natural species barriers without respect for the notion of a divine plan. Members of the Jewish and Hindu faith, as well as devout vegetarians may be found in this group. While an ethicist served on the expert panel, he did not receive questions or comments of this kind, either. It is difficult to know whether to interpret this as a sign that metaphysics were too conceptual for the level of debate at the conference or, that Canadians are truly secular and do not find this argument significant.

Both the religious and scientific criticisms of food biotechnology found missing are based on an analysis which looks at natural and changed categories of life organisms the technology introduces.

SUMMARY: Biotechnology as Social Drama

The farmers are divided. The scientists are divided. Even the government ministries are divided. Consider the minimal role the Ministry of Environment plays in the regulation of biotechnology, while Industry Canada promotes the technology for economic growth, but Health Canada officials banned bovine growth hormone (BGH), thereby casting a shadow of doubt on the industry. In

addition, consumer groups, environmentalists, and public interest positions appear unable to negotiate a satisfactory alternative to the feverish expansion of an industry panning for patentable genes. The irreconcilable world views of all these competing positions surely points to the stage of crisis over this technology. What is the nature of the crisis?

In a sense, the citizen panel members became the site of contestation and struggle in the crisis, as each expert participant attempted to win over the citizens by presenting a compelling and convincing story of biotechnology. However, because citizen conferences posit the citizen as jury, as leading the agenda, the expert is placed in a position where her communication may be framed, questioned, reinterpreted or re-encoded by the citizens. In a technologized, industrial society of experts and bureaucrats, Canadians are unaccustomed to this form of dialogue. The citizen as expert is a category for which we have no place.

An expert who framed her presentation entirely within a risk-benefits framework might be questioned in terms of a much broader cultural framework or asked to justify the position.

For example, during the cross-examination of presentations under Legislation and food biotechnology, a debate over scientific risk assessment versus the precautionary principle ensued. The former is associated with the North American system of regulating and approving genetically modified food and crops, which relies on a product by product assessment based on substantial equivalence.[3] The latter approach is associated with a European regulatory culture which acknowledges there are uncertainties which are impossible to quantify and therefore caution must be exercised in the face of these unknowns. In this regulatory model, the technological process of genetic engineering is emphasized over the specific product of the technology.

In the Legislation segment, a government spokesperson from the Department of Foreign Affairs and International Trade discussed international trade agreements emphasizing how the World Trade Organization (WTO) views

ethical and cultural arguments against a product as an economic trade barrier. This same policy officer stated that he does not understand why food biotechnology engenders such reaction as compared to information technology, for instance. The director of the Canada Grains Council, also promoting a free trade argument and endorsing the product by product regulatory regime to continue "making progress", stated emphatically that some discussions, such as patenting and social impacts, are simply not relevant to food biotechnology. "Aren't we setting the bar too high on this technology", he asked rhetorically. Audience and citizen were hearing a narrow definition of the technology in terms of economic impacts and strategic trade importance.

A political culture which insists on defining biotechnology in terms of economic trade and quantitative terms only was immediately challenged. Of the twenty two questions there was time for under Legislation, these are some the citizens cross examined with:

- what impact will international trade agreements have on Canada's decisions regarding patenting of living organisms?
- the precautionary principle has been described as vague and difficult to quantify. Why does this make it less appropriate?
- you stated that you believe we have a problem with regulation keeping up with the pace of new developments in biotechnology. Should we speed up regulation? Or should we slow down biotechnology?
- are we placing ourselves at risk in the long term by restricting our evaluation of risk to the scientific risk assessment approach instead of using the precautionary approach?
- should the evaluation of food biotechnology be based on risk assessment or on the precautionary principle?
- assuming scientific risk assessment is what you recommend, does this dilute our participation today?

Despite the narrow risk- benefits, risk assessment presentation the citizens heard from government and industry, the line of questioning reflects an effort to

reframe the discussion and challenge the cultural underpinning of scientific risk definitions of the technology. Experts were visibly uncomfortable, especially when audience laughter followed on the heels of the question of risk assessment diluting public participation.

One citizen redirected a response to the complaint of unfairly " raising the bar for biotechnology", by stating, *"I hope we've (the citizen panel) raised the bar for all technology"! (notes, March 6)*

The crisis exposed is threefold. Firstly, there is crisis over the safety and danger of the introduction of a technology which is capable of restructuring nature biologically, and society, socially and economically. Secondly, there is the frame dispute over the interpretation of that danger or risk: the scientific technical definition of risk assessment versus a broader frame which includes a social-ethical context. Thirdly, there exists crisis over the control and flow of information and communication between citizen and expert. Each crisis situation represents a boundary issue and a shift in a traditional category of experience, practice and materiality. The traditional categories of species of nature are shifted; the assumed privileged boundary of scientific autonomy is disturbed; the public-private lines of the ownership of knowledge are redrawn; and the model of communication, in particular the directionality of that communication is contested.

Actors in this social drama performed the state of crisis in a polite, serious and competent Canadian style. A shared experience of ritual redress, to be discussed in the last chapter, provided the citizens with a transition to social reintegration.

THE CULTURE OF BIOTECHNOLOGY

> "Many people these days fear a disruption of historical cultural variety brought about by world monoculture. Just as physical well-being depends on a varied gene pool, so social well-being depends on a varied "culture-pool".....Within the frame of postmodern information theory all knowledge is reducible/transformable into bits of information.....The underlying idea that information, not things, is the matrix of cultures and maybe of "nature" itself, is at the root of such recent exploration as recombinant DNA, gene splicing, and cloning. What these experiments 'create' is a liminal existence between nature and culture. The experiments suggest what the performing arts have long asserted, that 'nature' and 'culture' may be a false dichotomy, that actually these are not opposing realms but different treatments of identical information bits".
>
> Richard Schechner. Between Theatre and Anthropology.

We have left the theme of technology and culture to discuss in this chapter. I want also to look at the way scholars have conceptualized biotechnology in general, in particular the technology's relationship to Christianity, information technology, and the suggestions of a reconceptualization of nature. Returning to performance theory, we must finish the citizens' journey through social drama and discuss how the middle ground conference results map onto the phenomena of 'communitas' and the redressive stage of Turner's model. In addition, I want to talk about alternatives to biotechnology and resistant performance, international consensus conferences and the limitations of social drama as a communication model.

Technology and Culture

One of the final comments made at the conference, before the citizen panel retired to write their recommendations on Saturday, was a curious one. In response to a question from the audience regarding food and personal choice, the ethicist from industry made these comments;

"Ethics in policy is new....In the past nature took its course....Increasingly, we have more choices. We are now the masters of evolution, of ourselves and the animal world"...(conference notes, March 6).

Acknowledgement and debate about this capability of the technology was for the most part left untouched. I suppose participants felt the idea of altering evolution falls outside the jurisdiction of food biotechnology. I'm not sure, since

from my own perspective it is this boundary dissolving aspect of the technology which makes it so compelling. What does it mean to put human genes in animals? Or animal genes into plants? The day before, the same expert had alluded to the same notion and the concept was also left undisturbed. In the ethics cross examination, the complexities food biotechnology brings to the table were framed as the discomfort we experience with *any* new technology. Our ethics expert, once again legitimating the technology, this time in a medical context remarked,

> "Remember the first heart transplant, - do you remember that? We said, what are we doing! Is it right to be playing God? But over a few months worldwide consensus was gained. We are now in a similar state of gestalt, asking what is this? .... it is worthy of focused study, ...and I'm not saying consensus will be reached that quickly" .....(conference notes, March 5).

This speaker appeared to be respected greatly by many on the citizen panel and in the audience, so perhaps he was raising ideas most people are uncomfortable addressing publicly themselves, but yet do recognize as inherently significant. Neither religious, spiritual, nor metaphysical perspectives on the technology emerged in the key questions, in the citizen cross examination, or in the final report. And yet, each tiny precise probe into genetic structure is capable of effectively blurring a familiar life category. What are the relations between religious belief and biotechnology?

Genetic Engineering, Perfection, and Christianity

The Human Genome Project (HGP) has been cited as the largest engineering project since NASA's Apollo missions. This massive undertaking, the complete mapping of the human genome, has been referred to by geneticists as a contemporary search for the Holy Grail, and the language of DNA is often likened to a holy alphabet, the logos, the deciphering of the code which makes it possible to create and alter life (Noble, 1997). The Christian perseverance with perfection is mirrored in genetic engineering's desire not only to improve upon and dominate nature, but to co-create new living inventions as well. Noble cites Sheldon Krimsky, former National Institute of Health recombinant DNA advisory

member, in this respect;

"The perfection theme is very strong among Human Genome Project participants. They tend to view the human genome as being riddled with imperfection, with defects, and their aim is to perfect it" (Noble, 1997, p. 200).

However, the connections between genetic engineering and Christianity are not merely metaphorical. Francis Collins, the director of the HGP, is a leading member of the American Scientific Affiliation (ASA), an evangelical Christian organization of over 3,000 scientists. Donald Monroe, a geneticist and the director of ASA, describes HGP and science and technology in general as a "gift from God which extends mankind's domination over nature and better enables it to fulfill its stewardship function" (Noble, 1997, p. 195). Apparently, many scientists see themselves as stewards of creation, as carrying out their mandated role to extend the gift of technology, to co-create in the image of God. While genetic engineering and religion may not be the first pairing one considers in reflecting on new technologies, the notion of the Western molecular biologist as successor to the medieval alchemist reunites science, religion and technology. In fact, Noble argues that America's fascination with technology cannot be separated from its religious yearning for redemption. He asserts that the leading technologists in the space program, in artificial intelligence research and in extraterrestrial claims are themselves proclaimed believers in a transcendent religious world view which demands salvation.

While genetic engineering proponents profess that the technology will help alleviate suffering and contribute to the solution of material problems such as pests in crop production, (something we heard reiterated from several speakers at the conference) a great deal of the actual research leaks a more transcendent preoccupation with creating novel organisms, or what Francis Bacon predicted would be our rightful creation of chimeras. A look at just a few projects confirms this elusive obsession genetic engineering and the race for patents on new life forms exudes. The University of California has successfully created a true chimera, an animal with the head of a goat and the body of a

sheep, known as, ... a 'geep'. Human genes have been inserted into fertilized eggs of pigs and cows resulting in huge animals. Tobacco plants received genes from fireflies, imparting to the plants a glowing fluorescence effect. Growth genes from cattle have been transferred into fish, and of course the well known Onco mouse that Harvard patented, genetically designed to 'naturally' or, more accurately, inevitably develop cancer tumours.

We are about to see an entire collage of new life forms, all created by transnationals in the pursuit of profit, whose commercial applications of these products or proteins from new life will circulate around the free trade globe. I agree with Schechner's observation that transgenic life forms send us into a liminal place of experience. There is one added difference, however. Liminality, in its origins of 'rites of passage', implies a transitory state of being. In the world of genetic engineering and the experience of a transgenic creature, the sacrifice becomes one of permanence. Even Star Trek's transporter technology retains the molecular memory of the individual's structure, so their energy can be reassembled back to the original material form. With biotechnology, and applications such as germ line therapy, genetic alterations will be permanently passed on to subsequent generations.

The notion of Christian perfection and liberation from the constraints of nature is attained in genetic engineering's ability to reproduce, to create asexually, creating life by cloning from a single donor. This technology is reminiscent of the achievement of the homunculus, the quest of the medieval alchemists, and the ability for man to create man as God created Adam, except that now in this original Christian myth Mary is the first surrogate. These are the traces of belief from the Western tradition pervading the drive behind genetic engineering (Noble, 1997).

Thompson (1997), although a proponent of an ethical development of food biotechnology, feels that the strongest argument a group opposed to biotechnology can voice is of the religious vein. The idea of the 'sacredness of life' and the unknown consequences of interfering with thousands of years of

natural evolution, if popularized by churches and spiritual groups might effectively stop genetic research in its tracks.The Vatican's official position is pro-biotechnology, an unconditional support for a technology the Catholic Church also believes will feed the world. But, what about the abortion debate and birth control technology, which were both denounced on grounds of the sanctity of life? Not so in the case of biotechnology. The argument is shelved to make way for genetic engineering.

Noble insists America's obsession with technology needs to be considered alongside the revivalist and puritanical roots of the culture. Extending ourselves through technology is part and parcel of Christianity's search for divinity, for perfection and disdain for the physical. "They are merged, and always have been, the technological enterprise being, at the same time, an essentially religious endeavour" (Noble, 1997; p. 5). The assumed opposition between science and religion may be seen as a short secular blip, however both camps continue to grow, despite the logic that the modernist transition to a scientific world view would have resulted in a cessation of spiritual or religious belief. Instead, both perspectives co-exist and in many instances borrow from each other to legitimate their own claims.

In 1991, geneticist French Anderson promoted his work in recombinant gene therapy with a paper entitled "Can We Alter Our Humanness by Genetic Engineering?" He concluded that genetic engineering and the changes to life it introduces cannot alter the spiritual aspect of humans, for what makes us human is not found in physical attributes. Since the soul is outside the body somewhere, genetic engineering poses no risk. "Anderson argued [that] however much we might manipulate the physical, material components of our living beings, therefore, our essence survives untouched" (Noble,1997; p.199). He used this same argument to oppose genetic enhancement, saying since the soul is already perfect then physical improvements are wrong.

Leaving this conundrum aside, we can agree that biotechnology raises ethical issues not clarified by demarcating religious from scientific perspectives.

The Alliance for Bio-Integrity, a group composed of nine life scientists and seventeen clergy from various denominations, filed a lawsuit against the American FDA in May, 1998 based on the claims that the bio-engineering of the food supply violates the First Amendment, in the right to exercise religious freedom. The religious perspective argued that by insisting gene-splicing is equivalent to traditional sexual reproduction in plants, it violates the presence of a divine plan in nature. The assumption that human interaction can improve the genetic structure of nature by disrupting natural species' barriers allows for objections to the technology based on moral grounds. Given that individuals with religious views may therefore wish to avoid genetically altered foods, an argument for labelling is introduced. Additionally, this lawsuit claimed section 403(1) and 403(a) of the Food, Drug and Cosmetic Act which require added substances to food be labelled, is violated by current biotechnology policy. This law suit extended evidence that credible scientific positions recommending a regulatory policy which considers GE food to be a substantially different category, and not an extension of traditional breeding technologies, were overlooked due to the pressure on bureaucrats to propel the industry forward for economic gains. What is interesting about this law suit is that the scientists and clergy going forward with it argue that food biotechnology violates both religious belief *and* scientific knowledge. What is at root in both the religious and scientific dispute with biotechnology, is the concept of categories of life. Proponents of the current regulatory standards for biotechnology must adhere to the view that no category is being changed, no boundary being crossed. In this way ethical views are barred from the discussion. We saw this in the citizen conference with approaches endorsing free trade and existing regulatory checks and balances unwilling to accommodate ethical elements in the discussion. Similarly, Thompson (1997) writes:

> "Food Biotechnology is [such] a contested technology. This means that food biotechnology must meet ethical burdens of proof that many other technologies escape.....The fact that food biotechnology must bear this burden, while information technology and personal computers do not, is an

enigma that cannot adequately be explained....." (p. 14).

In some respects this is true. What public body has ever voiced resistance to information technology? As Bauer (1995) notes comparing resistance to the three major technologies of the post World War era (nuclear power, information technology, and biotechnology), the only resistance to information technology was among a few intellectuals and academics. So, biotechnology advocates bemoan being singled out and scrutinized differently than information technology. Current risk assessment practices and economic approaches to the technology resist social ethical discussion arguing that those concerns are voiced by the consumer at the point of sale. Why us they exclaim! Our Minister of Agriculture, Lyle Vanclief stated this clearly on CBC radio on May 9th, 1999 when asked how individuals might choose not to accept genetically modified food in a world trade environment pushing the technology. Not only did Vanclief dismiss the notion of public debate, emphasizing regulatory safety, he authoratively predicted WTO will force Europe to take our transgenic crops, no matter how much public resistance is demonstrated overseas.

If what publics are objecting to is corporate control and bureaucracy, not science and technology per say, then why not scrutinize information technology and one of the largest private empires in the world? And what of biotechnology, informatics and categories of life?

Computer culture and biotechnology

Biotechnology contains and is dependent on information technology. It is an extension of that technology. Only seven years separated the operation of the first ENIAC computer from the Watson and Crick discovery of the double helix (Rifkin, 1998). When I first began this project, one of the things I found interesting was how metaphors in our language that are used to explain recombinant research practices mirror the language of computer and engineering technology. For example, we talk about DNA as the 'code of life'. We 'cut and paste' genes from one organism into another. Biotechnology was

clearly legitimating itself on the back of information technology. However, this obvious parallel in language between the two technologies has an ideological history. Rifkin claims Watson and Crick, in the 70's, purposely chose the language of cybernetics to communicate genetic technology to the public.

Twenty-five years later, information technology is the material means by which the Human Genome project and countless other private and public research projects track, record, organize and decipher data on genomes. The digital and the biological are merged by necessity in order to document the more than 100,000 genes in the human body.

Rifkin's research claims the language of biology textbooks written in the 1980's was reflecting this co-mingling of cybernetics, information processing and life sciences. Students of that decade were at the forefront of thinking about cells in terms of programming, networks of exchange and feedback loops. In 1994, at the University of Southern California, a mathematician and computer science researcher named Adelman, demonstrated the degree of enmeshment between genetics and information technology, now dubbed genomics, in his difficult to fathom invention.

> "Realizing that DNA stores information in much the same way as computers, Adelman hit on the idea that you could use DNA to compute....DNA is essentially digital. This means it can count" (Rifkin, 1998, p. 196).

As a result, the first molecular computer was built in 1996. Constructed from DNA strands instead of silicon chips, the computing occurs at a much faster pace along DNA pathways.

A similar observation has been made by Bolter (1984) in his assertion that the computer, as the defining technology of our era, colours our worldview and typifies our relationship with nature. Pairing the potter's wheel with ancient Greece, the mechanical clock with medieval Europe, and the steam engine with the industrial age, we are left not with images of circles, cycles, seasons; nor with time, progress and linearity, but the speed and reproductive capacity of an electronic scripting loop. Has the progress metaphor finally exhausted itself to be

replaced by simulation? Haraway (1997) describes the aftermath of the joining together of biologics and informatics in this way. "At the origin of things, life is constituted and connected by recursive, repeating streams of information" (p. 134).

Various scholars (Bolter,1984; Haraway,1997; Rifkin,1998) have theorized our technological trajectory as moving towards a reconceptualization of nature, towards the construct of living organisms (eco-systems) as biological information processors, as living networks exchanging information. We delete genes, or add genes, supposedly only changing a few pieces of information to improve the utility of nature. We alter genetic structure in crops so that specific traits will only express in the presence of specific chemicals. We clone new animals which will produce proteins in their milk with pharmaceutical applications. In post-colonial society, the last frontier is the recombining of genetic species to make commercial products. The wild west, where a majority of biotechnology firms are located, is rounding up DNA from all over the planet. Today's gunslinger is a biotech CEO with a view of nature as an information resource, as asexual bits to be recombined endlessly in the hopes of stumbling over gold.

The old view of nature was based on Spencerian thought, survival of the fittest, evolution as an aggressive act. To what extent has a new cosmology taken root? Haraway (1997) claims that " Life, materialized as information and signified by the gene, displaces 'Nature', preeminently embodied in and signified by old-fashioned organisms" (p. 134). Are the current social-economic and political structures being called upon to legitimate this new construction of nature? Survival in the Darwinian industrial commerce era pitted company against company, but in the global economy networks of information hungry conglomerates anticipate more profitable relationships in an ever changing complex, commercial landscape. According to Rifkin, as well, cybernetic theory is becoming a naturalized construct for how we understand nature.

Over the last few decades cybernetics has moved beyond the earlier

reductionist representations of the gene and DNA as the master molecule of life. Now 'complexity theory' coming out of biology, mathematics, and physics acknowledges we are not simply the sum total of our DNA. Evolution is represented as the ability to process, respond to and modify more and more information. In extremely complex systems, chaos at one level of activity (molecules or cells) may end up as order at another level (behaviour). Rather than merely passively surviving, organisms are now seen as actively gaining increasing degrees of complexity, interacting with their environment, learning and adapting from that to self-organize activity and create new patterns (Rifkin, 1998).

" It is essential that the new cosmological narrative be closely examined. Our failure to do so might effectively shut the window to any possible future debate on the particulars of the Biotech Century.....once the revised ideas about evolution become gospel, debate becomes futile, as people will be convinced that genetic engineering technologies, practices, and products are simply an amplification of nature's own operating principles and therefore both justifiable and inevitable" (Rifkin, 1998; p. 207)

Are we creating ever increasing complex organisms as we genetically modify the food supply, or are we changing basic categories of life?

The Categories of Crisis

I showed in chapter four how the many fragmented positions at the citizen conference might point to a state of crisis over biotechnology. We can also look at the conference themes and discourses as a crisis over categories. When the conference is analyzed from the perspective of categories, three distinct categories of dispute were being contested there.

1. *Categories of Life*

Regulatory and industry positions use substantial equivalence and risk assessment to represent genetic engineering as a continuation of modern agricultural practices. Crossing natural species is interpreted to be no different than what we've been doing all along. In this worldview, the creation of transgenic plants and animals is not a new category of life. Environmental and

public interest groups are contesting this categorization. From their perspective, the creation of novel plants and animals is so revolutionary, that it is deserving of a precautionary approach and must be reflected in our regulatory practices.

2. *Categories of Ownership*

The reliance of biotechnology corporations on recovering the huge investments required in genetic engineering research ties the science and technology to the search for patent awards. The gradual awarding of patents on higher and higher life forms raises questions and disputes over the ownership of nature and knowledge. Referred to as the 'colonisation of nature', or 'the second coming of Columbus', or 'biopiracy' by the critical factions, (Shiva, 1997) this category of dispute pits the developing world against the first world, and public interest organizations against industry. Regulators are left in the impossible middle ground charged with both protecting the public and fostering the industry.

3. *Categories of Communication*

How are we going to talk about the issues genetic engineering and biotechnology bring to life? The public is distrustful of interactions with social institutions after decades of a one way transmission model of communication from experts. Moving towards a constructionist model of communication between citizenry and expert, we can ask, are institutions ready to show any degree of reflexivity in their mode of communication with the public?

The Citizen Panel and Categories

The Canadian conference shows citizens most concerned with contesting the categories of communication and participation. This is demonstrated by their strong attempts to become nominated to the new Canadian Biotechnology Advisory Committee in Ottawa. Based on the recommendations and cross examination the categories of ownership are next in importance. However, the categories of life and the view that genetic engineering changes these natural categories was not clearly an issue. In terms of crossing natural species barriers, the ability for Canadian regulators to address this blurring of lines was accepted. However, the issue of labelling introduces another perspective.

When a country adopts a labelling policy for genetically engineered foods, it is tantamount to stating that there is a degree of cultural agreement that this food does, in fact, represent a changed category. Canada, like the United States, has supported the Codex international position to not have GE foods approved by substantial equivalence require label information. The Canadian citizen panel made two recommendations advising the federal government to "resolve labelling issues" and "develop and implement an effective labelling policy". When labelling is interpreted from this perspective, the citizen panel did strongly contest the North American political rhetoric and practice around GE food, trade, and risk assessment practices. From a cultural perspective in Europe, where European Council Regulation 1139/98 requires corn and soy to be identified as containing modified material, this is not a particularly radical position. However, given that the North American perspective led by Washington and Ottawa is to oppose international mandatory labelling trends of GE products, the citizen stance represents an attempt to negotiate an exception to the dominant categorization of biotechnology.[4]

Perhaps Canadians are more comfortable with gene splicing than our European counterparts? The information technology revolution originated in the US, so perhaps a conceptual digitization of nature has occurred over the last couple of decades? Haraway (1997) terms Western ways of thinking "epistemological arteriosclerosis" or "hardening of the categories" which refuse to acknowledge the tropes and stories in our own systems of knowledge, resulting in the tendency towards "gene fetishism" in medicine, environmental gene prospecting, and transgenics (p. 139). Are we unable to see the shift in categories and relationships the technology produces, due to crystallized focus on the 'thing', the gene, which is mistakenly assumed to be the object of value? Citizens it seems, unlike molecular biologists and biotechnology CEO's, are at less risk of being seduced by the allure of the gene-as-a-thing. A citizens' perspective is capable of recognizing the technology as sets of relationships between different actors' networks, all promoting their own interests.

While fascinating work such as Haraway's analysis of the 'fetishization of the gene' is being written about the cultural meaning of biotechnology, we must return to our local performance of biotechnology and public interest. A cultural performance is not simply a text communicating pre-existing attitudes and beliefs in a different medium. The participating actors are constructing culture in the doing of the performance. In Turner's model of social drama, it is in the executing, or as Bell (1998) says, "orchestration" of the performance that a resolution of social conflict occurs. Social drama is not merely a dramatic re-enactment of the existing cultural text, but constitutes the action whereby culture may be changed. In this way, there is the possibility of subject agency, even though that subject is at the same time produced by that culture.

When the stage of redress is of the ritual and cultural form, rather than political or judicial, participants may undergo a rite of passage, and a psychological transformation(Turner, 1990).This experiential state also helps explain the middle ground outcome of the citizen conference.

Ritual Redress, Identity & Communitas

For a group of citizens to identify and come to terms with the issue of breach, the citizen conference model provides a process whereby new identities of empowerment need to be constructed in and by the group. This thought did not occur to me until reading Norman Denzin's ethnography of Alcoholics Anonymous groups and the 12 step program. Denzin demonstrates in his study how alcoholics, through the performance of narrative and story telling in the AA group, learn to create a new identity as a recovering sober alcoholic. Extending the analogy, when Canadian social identities are constituted in a milieu of expert technological opinion where citizens are generally construed to be irrational and fear ridden, certainly the consensus conference process also requires the reconstruction of new identities of empowerment, before the request for redress can be competently enacted. The way this happens is by performance within the group. Individual identities change and the group itself congeals. Each citizen during the second preparatory weekend was asked to take over an aspect of the

group facilitation process and contribute personally to the larger group. Denzin has shown that success in recovery programs is strongly correlated to the extent to which an individual risks this participatory task of narrative and personal story telling.

Although an unlikely analogy, (AA to CC), commitment to the group process involves the reconstruction of a personal identity which accepts that in the power and the will of the group lies the possibility of effecting real and lasting change.

Citizen panel members, like twelve step members, refer to their experience in a way which excludes all those outside the group. Our citizens began referring to the conference experience in terms of "the process they went through". In debriefing, or in discussions of further political involvement, they were careful to distinguish between their identity as a panel member and as an individual. But through all of it, there was a feeling that everyone, including the organizers, would always remain an outsider to the experience.[5]

The only portion of the citizen conference which is not enacted before the public is the stage of report writing. The task the group of citizens are faced with at this stage is the reaching of a group verdict on biotechnology. I want to suggest that this challenging and fatiguing experience, which continued all night and into the morning hours, constituted a rite of passage and the temporary constellation of an anti-structure state. A rite of passage marks the transition of an individual or group from one state or social status to another, often involving a symbolic birth, death or transformation. The phenomena of 'communitas' and 'liminality' occur during this passage. The state of liminality is the threshold, hybrid place between realities that subjects experience in transition from the ordinary, everyday secular role before the re-entering into the structure of one's culture. In this ambiguous, shifting place free of everyday norms, individuals also form 'communitas' with other liminal travellers in the ritual act. These are relationships which,

" nevertheless, do[es] not submerge one in the other but safeguards their

uniqueness in the very act of realizing their commoness. Communitas does not merge identities; it liberates them from conformity to general norms, though this is necessarily a transient condition if society is to continue to operate in an orderly fashion (Turner, 1974, p. 274).

This aspect of ritual redress is non-discursive and difficult for people to verbally describe, but it seems to occur as a result of the intense group work and "emotional bonding", as one male citizen self-consciously admitted. As well, the phenomena of 'communitas' was felt by the audience during the conference itself. Ignoring the neutral nature of the final report, people from the audience were heard to say, "but you had to be there to understand. It's an amazing process". This group sensation of intensely experiencing something outside ordinary reality, something 'betwixt and between', the 'liminoid' is captured in comments from one citizen evaluation:

"the people I met were extraordinary people in an ordinary world.....the citizens who dedicated their lives to understanding this field are equally intense characters and minds.....My faith in human nature is, in many ways, renewed, and in some ways shaken; regardless, my understanding of humanity is more widely based now. I understand hope better, and I understand fear better. I understand biology better, too."

The rite of passage experienced is a rite signifying the passage from an undifferentiated member of the uninformed to public to an individual and group capable of dialoguing competently with knowledge experts. Citizens emerged from the liminality of the Delta Bow Valley hotel suite and walked on stage as citizen-experts to read the seventeen recommendations resulting from the group deliberations. Others remarked on the experience in similar terms; "The opportunity to work with other panellists...on such a major issue...is no doubt a defining moment in all our lives...."

Negotiated Code

The media release we wrote to announce the outcome was titled, "Citizen Panel gives Food Biotechnology Passing Grade". The report and the position adopted by the citizen panel is a middle ground position, or in Hall's vocabulary, a negotiated code. It neither entirely endorses the dominant meanings about

biotechnology, nor strongly contests them. A negotiated interpretation requests change from the dominant position while not challenging the inherent power of that position. Recall that in the framing discourses laid out in the analysis, the only negotiated code represented was the Consumer position which is characterized by a demand for labelling of GE food. In this way, the citizen panel aligned itself most closely with this 'individual rights' discourse.

Stakeholders and audience from varying positions on biotechnology found merit in the report outcome and as a negotiated code it is most vulnerable to re-interpretation. Government and industry were left less anxious and defensive about opening the door to constructionist participation, but critical and environmental voices were not legitimated or strengthened by the negotiation.

There are at least two explanations for this less critical, negotiated citizen position. One is the experience of communitas we described. Does the phenomena of transformation into 'the group' trade off the more critical factions of individual judgement?

Whereas earlier analyses of ritual action interpreted the local act in the context of the larger cultural backdrop to extricate meaning, performance theorists are less likely to assume the local merely reflects the larger social cultural framework. Some analyses attempt to go beyond this framework, retaining a local ethnographic interpretation of regional political meaning in the performance or, even focussing specifically on how the particular actors under study construct or invoke the larger system of societal norms.

As this conference was a Western regional one, the political climate and relations between Western and central Canada cannot be overlooked in the outcome. The demand for more citizen participation and a willingness to negotiate the benefits of biotechnology for the agricultural community are more meaningful when seen in this local context of Canadian political relations. What I am wondering is if the reason for a less critical stance on biotechnology also resulted from Western citizens seizing an opportunity to demand more input into federal decision making? A more critical outcome may have closed the federal

door to further citizen involvement. Related to this explanation is the situation that two of the panel members were farmers. Hall describes a negotiated code as 'situated logic', because it decodes from a perspective which seeks to adapt to the dominant meaning structure yet confers meaning by reference to the local situation. By withholding opposition to the technology, the group was respecting the identities of those who produce food professionally and may choose to plant a GE seed crop.

In this scenario, a performance approach provides a plausible interpretation focussing on subject agency in the context of regional-federal Canadian relations. A ritual perspective which does not address this context is forced into the explanatory position that North Americans are simply more tolerant of new technologies.

Another way of interpreting the middle ground approach this local performance produced is that it illustrates one way citizens respond and cope with the impacts of reflexive modernity. Throughout the project the competing discourses were problematic for most of the citizens. There is a consistency in their initial approach to be 'balanced', in the report outcome, and in their final comments. This search for a fair and just position on biotechnology is exemplified by some of the written comments from citizens afterwards. Most of these focussed on the difficulty in getting the experts to "lay aside the rhetoric" or to "get the truth out of them". If the site of discourse struggle is the individual, these citizens fully realized the attempts experts made to reproduce, through their selves, specific discourses during the event. Ironically, however, a code of interpretation which stresses individual consumer rights can also accommodate many competing truths.

In the end, this discomfort and tension was alleviated in communitas and this experience made it possible for the range of individual positions to coalesce 'in the middle'.

Alternatives

Another silent area of the citizen conference was the absence of a

discussion of alternatives to agricultural biotechnology. To critically assess a technology, it seems appropriate we need to weigh alternatives, inquire into alternatives, or perhaps recommend alternatives. The citizen panel did not direct their questioning along these lines, and neither did the critical experts present arguments which included alternatives. Shiva, a vocal critic of the effects of biotechnology in the developing world, argues:

> "The dominant system also makes alternatives disappear by erasing and destroying the reality which they attempt to represent. .....Dominant scientific knowledge thus breeds a monoculture of the mind by making space for local alternatives disappear, very much like monocultures of introduced plant varieties leading to the displacement and destruction of local diversity. Dominant knowledge also destroys the very **conditions** for alternatives to exist, very much like the introduction of moncultures destroying the very conditions for diverse species to exist" (Shiva,1993; p.12).

The alternative of organic agriculture was briefly referred to in a citizen question and the farmer on the expert panel answered bluntly that organic is not sustainable, that it cannot provide economic sustainability for the farmer, nor provide an adequate food supply for the public. No other critics present, such as the farmers' union spokesperson or the environmentalist jumped in to pitch the organic industry. As a result, when industry tells us there is no other way to feed the world, and when evidence shows at any given time we have only the security of a 60 day food supply, we tend to look to safe regulation rather than alternatives. Do we have alternatives to biotechnology? Do we have alternatives to chemical mono-agriculture?

Adkin (1992) discusses the varieties of environmentalism in terms of creating a viable counter-hegemonic discourse. Her work is very relevant to agricultural biotechnology, as the resistant groups are comprised primarily of environmental organizations.

Environmentalism today is composed of many discourses, some which include motifs of productivity, others being counter hegemonic and "re-articulating elements of existing identities, values and conceptions of need"

(Adkin, 1992; p.136).

Adkin identifies four streams of environmental groups in Canada and argues for the emergence of a fifth, eco-socialism, which to be effective must address the development of alternative economic strategies by linking a radical critique of capitalism to the more fundamentalist environmental camps such as eco-feminism. The radical fundamentalist end of the environmental spectrum has failed to provide social economic solutions in the struggle to protect nature. Neither the Greens, Greenpeace, nor eco-feminism have developed an approach which goes beyond pessimism and the strategy of oppositional subject positions such as 'worker' versus 'nature'. However, they have sounded a critique of Western development and technocratic positivist science & technology agendas. While socialist groups have largely focussed on employment and worker agendas, ignoring environmental issues, the merging of these two factions might develop workable alternatives, thereby moving away from central fundamentalist arguments around nature, gender or class. Adkin admits the concept of eco-socialism has so far been confined to academic circles in Canada, and that it is not really possible to define or locate one such organization.

The reason I think her ideas are important to this discussion is that she states grassroots citizen groups always oppose technocratic management, attribute a high value to nature, and seek to affect the regulatory process in a social democratic manner. Discourses of professional environmental groups such as Pollution Probe or Canadian Environmental Law Association (CELA), inform citizen groups but are not of a participatory process. These groups lobby government, attempt to change policy and regulation, but are 'social-democratic' because, their approach is congruent with the belief that the government and regulators can balance the books in the interests of all stakeholders.

In many respects, our citizen panel reflects this belief, despite the obvious statement that they were an experiment in participatory decision making. In deferring to the next Biotechnology Advisory Committee, this observation bears

out. And yet Adkin also insists that these regulatory bodies simply articulate sustainability and environmental discourses to a capitalist agenda which assumes the exploitation of nature and expansion of consumption to be an unchanging necessity of a market led reality.

Yearly (1996) looks at how environmental organizations have been affected by reflexive modernity, by determining how they produce, use or critique science and by their relationship to the media. Environmental groups formed before and after the 1960's differ significantly in terms of these two factors.

Early conservation and preservation groups are characterized by a reliance on access to elite scientists and the use of that voice and professional research to argue a case. The Sierra Club and the Royal Society for the Preservation of Birds (RSPB) are examples of this form of environmentalism relying on the authority of science, and the assumption that western development can proceed with sound management based on 'good science'.

The rise of environmental groups from the 1960's onwards are characterized by the contesting of scientific authority itself, since in many instances it has been the products of science responsible for the destruction of nature and health risks associated with industrialization. (For example, the introduction of DDT elicited a Nobel prize). Usually these groups cannot afford to produce their own science and must rely on research produced by other parties. Their oppositional arguments are broader based than presentations of technical scientific data, incorporating emotion and a dramatic use of the media into the resistance. As Leiss (1999) admits;

"Industry and governments poured huge resources into scientific research and risk assessment, but throughout this long period - [1970's to 1990's] alas, it must be said - *no organization except Greenpeace took seriously the communications challenge*!" (p.10).

Increasingly, both types of environmental organization are forced to include some of each other's strategies; strong critical science based arguments attached to a dramatic communications strategy (Dale, 1996; Yearly, 1996). In other words, an effective oppositional communicative code must now combine

critical scientific content with dramatic competence.

Our citizen conference demonstrated this trend in the audience demand we experienced for more strong critical scientific positions (notes, March 6). Ironically, what our audience could not know is, in Canada, the critical factions prefer to avoid a performative public event such as this. The conference organizers experienced great difficulty securing the appearance of a radical oppositional scientist. Several reasons exist to explain this dilemma. One is that there are simply not that many professional scientists dedicated to taking a public critical stance on biotechnology. The ones that exist either do not trust public events where regulators will be present as they believe the event is a legitimation ritual, or are in too high a demand and too busy to schedule. A Canadian professor of agronomy and agriculture well known for her published critiques of biotechnology refused to participate and clearly had no faith the process might produce a resistant position. As a result, we were not able to present this type of position.

It is difficult to predict whether or not a more critical scientific voice might have changed the outcome of the citizens' recommendations. For the most part I suspect not, since the normative judgement about supporting 'balanced arguments' permeated the citizen dialogue from the first preparatory weekend in January. For an extremely critical position to be accepted by average citizenry, it must include a discussion of reasonable alternatives, or people decode it as opposition that is so far removed from their own identity it is dismissed as too marginal.

Carlson (1996) underlines this dilemma in feminist performance art, which we can extend to political performances of this kind. Political activists and citizen groups resisting hazardous applications of science and technology might gain fresh ideas from performance theorists who ask how is it that attempts to undermine the dominant culture often result in audiences re-appropriating or re-inscribing these representations into traditional meaning structures. Unless a "clear dialectic to the existing system" is presented, results will be no more than

reformist(Carlson, 1996; p. 178). Performance which relies on parody and exaggeration as the mode of effective contestation is less likely to undermine status quo attitudes.

There were no alternate possibilities to biotechnology provided at our conference for the citizen panel or audience members to identify with and seek political involvement in, aside from public involvement in regulating the technology. Bereano (1999) interprets the recent Danish citizen conference in a similar light as well, noting that the critical and environmental experts (which included Greenpeace) at their May 1999 conference on genetic engineering of food were not assertive enough and failed to curtail industry rhetoric to the degree expected.

Dale (1996) also, speaks of this needed shift from environmentalists for change to occur.

"But many environmentalists - some of them former Greenpeacers- now believe that a rearguard action is not enough: that our future depends upon the building of a new vision of an ecologically sane world, a vision based on the shared knowledge of people from across the globe and from differing intellectual traditions, and addressing fundamental structural questions such as the nature of our economic system and the need for democratic input into initiatives that have an impact on the environment. It is no longer enough to be against what is bad - the bigger challenge is to replace the evil with an image of good and a new sense of common cause." (p. 207).

Redress and Reintegration

In the end, this panel chose to defer to federal authority, with the hopes and trust that in return the federal government shall extend further invitations to authentically include the public in policy making; a public which this group performed as balanced and rational. In this way, the citizen conference established a conditional re-integration into the larger societal order. A new meaning about the idea of what it means to contribute and communicate citizen knowledge was constructed.

McLaren notes that for performance to be resistant, the contents of the performance must be encoded by the participants. Otherwise, participation in the

rite necessitates continued conformity. It is in this way that ritual is said to be a conservative force in society. The citizen demand for a labelling solution to identify genetically engineered foods is, in the language of social drama, a demand for redressive action. This demand, like the recommendation to broaden the literature upon which science risk assessment is based, demonstrates a modest re-encoding of the dominant biotechnology text.

International Citizen Conferences

How did other citizen panels this year deliberate on food biotechnology? Both Denmark and Australia held similar citizen conferences, also during March 1999 and published the citizen final reports and recommendations on-line. (See www.acs.ucalgary.ca/~pubconf/Citizen/international/).I will briefly outline some major similarities and differences, as these help put the Canadian experience in perspective. All three conferences followed the Danish model very closely and produced very similar sets of questions on the same key issues for their experts.

Degree of Technological Trust or Resistance to GE Food

Danish citizens were most critical, (or most cautious), whereas Canadians came out most tolerant of the technology. However, it can be argued that all three reports reflect a negotiated code and adopt a middle ground or 'balanced' position. The Australians stated, "No country should exclude exploring any and all opportunities that could offer benefits to its and the world's citizens...Research and field trials into GMO development should be allowed to continue provided adequate containment procedures are enforced". Danish citizens in a similar voice of optimism wrote, "...genetically modified foods offer no - or very few - direct advantages at present. However, the panel cannot dismiss the notion that, in the long term, advantages will emerge in step with continued development of the technology...in the eyes of the panel, the challenge is to create a fair balance between protectionism and development".

Scientific Risk Assessment

All three panels delivered clear directives that current risk assessment practices are too narrow in focus. In Denmark, "the panel recommends that

ethics is given the same weight as the technical aspects of an application for testing, production and marketing of genetically-modified organisms for food". In Australia, "We believe that decisions about gene technology in the food chain cannot and should not be made solely on the basis of scientific analysis". The Canadians recommended risk assessment be expanded to include multi-disciplinary research and that a code of ethics be established". Only the Danes suggested that both industry and regulators be requested to conduct risk evaluations before field trials are approved.

Labelling

All three countries addressed the labelling of GE food as a major concern, Canadians being least direct in the recommendations. Australians demanded an "all- encompassing GMO labelling system be established" and rejected outright the notion of substantial equivalence. They also requested a ban on all further importations of GE food stuffs which are unlabelled. Danes underlined the importance of choice for consumers in electing to eat non-GE foods. They recommended that government guarantee citizens in the future will have "real access to non-genetically-modified foods" and that, "thorough labelling of genetically-modified foods is necessary". Canadians more softly recommended that "labelling issues be resolved".

Monopolies and Ownership

Industry patenting and monopolies, of course, were of paramount concern for all three panels. Australians requested a pro-active role be taken to prevent multi-national food monopolies. Canadians made similar requests of our federal government. Only the Danish citizens suggested concrete ways to limit monopolies. They recommended that terminator technologies be banned, since they are associated with patents to multi-nationals; they suggested patent law be revised and limited to 5 year protection only and suggested 7 years study on field trials. Most publicly compassionate of all three countries, the Danes also requested that gene technologies and patents be made available without charge to developing countries.

Nature/Culture

One of the most interesting differences relating to my research focus is how the three panels reflected beliefs about nature. Denmark illustrated a marked cultural attitude to nature in the language of the opening paragraph of their report. "There is absolutely no doubt that the production of genetically-modified foods affects nature's cycle". At several points in their document the Danes refer to "nature's cycle". In Canada and Australia, the citizens usually referred to the "environment". In Denmark organic agriculture is quite established and the panel recommended that genetically engineered production and organic production be kept separate at the present time. There is a sense that the way people perceive nature is more traditional or preservation oriented. To this end, the Danes also requested the establishment of seed banks to ensure genetic diversity. On the other hand, out in 'the colonies' (Canada and Australia), we are so accustomed to space and wilderness, we tended not to use the word 'nature' in either document. Rather we show concern for 'environmental impacts or sustainability'. The Danes expressed a need to "take into account all of living nature and its integrity". In contrast to the wording in the other two reports, the European tone becomes almost poetic in its respect for nature. Nature versus Technology are separate and defined categories, whereas reading the Canadian and Australian reports, we plunge immediately into 'technology and society', the 'environment' remaining one of many subordinate considerations.

Gene Offices

Before hastily concluding that the Danes show less tendency to succumb to the allure of the gene as master molecule and master technology, they and the Australians both recommended the establishment of Offices of Gene Technology in their respective countries. Like the Canadian hopes for the new Biotechnology Advisory Committee to impartially address social ethical concerns in the public interest, all three panels come out with an optimistic verdict under conditions of ideal regulatory frameworks. The Danes however, come closest to discussing the notion of changing categories of nature.

In all three cases, the potential good the technology might bring society becomes the justification of its continued existence. However, unlike Canadians, both the Australians and the Danes discussed the need for alternatives to genetic technologies in their reports.

Final Comments: Social Drama Model

Six weeks after the conference, the citizens and planning team reconvened in Calgary for a debriefing session and social gathering over dinner. We were curious how the citizens might perceive their experience after some reflection. As well, the GE food controversy had begun to heat up in Europe and we all were getting news on the opposition overseas.

In general, there was a marked degree of comradery and friendship apparent among all the citizens. Three described the outcome of trips to Ottawa for Consumer Affairs and Agriculture Canada as citizen representation on committees since the conference had ended. Their nominations to the Canadian Biotechnology Advisory Committee were celebrated and hopes declared for citizen representation on that committee. One man mentioned the possibility of starting up a "citizen NGO" to continue their work. Another woman acknowledged that they had never really talked about a scenario wherein the technology is not considered a given. Neither comments garnered much support, but neither did they engender hostility. Citizens, from what I would consider different perspectives on genetic engineering, kibitzed and exchanged personal news. There was a satisfaction being enjoyed in terms of the work accomplished. The opposition in Europe was referred to as extreme and irrational by some. They reminisced over experts staging responses and the frustration felt in expecting experts to 'tell the truth' about things. The group remained united in their middle ground stance. If regrets were felt they were not shared with the group.

To what extent was this cultural performance the ritual re-enactment and re-construction of Canadian culture? I go back to the definitions of performance and think about individuals being constructed by and constructing culture. This

citizen conference and social drama must be understood in the context of a highly technologized Canadian culture. Perhaps more so than any other country in the world, as Canadians we love, use, depend on and continue to invent new technology. Per capita, we are the number one users of digital cell phones and bank machines, living in the largest land mass in the world - most of it wilderness. Our identities are bound up in technology and we look to wilderness as the mysterious Other. To ask a citizen panel to make recommendations from within this cultural bias is asking for a large measure of both reflexivity and transformation if we expect more than a negotiated code of meaning as an outcome.

However, the model of social drama and performance studies, in general, unlike other models, does allow for the possibility of change and transformation to occur. Resistant subject agency remains a potential course of action amidst the formidable power of dominant discourses and institutions. As Ashley (1990) asserts,

> "His [Turner's] key concepts of 'social drama'...'liminality'...and 'performative genres' provide a means - sometimes through broad constructions, sometimes through fine-grained analyses - to bring together socioeconomic and political structures with their individual actants" (p. xx).

The limitations of the framework are in a different area. Grimes (1990) claims the principle problem with Turner's model is that it is not systematic enough and tends to be employed in a cliched fashion exploiting terminology, rather than exhibiting a critical use of his theories. For example, although the concept of dramatism is central to the work, it is unclear how to actually employ the study of drama in a case and exactly what Turner means by it. Grimes asks, does the emphasis fall on characterization or dramatic roles, the presence of conflict, bodily action or some other principle of dramatic action? Certainly, I found this to be the case in adapting the citizen conference to social drama. Exactly which dramatic elements was I to pay attention to? How does one know how to weight the various possibilities? For the researcher, these things are not

specified and one must be inside the local example to make those decisions and distinctions. It is due to this difficulty that I found the use of themes, framing discourses and Hall's communicative codes helpful in analyzing the data within this model.

Another shortcoming of social drama and a performative approach in contemporary research is in understanding or accounting for the source of conflicts or competing beliefs in a cultural group. The use of social drama presupposes a thorough cultural understanding as a context to its use. While Turner's explanation posits 'breach' as the source of conflict, where does the role and influence of media and popular culture fit into this framework? Certainly, in the case of biotechnology, a study which is able to also account for media coverage and popular constructions of genetic engineering in film, literature, and advertising may provide a richer understanding of the topic in a critically constructionist vein.

In terms of a Canadian context, we are talking about the relations between nature, technology and culture. Ferkiss (1993) recounts the 'mastery of nature' lineage beginning with Aristotle, through St. Augustine, Thomas Aquinas, Francis Bacon and Descartes. All these Western thinkers proclaimed our rightful place in dominating and subordinating nature for human utility. Yet, quiet examples of other contrary views on nature have existed, such as the famous St. Francis of Assissi. Perhaps these underground threads still surface in contemporary environmental movements in North America.

Mary Shelley's famous novel is a critique of science, but can also be read as a critique of Kantian dualism. Dr. Frankenstein, the creator of the monster, represents the transcendent search for the sublime and as a result loses everything in his life. Steiner (1999) claims audiences have missed the main thesis of Shelly's imagination and have ironically been seduced by the sublime horror of the monster. Shelley humanized the monster, his loneliness and his desire for companionship, and she pits the allure of the sublime against everyday domestic affection, science against art, the aesthetic against the moral

and the polar ice caps against the gentle nature of the Rhine valley.

As Canadians, we believe we can have our technology and unite these polarized positions. We remain convinced that we can regulate the prevention of Dr. Frankenstein's monster. We presume the right to dominate nature for human uses. The citizens' tremendous effort to resolve amicably the dilemmas posed by genetic engineering with the hopes of making it a democratic tool for the benefit of society represents a continued belief in this Western tradition towards technology and nature. The citizen conference social drama produced an optimistic ruling on technology with citizens attempting to negotiate the dominant categorizations of biotechnology. At that point in time, the local drama both reproduced larger Canadian cultural beliefs and produced new possibilities about the public's role in regard to new technology. However, as we see the media now beginning to more actively influence and participate in the public discourse in Canada, the development of a more widespread crisis and large scale social drama may emerge. While I personally had held hopes for a more critical assessment of genetic engineering at the local event, the conference successfully co-created a moment of citizens taken seriously by experts and that is something new for our technologized culture.

Endnotes:

Chapter 1

1. Biotechnology has become synonymous with genetic engineering techniques, which makes it possible to insert genetic material across traditional species barriers, however, it has a long history prior to the 1970's in less contentious circumstances. Bud (1993) places its origins in the19th century factories of Copenhagen and Chicago, where the leading chemists of the day where employed in the industrial crafts of fermentation and distillation. Biotechnology's earliest practice in the production of micro-organisms for commercial purposes was then known as 'zymotechnology'. Throughout the 20th century it remained connected to chemical engineering and has been promoted as a wonder technology with various interpretations and linkages. During the 1930's in the US, it became a means to use excess agricultural crops in the production of new resources. The attempt to replace petroleum with 'agricrude', an alcohol made from fermented starch, was similarly reintroduced in the 1960's and 1970's under the name of gasohol and biogas. Brazil hoped to power all their cars with alcohol produced from sugar cane and China and India built methane digestors to produce gas from farmyard manure from the 1930's into the 1980's. A recent face of biotechnology appeared during the 1960's green revolution when it was promoted as a clean, efficient means of improving environmental and human health, although the effects of the green revolution have been hotly disputed (Shiva, 1997). Microbes that could eat oil spills or super nutritious single celled protein foods were also memorable applications. The anxiety and concern caused by genetic engineering possibilities in the 1970's onward, and the debate around eugenics, made it expedient for experts to attempt to link genetic research with the memory and language of a green 'sustainable' biotechnology.

2. The first produce item to make it to grocery shelves was the Flavr-Savr tomato approved for U.S. sale in 1994 and reaching Canadian stores in 1995. The Flavr-Savr's genetic structure was altered to delay ripening and prevent bruising of the fruit. Not a commercial success the industry likes to dwell on, the GE tomato has mysteriously disappeared from produce shelves and is now relegated to tins of paste. To date, there have been no applications of food biotechnology delivering the improved nutrition and taste the industry has promised, other than the aggressively marketed canola oil with altered fat content.

3. Terminator Technology was actually developed by the USDA, (in other words with public monies) in conjunction with Delta Pine and Land, the patent originally awarded to both of them. Monsanto later bought Delta for a cool $1 billion plus.

4. Genetically engineered potatoes have been altered to continuously produce and emit their own insecticide rendering the potato immune to the Colorado potato beetle. In fact, in the U.S. for purposes of federal regulation, these Bt potatoes are considered a pesticide, not a food. This allows the potato to be sold without labelling to indicate the presence of a food additive. The Bt protein expressed is classified as a pesticide, not a food additive,

even though the potato is clearly for sale in grocery stores as a food (Pollan, 1998).

Chapter 2

5. A fact sheet from Industry Canada in August 1998, states the guiding principles of the renewed CBS to centre on reflecting Canadian values, and engaging Canadians in an open, ongoing, transparent dialogue and promoting an innovative economy. Other goals are subsequently listed. However, when one reads down to a section referring to "concerted action", the strategy's goals are described as "implementing public confidence, communication and awareness" as the first action theme. I read this as the continued reliance on conventional risk management and risk communications principles with a rhetorical *promise* of dialogic or constructionist participation.

6. Theories of birth order originate in social psychology research, (as did cognitive theories of risk) and describe youngest born siblings as being immature adults due to a sense of being 'special' throughout childhood. Theirs is a position that will never be usurped. They are always the baby, - optimistic, underachievers who may appear to be rebellious, and yet generally follow rules set by leaders who are someone the youngest sibling wants to please. (Richardson, 1987).

7. The Slovic (1982) work is said to be instrumental in opening up the entire field of risk research, especially that of risk communications. Original membership in the Society for Risk Analysts was comprised mainly of engineers and biologists, with scarce representation from social scientists. By the late 1980's, social sciences and life sciences dominated the publication, and physical sciences slid into a minority status as far as publication stature goes. In a sense, Slovic is said to have made the field of risk perception a legitimate pursuit, even though Douglas and Wildavsky (1982) were publishing at this same time. Also, of note is the observation that most of the early risk research revolved around nuclear power disputes and public perceptions of risk. Some writers have found genetic engineering analogous to the nuclear power conflict, in terms of the capacity for large scale accidents to occur, the degree of uncertainty involved, and the continued predilection for risk analysts to attempt to frame the issue void of social-cultural context. While it is easy to accost Slovic in retrospect today, in comparison to his predecessor Stark, Slovic is subtle. Wynne (1992) traces the language of risk and benefits to a 1969 paper by Stark who decided to define acceptable levels of risk based on public behaviour. Formulation of "the laws of risk acceptability" which were basically mortality statistics, or number of deaths attributed to a risky activity, became the technical scientific framing of risk as a measurable thing engaged in universally, given the benefits are attractive enough. The phrase "acceptable level of risk" endures today.

8. This withdrawal of trust by the public which occurred with nuclear power disputes has been likened to biotechnology in the present. Now to avert withdrawal, we are seeing major efforts by many governments to solicit public participation. Australia, Switzerland, Korea, and Denmark have all planned citizen conferences on biotechnology during 1999.

9. Monsanto's desperate attempt to bribe Health Canada scientists with $2 million to push through a safety approval for recombinant bovine growth hormone in the milk supply, amidst opposition from diverse citizen and special interest environmental groups is an example of this scenario. The dispute occurred because a biotechnology derived drug which is legal in the US has not yet been approved for use by the dairy industry in Canada. Risk literature published by Monsanto and Health Canada simply state there is no technical scientific evidence the hormone is unsafe for humans. In January, 1999 Canada held hearings and decided on the weight of the evidence concerning animal welfare from veterinary scientists that we would not legalize the hormone for sale in this country. Monsanto is expected to take legal action on the grounds of free trade violations.

Chapter 3

10. For further information on the citizen lay panel selected or citizen conferences in general see the website Designer Genes at the Dinner Table on-line at http://www.acs.ucalgary.ca/~pubconf/.

Chapter 4

1. Terminator technology refers to the development of patented seeds which mature into sterility, thereby making it necessary for the farmer to repurchase new seed stock on an annual basis from the biotechnology (seed) firm. Critics argue that the trend towards corporate monopolies in conjunction with this technology will not only jeopardize ecological diversity, but cause financial hardship for peasant farmers in the developing world who rely on traditional seed collection methods.

2. While seven federal ministries are involved in the regulation of biotechnology, the 'lead' ministry is Industry Canada. The ministry of Environment plays an increasingly minor role in the safety and governance of 'novel' organisms. In this way, by looking at government actors, we can see the shift or reclassification of biotechnology away from whole organisms towards the notion new information pieces for economic gain.

3.Substantial equivalence is a regulatory concept which allows a novel food to be approved for introduction into the market if it can be shown that it is basically equivalent in composition and nutritional value to its conventional counterpart. The outcome of the specific product is assessed rather than the process of genetic modification used to produce the food. Substantial equivalence then implies that novel foods or foods derived through genetic modification are simply an extension of the existing agricultural model of food production.

Chapter 5

4. On June 11, 1999, the USA and Canada told a meeting of the WTO's Committee on Technical Barriers to Trade that five new GMO related measures have been adopted by countries in the first five months of 1999. The North American position argues that the adoption of labelling measures for GE foods are a potential barrier to trade and that there is no scientific rationale for treating these foods differently than conventional counterparts. Australia and New Zealand have recently proposed labelling requirements for GE foods. Brazil has preparatory discussions underway for labelling and India has requested all exported GE foods to developing countries be labelled. The EU, in 1998, required imports of GE soy and corn to carry labelling information, thereby upsetting the North American agricultural regime. In response to the June 11th complaints, the EU responded that there is a strong demand for information on GE food products and that they remain committed to labelling requirements. Source: International Trade Reporter/V.16:24

5. During working sessions and during the report writing the citizens resisted the presence of any outsiders, other than the immediate planning team. One session was observed by two members of the advisory committee to the project and in later evaluation comments, many regarded this as an intrusion into their process and recommended future projects prohibit observers. While that is understandable, it must be added that the entire project from the first meeting in January through to the end of the public conference was video-taped with full permission from everyone. In retrospect, not one citizen voiced any concern with the constant media intrusion.

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