Biotechnology Unglued

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Biotechnology Unglued:
Science, Society, and Social Cohesion

To Kathy and Kendra –
Birds of a feather flock together

Contents

Acknowledgments

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1
Introduction: The Impact of Innovations in Biotechnology on Social Cohesion

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Proponents of biotechnology claim that advances in this technology will create a better world: a world free of malnutrition and hunger, with less reliance on herbicides and pesticides, better medical diagnosis and treatment through gene discovery, and more efficient policing and prosecution with forensic techniques using DNA evidence. All of this promise sounds too good to be true. While some innovations in biotechnology provide significant benefits to particular users, the impacts of these technologies on society are often poorly understood. *Can biotechnology threaten the social fabric by weakening, even if temporarily, the social cohesion of society?* This book provides eight case studies on how particular applications in agricultural, medical, and forensic biotechnology affect the social cohesiveness of agricultural communities, citizens of the developed and developing world, consumer groups, scientific communities, and society in general. The glue that holds us together as a society is in danger of dissolving due, in part, to the way that some innovations in biotechnology are currently being developed, marketed, and used.

What Is Social Cohesion?

The literature on social cohesion is rich and varied yet poorly integrated. Social cohesion is a measure of how tightly coupled, robust, and unified a community is across a set of indicators. A community with a strong sense of identity and shared goals is considered to be more cohesive than one without these qualities. A cohesive community is also able to buffer more effectively changes resulting from realignments of international actors, national priorities, local political climates, economic upturns or downturns, and the introduction of new technologies. Recent developments in agricultural, medical, and forensic biotechnology give us a unique opportunity to chart how different communities and actors adjust to the introduction of new technologies and to extend our understanding of the relations between scientific innovations and the social environments into which they are introduced.

There is little agreement on how to define social cohesion. This is somewhat startling considering how widely used this concept is and how quickly some claim that social cohesion has declined in recent years. Moreover, such assertions suggest that social cohesion is a desired state instead of its more likely manifestation as a process that reflects the changing nature of social relations.

Jane Jenson (1998, 3) suggests that social cohesion became popular as a topic of discourse because it illuminates the interconnections between "economic restructuring, social change and political action." Furthermore, Jenson notes that, according to a range of governmental agencies and organizations such as the Organisation for Economic Co-operation and Development (OECD), a cohesive society is assumed to be socially and economically optimal and a decline in cohesion represents a threat to social order. However, it is worth noting that changes in social cohesion are considered to be much more than simply a threat to markets. Judith Maxwell (1996) considers the relationship between social cohesion and the social conditions that indicate when a society fails to function adequately. Maxwell defines social cohesion as the sharing of values that reduce "disparities in wealth and income" while giving people a sense of community (13). It is assumed from this definition that strongly cohesive societies are better able to face the challenges posed by social, economic, and technological change.

This definition demonstrates that social cohesion is a concept that embodies a range of social processes that help to solidify a community and give its members a sense of identity and belonging. Cohesive communities share common values that orient individuals to general needs of the collective but at the same time have the potential to ignore or actively reduce the quality of life for individuals who are in the minority.[1] In other words, by their very nature, cohesive communities are not necessarily more concerned about issues related to things such as equality of opportunity. In fact, some forms of social cohesion may help to reinforce practices that are inherently unjust. As such, the topic of social cohesion plays a significant role in disciplines such as sociology because it provides a lens for observing how social change impacts on community. Cope, Castles, and Kalantzis (1995, 39), following the work of Thomas Hobbes and other social contract theorists, pose the question "in view of the constant competition between human beings for scarce resources, what makes it possible for people to live together peacefully in a civil society?"

Jenson (1998) aids our understanding by providing a glimpse back in time of how the concept of and processes associated with social cohesion evolved theoretically. She points out that social cohesion is a long-standing concern of social scientists and others. In his highly influential book *The Division of Labor in Society* (1893), Émile Durkheim discusses how nineteenth-century Europe experienced decades of social unrest due to rapid changes

ushered in by technology, increasing urbanization, and changing gender roles. In his analysis of these changes, Durkheim uncovered the extent to which societies exhibited high degrees of interdependence to satisfy the ever-increasing needs of modernity, where the division of labour required efficient institutions of state and market and presumably some degree of social cohesion.

The extent to which interdependence was linked, both socially and economically, to efficiency is described in Max Weber's book *The Theory of Social and Economic Organization* (1947). Weber's analysis of bureaucracy as a pervasive feature in modern societies demonstrates how a systematic approach to organizing institutions such as government along formal channels of responsibility meets some of the needs of an interdependent and diverse society. When the role of bureaucrat is socially sanctioned , support for an elaborate hierarchical division of labour is assured. For Weber, the ideal bureaucrat was someone who could apply impersonally the rules of an organization in a professional manner. The bureaucrat owns neither the means of production nor the means of administration and is viewed as an agent or supporter of rational administration. In this sense, the bureaucrat maintains the efficient functioning of an administrative machine by oiling the mechanisms that support the division of labour made necessary by modernity. In a society where class struggle and the existence of inequalities are systemic, the functioning of bureaucracies, and the changes occurring institutionally as a result of capitalism's unfolding, bring the topic of social cohesion to the foreground.

Weber viewed bureaucracies as highly efficient ways of formally entrenching rational analysis in the goals that people and societies hold. Consequently, Weber viewed bureaucracy as inescapable. While he saw the process of bureaucratization as inevitable, at best he was ambivalent about this development. Nonetheless, many modern-day states formally and informally create bureaucratic procedures that are designed to weed out inefficient practices and to stimulate the development of innovations that improve profitability under the assumption that economically successful societies have happier, more cohesive, and more productive citizens. To wit, a society where the production of wealth is encouraged, and where some means for rationally allocating wealth exists, is more likely to place a premium on strong social cohesion, especially if such cohesion welds workers and management together in the name of efficiency, profitability, and global competitiveness.

Talcott Parsons did not share this optimism and faith in the value of socially diverse institutions and their positive impacts on social cohesion. In *The Structure of Social Action* (1937), Parsons discusses the limits faced by capitalist societies for creating the social conditions necessary for ensuring social stability. For Parsons, the nation-state is the best form of social organization for ensuring that social, political, and economic needs are met

under capitalism. Clearly, Parsons was aware of the threats posed by excessive liberalism and he treated society as a system that was unified by shared values. A society without stability is one where individual behaviour, especially in the marketplace, fails to provide the corrective forces necessary for social order. Parsonian functionalism emphasized the need to depathologize poorly functioning institutions, and markets, by striving for consensus rather than diversity of opinion. With many changes occurring in society during the 1930s and 1940s, a Parsonian approach to managing society, by controlling its systems and subsystems, garnered criticism. Rapid social change and an increased awareness of the collateral damage associated with rapid industrialization began to demonstrate that shared loyalties and values, within social systems characterized by interdependence, were not necessarily socially optimal.

This systems approach also emphasized the primacy of institutions over individuals. This emphasis became problematic when it was realized that even the most stable and historically cohesive societies continued to function without manufactured consensus. Jenson (1998, 10) observed that supporters of the Parsonian tradition reluctantly "came to realize that consensus was not necessarily a requisite of cohesion and that conflict could be healthy."

We can more completely understand why conflict emerges in societies that are, on most levels, considered cohesive by returning to Durkheim for assistance. Durkheim (1893) used the term "anomie" to describe a condition in society where people break the rules that are normally used to create predictable behaviour. Anomie is a breakdown of social norms and the conditions required for their enforcement and stability. For Durkheim, sudden changes in society generated anomie by challenging how people think and behave and by weakening social bonds. These changes are expected to weaken group-oriented goals and to coincide with periods of economic dislocation and higher rates of crime and deviance.

Durkheim proposed that societies evolved along a path moving from simple to more complex forms. He labelled the simple stage *mechanical* and the more complex stage *organic*. In the mechanical stage, a society contains people who share common roles and perform group-oriented tasks. Mechanical societies are relatively less formally organized and are flatter hierarchically. In contrast, an organic society is more complex and exhibits specialization in terms of social roles and division of labour. Organic societies are characterized as being more impersonal and less stable. Conditions that generate anomie are expected to have more impact on organic societies. Such societies are also characterized as having more need for rational administration through formal bureaucracies so that the complex relationships that exist in such societies can continue to function smoothly and efficiently.

Many developed countries may be defined as organic in both nature and functioning, and as such they place a strong emphasis on social cohesion as a cultural resource (Berger 1998). This status creates a range of stresses that sometimes pit social cohesion against the very nature of pluralism itself. A vision of what constitutes a cohesive society should not include a desire to return to supposedly homogeneous communities of the past. Organic societies must recognize differences and the benefits that can be derived from diversity. However, such a condition requires that public and private institutions respond to the challenges posed by dynamic actors and agents. It is important to note that social cohesion does not imply social, political, or even economic stability. In some hidden way, change seems to foster different kinds, or degrees, of cohesion. A "healthy community" is one that can grow from within by responding to change without becoming overly introspective or, worse yet, overly corrective. Here the role of institutions, and their legitimacy, becomes key.

A cohesive society is one that can sense itself and, more importantly, mobilize the necessary "social capital" to correct distortions.[2] It contains institutions that foster trust and commitment that work in the interest of the public good. Such a society utilizes social capital by actively building networks and forums that encourage public debate. Indeed, such societies welcome the opportunity to explore complex and perhaps even divisive issues such as those raised by the introduction of biotechnology. By taking advantage of social capital, a society becomes more responsive to the inequities generated by neoliberal economic policies that sometimes work in the direction of weakening or shifting the nature of social cohesion.[3] From a Durkheimian perspective, building social capital helps to reduce the degree of anomie that may follow rapid changes in society.

Some of the challenges that confront our society seem to be overwhelmingly large. Diane Bellemare and Lise Poulin-Simon (1994, 12) note that particular economic and social policy decisions made recently in Canada have potentially negative impacts, including increased rates of unemployment and growing disparities in income that "contribute to social division and the erosion of social cohesion." If we combine this observation with that made by Thomas Homer-Dixon (1994), we may see why some are quite concerned about the future. Homer-Dixon is well known for his work on the environmental basis of conflict. For him, scarcity of things such as food and drinking water can precipitate incidents of violence in poorer countries that "directly challenge the national security interests of developed countries, including Canada" (7). In this instance, social cohesion in developed countries can manifest itself in the form of trade agreements or military pacts that help to minimize such risks. Additionally, international agreements such as the Kyoto Agreement on the reduction of greenhouse gas

emissions and the Convention on Biological Diversity may become part of this global chess game. However, from an equity and humanitarian basis, such practices are questionable.

Paul Bernard (1999) addresses this issue indirectly by providing three broad sets of responses to the question posed by Cope, Castles, and Kalantzis (1995) on how people can continue to live together peacefully under conditions of scarcity and competition. First, Bernard suggests that a classical liberal approach to this question defers to the wisdom of the marketplace by assuming that individual preferences are expected to "produce a flexible and viable social order from the apparent disorder of individual freedoms" (4). Second, some may believe that placing a high degree of faith in the "invisible hand" of the marketplace fails to prevent what Bernard refers to as the "unchecked pursuit of individual advantages" (4). This concern is echoed by Gordon Betcherman and Graham Lowe (1997, 42), who state that "the current of economic life is now running against the collectivity of communities. We are at risk of becoming a society of consumers and customers, not citizens." Betcherman and Lowe observe that the creation of greater social inequities heightens the "individualization of risk," where individuals are expressing an interest in exerting their rights to disconnect from services provided to the collective in favour of self-directed services (e.g., two-tiered medicine).[4] To minimize this risk, it is necessary to strengthen institutions that reflect and support widely shared values and to give such values a moral underpinning. Third, others believe that it is necessary to root out the social bases of injustice by minimizing the inequities that exist in the social order by class, sex, ethnicity, race, sexual orientation, and so on. The presence of widely experienced forms of injustice may lead to social conflict and correspondingly affect social cohesion.

From this review, it should be evident that much of the theorizing on social cohesion has formally, or tacitly, an emphasis on the importance of ensuring that equity concerns are addressed. It is essential to reiterate that social cohesion can work to ensure that injustices are minimized, or, conversely, can support the conditions that allow injustices to remain entrenched or even to develop more markedly.[5] Many of the debates over innovations in biotechnology pick up on this thread.

Social Cohesion and Biotechnology

In the summer of 2001, I sent out a call for papers on the social impacts of biotechnology to several individuals, institutions, and e-mail-based listservs. The chapters in this book represent a wide range of perspectives on how advances in agricultural, medical, and forensic biotechnology may threaten the social cohesiveness of different kinds of communities and at different scales. Each chapter represents a case study on how the development, regulation, commercialization, or use of different innovations in biotechnology

affects the social cohesiveness of agricultural communities in the developed and developing world, consumer groups, scientific communities, and society in general.

In Chapter 2, I examine how the introduction of innovations in agricultural biotechnology (also known as ag-biotech) influences the social cohesion of food producers (farmers). Specifically, this chapter examines how the use of herbicide-tolerant (HT) canola and genetically modified corn (Bt) affects land tenure, management practices, and the social fabric of agriculture in western Canada. I address a number of questions. Does the use of HT crops provide an advantage to large-scale farmers relative to small-scale farmers? Does the use of this technology affect the cohesiveness of agricultural communities by creating a culture of surveillance (e.g., to ensure that Technology Use Agreements are followed)? Does the use of this technology deskill farmers? Can innovations in agricultural biotechnology stimulate conflicts between farmers? This chapter demonstrates how innovations in agricultural biotechnology may threaten social cohesion, and it suggests that weakly cohesive communities are more likely to suffer when economic fortunes decline and are much less capable of mobilizing the social capital needed to sustain themselves and to be innovative. As a result, weakly cohesive agricultural communities represent a decline in the quality of living in rural communities.

In Chapter 3, Jacqueline Broerse and Joske Bunders deconstruct the argument that biotechnology is needed to stave off global famine. Biotechnology is often presented as a potentially powerful factor in contributing to poverty alleviation, food security, and sustainable development in developing countries. When we look at the innovations currently being developed through biotechnology research and development (R&D), we can, however, conclude that these innovations are usually inappropriate for this purpose. Skepticism therefore prevails in the development community about the usefulness of biotechnology as an instrument for achieving these goals. In this chapter, Broerse and Bunders provide a broad overview of a range of recent developments in agricultural biotechnology primarily focusing on the developing world. They argue that, if biotechnology is to benefit the poor, a double shift in the research paradigm is needed. Biotechnology R&D should be specifically (1) focused on agro-ecological systems and products important to poor people and (2) contextualized within the broader socioeconomic and cultural situation of the poor while fostering a deeper understanding of sustainability issues. They conclude that implementing an interactive and participatory approach to the biotechnological innovation process – involving farmers, scientists, and other stakeholders as well as enhancing a broader process of training of human resources and institutional change – is the way to proceed in the field of biotechnology development for small-scale, resource-poor farmers. Unless such an approach is taken, the introduction

of new ag-biotech innovations is likely to threaten the stability and social cohesiveness of the developing world by jeopardizing food security and reducing the viability of small-scale farming.

In Chapter 4, Christopher Vanderpool, Toby Ten Eyck, and Craig Harris examine how the introduction of genetically modified foods into the US marketplace has created a crisis of legitimation that serves to weaken trust in regulatory agencies and the food industry. Although genetically modified foods are novel, at first glance they are not more novel than other agrifood technologies. Yet genetically modified organisms (GMOs) have become embroiled in highly rancorous conflict in many societies. Vanderpool and colleagues suggest that this situation has come about because (1) genetic engineering (GE) alters the nature of food in essential ways; (2) especially in the United States, GE foods were introduced in a context of growing concerns about food safety; and (3) agrifood factions interested in GMOs attempted to keep public awareness of GM foods and their various attributes as low as possible. These three factors have not only produced divisive conflicts over agrifood biotechnology itself but also caused a legitimation crisis wherein significant segments of society begin to withhold their allegiance to the state and become less accepting of government claims and regulations.

In Chapter 5, Margareta Wandel documents how consumers in Norway have responded to the introduction of genetically modified foods and how their perceptions of the risks posed by these foods have been addressed. Consumer studies show that Norwegians are concerned about the use of gene technology and that negative attitudes are particularly strong when this technology is used in food production. This chapter takes as a point of departure the statements and conclusions made in two lay panel conferences, carried out in Oslo, and builds on Ulrich Beck's (1992) work on the "risk society." In short, Wandel's analysis demonstrates the need to understand how consumer perceptions of food are linked to the trust that individuals have in institutions. In situations of low trust, concerns about food safety are likely to be amplified. One remedy explored by Wandel for building trust involves the mandatory labelling of food containing ingredients from genetically modified sources. Since trust is an essential component of a socially cohesive society, important lessons from the Norwegian consultation exercise become apparent.

In Chapter 6, Kyle Eischen explores the social questions raised by the Iceland Genetic Database. On one level, there are serious issues of privacy, competition, commercialization, and individual rights that challenge or extend existing local legal codes and social norms in fundamental ways. On a higher level, the developments in Iceland provide a way to outline how global economic, social, and technological trends shape and connect with local resources, needs, and policies. The development of the Icelandic data-

base depends on a unique set of circumstances that have given Iceland an extraordinary degree of cultural, biological, and social cohesion. In combination, they provide for a unique data set that is invaluable to new global industries such as medical biotechnology. Eischen suggests that information technologies, as both process and product, build on and embody this existing social knowledge and thus represent the construction of new social norms and institutions in unforeseen ways. As such, the construction of new local social structures is intimately tied to broader global trends. Simply, Iceland matters not only because of concerns over privacy or commercialization of individual genetic information on a regional level but also because the debate itself exists only when broader global trends impact in real ways on specific regions and populations. Iceland offers a detailed example of how social cohesion is realigned with powerful and sudden changes in technology outside the immediate control of individuals or existing institutions. How societies such as Iceland respond to these transformations, how they use existing social capital and resources within these new global relationships, is a central feature structuring future social cohesion.

In Chapter 7, Neil Gerlach focuses our attention on how biotechnology intervenes in bodily processes by facilitating new modes of surveillance. Canadians seem to be relatively unaware of DNA matching and banking within the criminal justice system. Since 1995, Canadian police have been empowered to obtain warrants to seize DNA samples from suspects of crime, and since 2000 a fully operational national DNA data bank has been in place to store DNA samples of convicted offenders. A number of interest groups have raised concerns about the potential of these technologies for intruding upon privacy rights of citizens as set out in the Canadian Charter of Rights and Freedoms. Nevertheless, DNA testing and banking remain uncontroversial in the public sphere. Gerlach describes the entry of DNA testing and the DNA bank into Canadian criminal justice and examines the enabling conditions that have allowed these modes of surveillance to enter Canadian society in a relatively unproblematic way. Specifically, fear of crime, increasing comfort with surveillance, redefinition of criminality as based in nature rather than nurture, and rationalization of criminal justice institutions using corporate models of efficiency have allowed for an easy normalization of DNA testing and banking. The result has been a growth in state powers of social control and less emphasis on human rights in the execution of criminal justice. In short, technologies of surveillance are more likely to be tolerated, or even embraced, when beliefs about the collapse of formerly socially cohesive societies are widely held.

In Chapter 8, drawing upon literature usually reserved for collections of art and natural science during the rise of the industrial North-West, Annette Burfoot and Jennifer Poudrier explore several aspects of biotechnology as

collection. The chapter begins by reviewing the history and critical views of collection. Collecting principles (social progress, appropriation, classification and display, and value) are applied to contemporary biotechnology collections in the second section of this chapter. The modern collections include those involved in plant bioengineering, plant and animal preservation, the Human Genome Project, pharmaceuticals, and medical biotechnology. Burfoot and Poudrier claim that the main principles of modern collection are the decontextualization and appropriation of genetic variation and the designation of value through patent protection. As such, corporate control of plant genetic resources and other kinds of DNA has profound effects on indigenous cultures and peoples of the developing world. Corporate practices such as the race to sequence and patent parts of the rice genome intensify a monocultural ideology in which local self-sufficiency and environmentally sound practices are eclipsed by the forces of a globalized food marketplace. In short, the practice of collecting DNA for corporate gain accelerates social change in many parts of the world by introducing new values such as efficiency, scientism, and Western conceptions of intellectual property that may affect the social cohesiveness of communities in the developing world.

In Chapter 9, Robert Dalpé, Louise Bouchard, and Daniel Ducharme examine the new research dynamic in biotechnology generated by industry's direct relations with university or public laboratory researchers. Their objective is to determine how researchers act and respond to their new environment and to understand the nature of constraints imposed. Dalpé and colleagues present results from a case study dealing with the discovery of two genes associated with breast and ovarian cancer, BRCA1 and BRCA2. Their analysis is based on in-depth interviews of seven researchers exemplifying the different profiles in research dynamics. They conclude that firms and public organizations engage in frequent conflicts concerning patenting of both genes and their subsequent industrial applications. Their data suggest that scientific collaboration is more difficult when intellectual property is an issue and that such conflict may weaken the social cohesiveness of scientific communities and create a sense of distrust.

The chapters in *Biotechnology Unglued* show how a range of applications derived from the science of biotechnology affects in manifold ways the social cohesiveness of different kinds of societies. These impacts may be regional and sectoral in nature, as in my chapter on the introduction of genetically modified canola and corn into agricultural communities in western Canada; national in scope, as in the chapters by Vanderpool and colleagues, Wandel, Eischen, and Gerlach; global in nature, as demonstrated by Broerse and Bunders and Burfoot and Poudrier; or specific to particular scientific communities, as illustrated by Dalpé and colleagues. Finally, each

chapter in this book strives to show the two faces of biotechnology by exposing the promises and perils associated with a range of innovations, and it demonstrates how particular kinds of technology-society and technology-corporate configurations affect social cohesion by creating cultures of surveillance, competition, social exclusion, and control. While advances in biotechnology continue to be made in laboratories around the world, a significant social experiment is occurring simultaneously. Will these new technologies unglue, or perhaps realign, the social fabric as we know it? Clearly, this book is only a starting point for investigating the impacts of technology on social cohesion.

Notes

1 The attacks on New York City and Washington, DC, on 11 September 2001 illustrate this point. The "War on Terrorism" has reinvigorated patriotism in the United States. The sale of American flags and the general support for military action against the Taliban government of Afghanistan represent a new kind of social cohesion aimed at weeding out an identifiable threat (terrorists in general, Osama Bin Laden in particular). An unfortunate side effect of this new cohesion is the discriminatory actions taken against many visible minority groups through measures such as racial profiling at airports and border checkpoints.

2 According to Robert Putnam (1993, 2000), social capital is defined as networks, norms, and trust that operate within social organizations to facilitate mutual benefit. Organizations that can leverage social capital are considered to be cooperative and collaborative in nature and structure and to formally and informally support exchanges of information and expertise.

3 Neoliberalism is a philosophy that assumes that the marketplace is the most efficient way of dealing with social problems. It values maximizing transactions on a global scale, formalizing exchanges, and creating an "audit society." Critics of neoliberalism claim that such policies increase the gap between rich and poor and benefit powerful financial institutions that enjoy support from organizations such as the International Monetary Fund (IMF) and the World Bank. Recent protests at various meetings of the World Trade Organization (e.g., Seattle and Quebec City) illustrate how social cohesion works on a different level. Protesters, and many of their supporters who did not physically take part in the actions, represent a relatively cohesive community who share common concerns and values about the changing nature of international trade. On some levels, the concerns of these protesters represent a direct critique of neoliberalism.

4 To a certain extent, this trend is already well established. Private insurance coverage and self-directed pension plans are common examples of how individuals build secondary sets of safety nets.

5 Even Second World War Nazi Germany was a relatively cohesive society. Cohesion is by no means a guarantee that systemic discrimination and state-sponsored genocide cannot happen. I attribute this observation to Professor Peter Li from the Department of Sociology, University of Saskatchewan.

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