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Ideas, thinkers, and social networks: The process of grievance construction in the anti-genetic engineering movement

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Abstract. Popular commentaries suggest that the movement against genetic engineering in agriculture (anti-GE movement) was born in Europe, rooted in European cultural approaches to food, and sparked by recent food-safety scares such as "mad cow" disease. Yet few realize that the anti-GE movement's origins date back thirty years, that opposition to agricultural biotechnology emerged with the technology itself, and that the movement originated in the United States rather than Europe. We argue here that neither the explosion of the GE food issue in the late 1990s nor the concomitant expansion of the movement can be understood without recognizing the importance of the intellectual work carried out by a "critical community" of activists during the two-decade-long period prior to the 1990s. We show how these early critics forged an oppositional ideology and concrete set of grievances upon which a movement could later be built. Our analysis advances social movement theory by establishing the importance of the intellectual work that activists engage in during the "proto-mobilizational" phase of collective action, and by identifying the cognitive and social processes by which activists develop a critical, analytical framework. Our elaboration of four specific dimensions of idea/ideology formation pushes the literature toward a more complete understanding of the role of ideas and idea-makers in social movements, and suggests a process of grievance construction that is more "organic" than strategic (*pace* the framing literature).

Substantial evidence shows that a new social movement against genetic engineering in agriculture has had a significant impact on public acceptance of genetically engineered (GE) foods, the regulation of these new production technologies, and the economic fortunes of the agricultural biotechnology industry (Barrett 2000; Kilman 2002; Schurman and Munro 2003). Anti-biotech activists have helped to turn many consumers away from GE foods and catalyzed important new regulatory restraints on the technology, including insect refuge requirements for genetically engineered crops, a multiyear moratorium on new GE crop approvals in Europe, and new labeling laws in many countries. In 1999, a coalition of US-based activists exposed the presence of an unapproved

genetically engineered corn (StarLink®) in the food supply, leading to millions of dollars' worth of product recalls, crop "buybacks," and enormous losses for U.S. companies and agricultural exporters (Alliance for Better Foods 2001; Harl et al. 2000). The biotechnology industry itself admits that these actions have hurt it economically: Largely as a result of the activists' multi-pronged attack, some of the world's largest agricultural biotechnology firms have narrowed their focus to a few select crops (Barrett 2000; Belsie 2000; Bernton 2000). Moreover, between 1999 and 2001, three of the world's largest life sciences companies put their agricultural divisions up for sale.

In light of these trends, it is clear that the anti-GE movement has become a major actor in shaping the contemporary agrofood system. Popular commentaries suggest that this movement was born in Europe, rooted in European cultural approaches to food, and sparked by recent food-safety scares such as BSE ("mad cow" disease) and dioxins. Few realize, however, that the origin of the anti-genetic engineering movement dates back thirty years, that organized opposition to agricultural biotechnology emerged in tandem with that technology, and that the movement developed first in the United States. Indeed, only a year after two California biologists developed the technique of recombinant DNA in 1973, scientists and citizens in several U.S. cities became concerned about the health and environmental risks and organized public debates around these issues (Committee for Responsible Genetics 1983; Krimsky 1982). Around the same time, two Washington-based activists, Jeremy Rifkin and Ted Howard, published a highly critical and widely read book on genetic engineering (Howard and Rifkin 1977). Between the mid-1970s and late 1980s, a small group of left-oriented activists, citizens, and academics were attracted to the issue, and a core of opposition was born.

The emergence of this core of opposition, as we show here, is of fundamental importance to the subsequent mobilization and impact of the anti-GE movement. It also raises several fascinating puzzles for social movement theory. The first, and perhaps most obvious question, is how these activists succeeded in making genetic engineering into a major social issue. Unlike nuclear energy technology or the production of toxic chemicals, for which the threats to the environment and public health are easy for people to perceive, the potential problems associated with genetic engineering are less immediately apparent. To date, agricultural genetic engineering has not produced a single environmental

disaster of the type or magnitude of Chernobyl, Three Mile Island, or Bhopal.[2] Moreover, in most people's eyes, GE soybeans are indistinguishable from non-GE soybeans: they are not a translucent shade of green, they do not taste noticeably different than their non-GE counterparts, and no one is known to have died from ingesting them. So how did these anti-GE activists get so many people to question the use of these technologies?

The answer to this question actually depends on the answers to two prior questions. The first is why these activists emerged as an oppositional group to this technology in the first place. In the 1970s, the science of gene transfer was in its infancy, industry was only starting to become involved with the technology and research was still being conducted largely by university scientists. Moreover, at least in theory, genetic engineering held out the promise of addressing some important health and disease problems, and of reducing the use of toxic chemicals in agricultural production. So why did this particular set of individuals focus on the perils of agricultural biotechnology rather than its promise?

The second prior question is why and how these activists were able to sustain their opposition across the two decades separating their emergence in the mid-1970s and the rapid growth of the anti-GE movement in the 1990s. Despite its early response to the development of genetic engineering, the fledgling anti-GE movement in the United States never turned into a mass movement. Rather, it remained small in size, limited in visibility, and chronically short of resources. While this small coterie of activists did manage to exert some pressure on the state and biotechnology industry through legal challenges and other means, they attracted only a tiny following, had no powerful political allies, and garnered little media attention. Nor did they enjoy any major, lasting political victories, a record of which they were well aware (author interviews). In short, for twenty years, anti-genetic engineering activism had none of the features that we might expect are necessary for movements to survive over long periods: a mass base of popular support, a strong supply of financial and organizational resources, important political allies, or significant victories. In fact, it was not until the last few years of the 1990s that a substantial movement emerged around GE food. If conditions were so negative for movement organizing, how did this core of opposition survive for so long?

In this article, we contend that neither the recent explosion of the GE food issue, nor the concomitant expansion of the anti-GE movement in the United States and abroad, can be properly understood without an analysis of the intellectual work undertaken by a small group of activists during the two-decade period prior to the 1990s mobilizations. Through their analysis of the developments occurring in the biological sciences, their critiques of the social relations surrounding the new biotechnologies, and their challenges to the emerging legal framework governing these technologies' ownership and use, these early critics forged an oppositional ideology and concrete set of grievances upon which a movement could later be built. In short, without the intellectual work conducted by this "critical community" of activists in the 1970s and 1980s (Rochon 1998), there would not have been an anti-GE movement in the 1990s.

By examining the intellectual work carried out by this core group of activists, this article brings two insights to bear on social movement theory. The first involves establishing the importance of the "proto-mobilizational" phase of a social movement. Much of the work on social movements begins at the point when sustained interaction with a group's target commences, i.e., when people take to the streets on a regular basis or engage in a long series of confrontational acts against authorities. For example, as Sidney Tarrow has argued, "it is only by sustaining collective action against antagonists that a contentious episode becomes a social movement" (1998: 6). But as our study of the anti-GE movement shows, failure to examine what happens *before* the interaction between a movement and its target(s) becomes sustained leaves a crucial phase of grievance formation and articulation beyond our purview. Indeed, for all social movements, but particularly for those that can be characterized as "quality-of-life"-type movements, grievances have to be not only identified, but analytically constructed and articulated before collective action is imaginable.[3] In the absence of the intellectual activity that happens in this crucial proto-mobilizational phase to formulate a specific set of grievances, many movements simply would never materialize.

Our second, related contribution is to push the social movements literature toward a broader conceptualization of the *cognitive* or *ideational* work in which activists engage in the process of grievance formation. Recently, there has been a resurgence of scholarship on the role of ideas, values, and beliefs in social movements. The most well known

of this scholarship is associated with the "framing" literature (Gamson, Fireman and Rytina 1982; Snow et al. 1986; Snow and Benford 1992), which has usefully highlighted the importance of ideas, cultural resonances, and interpretative processes in motivating people to join social movements, but has also tended to see activists' engagement with ideas mainly in a *strategic* or *instrumental* light (Oliver and Johnston 2000). In this article, we step back from a focus on how ideas *are used* by movements, or interpreted by movement participants and potential recruits, to show how activists develop and come to embrace the complex of analyses, ideas, and normative concerns – the *alternative worldviews* – that inspire their mobilizing efforts in the first place. More specifically, we build on Oliver and Johnston's call for greater attention to the "thinking work" that activists do (2000), Eyerman and Jamison's theory of social movements as "re-cognizing" elements of social reality (1991), and Thomas Rochon's ideas about "critical communities" (1998), to identify four cross-cutting processes by which activists develop the critical analytical perspectives that animate movements and generate the content of movement frames. Our elaboration of these four dimensions of idea/ideology formation pushes the literature toward a more complete understanding of the role of ideas and idea-makers in social movements, and suggests a process of grievance construction that is more "organic' than strategic, contrary to what the framing literature suggests.

Grievances, ideas, and ideology

A concern with underlying sources of discontent, or grievances, has long preoccupied social movements scholars, although the rise in the 1970s of the resource mobilization (RM) perspective, which focused primarily on the conditions that make collective action possible, pushed that concern temporarily into the background. Indeed, it was dissatisfaction with the RM perspective, along with the "cultural turn" in sociology, which led to a resurfacing of an interest in grievances in the 1980s. Key advances came from the framing perspective associated with David Snow and colleagues, who challenged the field to pay closer attention to the interpretation of grievances, values and beliefs in the study of social movement participation (Snow et al. 1986). This literature emphasized the agency of activists, who "not only act upon the world... by attempting to exact concessions from target groups or by disrupting daily routines, but... also frame the world in which

they are acting" (Snow et al. 1986: 467). Frame theorists stressed the importance of people's subjective perceptions and consciousness for inspiring action. As McAdam and Snow observed, "the meanings objects or events hold for people are not intrinsic – they do not, in other words, attach to them automatically – but are assigned or imputed through interpretative processes" (McAdam and Snow 1997: 233). In short, people define a given set of conditions as problematic through the act of interpretation (see also Melucci 1996).

Despite the important insight that there is no one-to-one mapping between objective conditions and social movement participation, the framing perspective is characterized by two important shortcomings when it comes to understanding the cognitive and social processes that play a role in grievance formation. First, as Oliver and Johnston (2000) point out, the scholars who have contributed to building this paradigm focus primarily on the instrumental aspects of framing, that is, on how social movements use frames as a "marketing device" to attract and mobilize a constituency (see also McAdam, McCarthy and Zald 1996). In this reading, ideas matter, but they matter insofar as they have the power to motivate people to take action and to join a movement. Although activists craft ideas and act on their values in the framing perspective, they do so not because they are engaged in an ongoing process of social/political analysis, but for instrumental reasons – to build a movement. A second lacuna of the framing perspective is that it takes little account of where a movement's ideas come from, and how its leaders actually generate and come to embrace the ideas that prompt them to take action. In effect, the framing literature takes as its point of departure a leadership that "has frames (and ideas, beliefs and values), and will travel." It thus ignores the profoundly important intellectual work that leaders and other members of a movement do, as they actively construct their critiques of society.[4]

"Thinking" in social movements

In a recent article in *Mobilization*, Pamela Oliver and Hank Johnston (2000) noted that the simple but typically neglected act of *thinking* is critical to the work activists do, when they generate theories of how the world works. "People think a lot in social movements," they note, "along with the related activities of reasoning, judging arguments, evaluating evidence, testing predictions, recognizing connections, and developing new knowledge" (Oliver and Johnston 2000: 44). This argument

suggests that thinking work is not merely an instrumental activity, through which movement intellectuals formulate and articulate the interests and needs of a movement, but indeed a *constitutive* activity of the movement. To fully appreciate its significance, Oliver and Johnston argue, it is necessary to go beyond the concept of frames and to revitalize the older, more politicized concept of ideology, which they define as "a system of meaning that couples assertions and theories about the nature of social life with values and norms relevant to promoting or resisting social change" (2000: 37, 43).[5] Yet the task remains to delineate more specifically the relationship between thinking as an activity, the formation of an ideology as a system of meaning, and production of a social movement. As such, it raises many related questions for the analysis of social movements: how does the thinking process work, and how is it related to the production of an alternative system of meaning, or ideology; and how does the social or technical knowledge produced by thinking work become *political* knowledge (or knowledge that motivates political action)?

The most provocative and useful answers to these questions to date have been advanced by Ron Eyerman and Andrew Jamison (1991), in their work on movements as "cognitive praxis," and by Thomas Rochon (1998), in his work on "critical communities" of movement thinkers. These authors recognize that movements tend to start with the intellectual work of concerned citizens thinking (and re-thinking) about social reality, and that this work defines the kind of movement that develops. Eyerman and Jamison are particularly interested in movements as producers of new forms of social knowledge. Drawing on Jurgen Habermas's theorizing on the "knowledge constituting interests" that drive human action, they maintain that all movements are driven by particular "knowledge interests" (cosmological, technological, and organizational), which infuse their reading of particular social situations. As interested individuals identify a social problem (as a public problem), they think about it, interact with each other individually and in groups, lock horns with their adversaries, and reflect upon the efforts of older and other social movements. In the course of these encounters, they "re-cognize" their social reality in terms of the specific knowledge interests that drive the movement. Eyerman and Jamison view this process of knowledge formation as the "cognitive praxis" of a movement that defines its core identity.

The notion of "re-cognition" is heuristically powerful, not least because it impels us to view social movements as "processes in formation."

In Eyerman and Jamison's stringently cognitive approach, however, analytical focus falls primarily on the *ideas* in knowledge production rather than on the ways in which social actors collectively *produce* those ideas, because the core identity of a movement is not determined by its members, organizations, or activities but rather by "the cognitive space that the movement creates, a space for new kinds of ideas and relationships to develop."[6] Consequently, their analysis pays inadequate attention to the specific ways in which movement thinkers' activities generate a collective social grievance amenable to political action. In short, a clearer analytical link between the thinking work of movement activists and the process of re-cognition is required.

Thomas Rochon's work on the role of intellectuals in social movements provides a useful starting point for analyzing that link. Rochon explores the process of re-cognition from a cultural perspective.[7] He argues that small groups of intellectuals, networked in what he calls "critical communities" of ideological production, play a central role in creating new theories and ideologies. According to Rochon, these are people "whose experiences, reading, and interaction with each other help them to develop a set of cultural values that is out of step with the larger society." (1998: 8). Critical communities serve to provide new value orientations to particular issues and they develop new discourses for apprehending them.[8] Rather than simply thinking new thoughts within existing frameworks of interpretation, however, their significance is that they fundamentally "alter the conceptual categories with which we give meaning to reality" (1998: 15). The critical communities of thinkers he describes represent a sort of countercultural current within society.

Rochon's "critical communities" constitute what we could call a movement *intelligentsia,* and his description of how such critical communities form, and what they do, is highly apt for describing the process of grievance formation in the proto-mobilizational phase of social movements:

> The creation of new ideas occurs initially within a relatively small community of critical thinkers who have developed a sensitivity to some problem, an analysis of the sources of the problem, and a prescription for what should be done about the problem. These critical thinkers do not necessarily belong to a formally constituted organization, but they are part of a self-aware, mutually interacting group. (1998: 22)

Rochon notes that different members of a critical community often have different "takes" on the scope of a problem and the emphasis that

should be given to its various causes, underscoring the multiplicity of voices that collectively construct an alternative perspective. He also emphasizes the fundamentally critical nature of their ideas. For example, in explaining what differentiates a critical community from an "epistemic community" – a concept developed by political scientists to denote a group of experts who have a shared worldview – Rochon writes: ". . . critical communities are *critical*. They develop alternative challenging ways of looking at an issue, and their perspectives are critical of the policy establishment rather than being oriented toward helping it to function better" (1998: 25). It is this that makes them into central agents of cultural change.

In building on Eyerman and Jamison's notion of "re-cognition" and Rochon's notion of critical communities, we wish to stress two specific points. First, we focus specifically on the role of activist thinkers in defining the relationship between grievance formation and movement formation. In particular, we analyze the thinking *work* of intellectuals in terms of its distinct components in order to show both how individual thinkers come by their ideas, and how they consolidate those ideas into a critical social analysis through an interactive and collective process. Thus, grievance formation occurs through a process of what we might call "thinking as social action." Moreover, as our empirical analysis indicates, there is a reflexive relationship between the process of idea generation and the thickening and expansion of social networks that provide the organizational core of a movement. In the case of the genetic engineering issue, the members of the *intelligentsia* that generated the grievances motivating the anti-GE movement were also among the movement's most involved and committed activists. Even as some of these activists personally began to work less directly on genetic engineering issues in subsequent years, they remained within these networks and brought younger colleagues and protégés into them. Our analysis of this process enables us to capture not only the relationship between grievance formation and movement formation, but also the dynamic character of movement thinkers' critical analysis as it responded to the changing socio-political environment.

Second, we wish to stress that critical communities are also *normative communities*, that is to say, the sociological and political-economic analyses that drive their cognitive praxis are imbued with a deep and multi-faceted moral outrage at the course society is taking. This moral dimension to the process of idea generation is important for

two reasons. First, it creates a powerful bond between activists even when their analytical frameworks vary. As such, it generates cohesion in what may be a diverse movement. In the case of the anti-GE movement, for instance, a strong moral integument unified activists even when the target of their outrage ranged from corporate greed, to technological overreach, to the ethics of "playing god" with nature. Second, this sense of outrage underpins a profound commitment to an issue. Thus, activists are concerned first and foremost with addressing an issue rather than building a movement.[9] In the case of the anti-GE movement, this created a powerful feeling among activists that one had to do something to alter the course of history around the new genetic engineering technologies, no matter what the odds were for change, or how long it was going to take to achieve it.

Ideas and intellectuals in the making of the anti-GE movement

To understand the construction of a grievance around genetic engineering, we need to begin in the 1950s and 1960s with the emergence of a plethora of social movements ranging from the civil rights, women's rights, and the anti-Vietnam war movements, to what scholars have called the "new social movements" that arose around peace, nuclear power, the environment, and sustainable agriculture. These movements stringently opposed many of the political, economic, and techno-scientific developments occurring in society, and created a climate that fostered a new kind of thinking about social inequality, power relations, world politics, and U.S. imperialism. As such, they formed a central part of the socio-historical context in which many early anti-GE activists came of age. In effect, they produced a generation of people who would look at contemporary social, political-economic, and technological developments much more critically than the generation before.

These new social movements' critique of modern society had two components that are crucial to understanding the roots of anti-GE activism. First, they were profoundly concerned with the social and environmental costs of post-industrial society. A critical issue was the increasingly obvious capacity of humans to destroy the earth and their own well-being with new technologies: the threat of obliteration posed by nuclear power, the scarcity of non-renewable natural resources, the large

industrial interventions in local and global ecosystems, the massive ecosystemic impacts of industrial agriculture. In the United States, the Vietnam War had an especially galvanizing effect, as the activist academic Sheldon Krimsky noted in an interview: "in the 60s, the Vietnam War had created more of an assemblage of groups from different disciplines, and in some cases, the young biologists who were draft age at that time became politicized, people like [Nobel Prize winner] David Baltimore, and they began thinking about the military uses of biological weapons . . ." (author interview). Second, the displacement of the costs of this economic development model to poor communities, both domestically and globally, motivated activists to work on issues related to human rights, environmental justice, appropriate technologies, and sustainable livelihoods/development.

It is striking how many of the first-generation activists and organizations in the anti-GE movement got their start working on these issues in the 1970s. Cary Fowler, an early critic of agricultural biotechnology, came to the genetic engineering issue from his work on the root causes of world hunger at the Institute for Food and Development Policy in the mid-1970s. Part of his research involved developing a critique of the Green Revolution and its impact on small-scale farmers in the global South.[10] Jack Doyle, author of one of the earliest critical books on biotechnology, worked first as an environmental advocate on transportation and energy issues, before following companies such as Royal Dutch Shell and others into the biotechnology sector.[11] Jonathan King and Philip Bereano, who began working on the genetic engineering issue in the late 1970s, were both involved in the anti-Vietnam war movement and the academic/activist organization, Science for the People. And Marty Teitel, who was instrumental in helping to fund anti-GE activism in the 1980s, ran war-zone feeding programs for the American Friends Service Committee in the 1970s before helping set up the CS Fund, a public interest foundation, in 1981. One of the issues the Fund took up was nuclear power.[12]

The anti-nuclear movement was particularly central to the milieu in which many anti-GE activists moved because it brought together a variety of sensibilities, ranging from peace and disarmament to toxic waste, under the umbrella of concerns about a potentially apocalyptic and unnecessary technology. The growth of the movement reflected a growing perception that the organization of modern industrial societies was imposing critical limits on the quality of life of ordinary people: What was the point of being materially secure (under the welfare state)

if you lived under a quotidian threat of being destroyed by nuclear fallout, toxic waste, and pollution? As a result, these activists became energized by a growing appreciation that, for all the liberating effects of modern society, life in the modern world was hedged with very potent risks and dangers. What is more, these risks and dangers were an outcome of the institutional organization of a technology- and private property-based economic growth model.

Early developments in the field of genetic engineering provided grist for these concerns and helped to shape the sensibilities of a nascent group of critics. One such development was the rapid commercialization of biotechnology following the gene-splicing breakthrough made by two California-based scientists in 1973. A second was a shift in the regulatory framework governing ownership of these interventions in nature. In 1980, the U.S. Supreme Court ruled, in the civil case of Diamond v. Chakrabarty, that genetically engineered microorganisms are legally patentable. As critics quickly realized, this meant that life itself could now be subject to exclusive monopoly patents, so long as the intervention met the standard criteria of patentability: novelty, utility, and non-obviousness. These trends caught the attention of citizens and activists who saw technology as inescapably bound up with social relations, and who were deeply concerned about what private enterprise and the state could do with the technology. Chief among them were concerns that genetic engineering would lead to the commodification of life, including human life; exacerbate social and economic inequalities; enable genetic discrimination at the workplace; and foster a biological arms race. The Chakrabarty decision was seen by these individuals as an "enclosure of the commons" and an extension of the capitalist commodification process into a qualitatively new realm.

For many philosophically-oriented critics, these developments brought into sharp focus not only the problem of human beings' relationships with other forms of nature, but also what it means to *be* human. In the words of Andy Kimbrell, one long-time anti-GE activist, "There was a change, a significant change. . . What you had was people who began to say, 'Well, wait a minute, we want to question the whole industrial paradigm"' (author interview).

Developing a critical analysis

It was in this context of widespread social activism and a "questioning of the whole industrial paradigm," that modern methods of genetic

engineering were born. In 1973, news of Stanley Cohen and Robert Boyer's success with gene splicing spread rapidly through the scientific community and then into the business world and popular press. Although reports of the first DNA transfer were generally met with great enthusiasm – particularly after initial concerns about the safety of these new technologies were discussed in a major scientific meeting and then dismissed[13] – there was a small group of socially conscious scientists and other academics, activists, and critically-minded citizens who viewed these developments with trepidation and concern.[14] The intellectual work these individuals carried out over the subsequent fifteen years would form the ideational basis for a new social movement.

At least four processes were important for the development of a critical analysis of genetic engineering. The first involved the plethora of analytical activities that Oliver and Johnston refer to as "thinking work" (2000). A second was the social nature of this "new knowledge" production process, that is, the intellectual give-and-take that took place among the early activists as they met and networked with one another not just on a social and organizational basis but on an intellectual one as well. Third was the dynamic character of this fledgling movement's ideology formation process, which flexibly incorporated changing circumstances, new ideas, and new information. And fourth was the mutual imbrication of these early activist-intellectuals' ideas, and the moral sensibilities and value commitments that drove their passion for the issue. Together these processes culminated in the development of a new analytical framework on the meaning and significance of modern methods of genetic modification.

"Thinking work"

The activists who laid the intellectual foundation for the anti-GE movement spent an enormous amount of time engaged in research and "thinking work": they gathered and organized copious amounts of information, they read voraciously about the science and business of genetic engineering, and they analyzed the material they amassed through their own set of critical lenses. In short, they did what scholarly researchers do: they took a set of analytical skills, theoretically informed ideas, and knowledge of a field and applied them to a problem and body of data. The primary difference was that while the vast quantity of research done in society – in academia, think tanks, and research establishments – tends, consciously or unconsciously, to reproduce hegemonic knowledges and power relations, the theories and

perspectives these movement intellectuals advanced stood the dominant interpretations on their head.

The analytic efforts of these individuals, as they sought to think through the meaning and societal implications of genetic engineering, is clearly evidenced in the publications they produced. Jack Doyle's popularly written book, *Altered Harvest: Agriculture, Genetics, and the Fate of the World's Food Supply* (1985), provides a detailed analysis of data he had collected on changes in intellectual property law, the confluence of the pharmaceutical, petrochemical, and agrochemical industries into a new "life sciences" industry, and the efforts these firms were making to buy up the seed industry. In contrast to those who saw fantastic economic and scientific potential in these trends, Doyle suggested that their impact would be greater corporate control of agriculture, a massive loss of biodiversity, and further impoverishment of third world farmers.[15] Peter Wheale and Ruth McNally, two British scholars who in 1988 published a book called *Genetic Engineering: Catastrophe or Utopia?*, engaged in the same kind of data gathering and analytic activity. In interviews, McNally and Wheale described how they spent a year in the United States, collecting information from a wide variety of sources, ranging from obscure technical and legal documents to data from Defense Department-related projects secured through the Freedom of Information Act, as they sought to make sense of the scientific, legal, regulatory and economic developments associated with the new technology.[16] As they went along, they honed their analyses publicly in papers presented to scientific conferences and academic seminars – not always friendly or receptive settings (author interviews).

As they analyzed the development of biotechnology, these early critics made connections between past and present, and present and future. For example, drawing on their analyses of previous technologies that had posed environmental and human health threats, such as agrochemicals and nuclear power, they generated a critique of the health and environmental risks associated with recombinant DNA (Howard and Rifkin 1977, see also the early issues of GeneWatch, published by the Council for Responsible Genetics).[17] Terri Goldberg, the first Executive Director of the Council for Responsible Genetics, an organization of critical scientists and others whose self-stated goal was to "discuss, evaluate, and educate the public about the social implications of biotechnology" (Committee for Responsible Genetics, 1983),[18] described this process of making connections as follows.

> This was way back in the 70s when recombinant DNA research was emerging and there was a lot of concern about. . . how this research was evolving, where it was going, what implications it would have, [whether we] were prepared to handle any of the unforeseen consequences of the research . . . And so there were all these questions and a lot of [the discussion] focused on the centers of the research, Boston, Cambridge, Berkeley . . . . [places] where there were clusters of scientists aggressively pursuing this. That's where the activism [came from] and from scientists. . . who began to say "wait a minute." [M]ost of the people I'm talking about had been schooled in the anti-war movement, had been opposed to the war . . . and saw this emerging technology as part of what was going on at that time. . . . There was a lot of activism about nuclear power, about chemical waste sites, and hazardous waste problems at Love Canal, those kinds of things. So there was this strong feeling like, "why didn't we question some of these developments when we would have had an influence, when we *could* have had an impact?". . . Maybe at the outset of the chemical revolution and the nuclear revolution, had we said "wait a minute, what are the health and safety issues here, what are the environmental implications of this?" . . . Had we done that early on, maybe we wouldn't be where we are now, trying to deal with Three-Mile Island and Love Canal and all these things (author interview, October 2004).

Similarly, critics of the Green Revolution made connections between that earlier agricultural technology and the "gene revolution," as they took their analysis of the root causes of hunger (power and structural inequalities) and applied it to genetic engineering, convinced that hunger and poverty were not going to be solved with a technological fix but would require real structural and political change (Fowler et al. 1988; Fowler and Mooney 1990; author interviews).

A sharp awareness of the larger context in which these technologies were evolving helped to shape these activist-intellectuals' concerns. An important aspect of this context was the deregulatory thrust of the Reagan and Thatcher administrations, expressed both in a new "neoliberal" ideology and in the concrete policy changes that were being made in a variety of arenas. Seeing these two governments on either side of the Atlantic strip away government constraints on private enterprise while extolling the virtues of "free market" capitalism led many to worry that no one was protecting the public interest in food safety and the environment while corporations were being set free to prowl. This profoundly alarmed those with a critical perspective and led them to think in terms of the worst case scenario.

Not all of the early critics' efforts at thinking work took the form of writings and publications. Some who took an early interest in the issue were lawyers who used their skills to develop the legal bases

for court cases, such as the one that Jeremy Rifkin launched against the first genetically engineered bacteria scheduled for field trials in California (the famous Ice Minus bacterium). Those with scientific backgrounds applied themselves to studying data on the safety of the new gene transfer methods and the products these techniques were producing. As they formed their analyses, these movement intellectuals advanced alternative perspectives on the significance and meanings of genetic engineering. In the process, they performed one of the most important roles that social movements play in society: they thought new thoughts, generated new ideas, and created new knowledge (Eyerman and Jamison 1991; Rochon 1998; Tesh 2000).

The social nature of the grievance formation process

The process of developing an analysis of GE technologies was a profoundly social one, taking place as activists shared information, discussed and debated issues, and read each other's – as well as previous social theorists' – work.[19] In theorizing about the process of knowledge production, Eyerman and Jameson correctly note that knowledge reflects "the product of a series of social encounters, within movements, between movements, and even more importantly perhaps, between movements and their established opponents" (1991: 57). This was indeed the case for the anti-GE movement, but it wasn't just a set of *social* encounters that was occurring, it was a series of *intellectual* encounters as well. People who were concerned about genetic engineering got together not just to meet, talk, and "network" with one another, but quite literally to *think together*, that is, to make arguments and hash their ideas out with others who shared the same basic perspective. In the course of these encounters, people exposed one another to new ideas, learned from each other, and broadened their understandings as different participants brought their own specific perspectives and concerns to the table. In the process, the members of this nascent "critical community" developed a more coherent, sophisticated, and multifaceted analysis, as well as a growing commitment to the issue.

The words of Stuart Newman, one of the earliest members of the Council for Responsible Genetics, are worth quoting at length here, in that they reveal the social process of analysis formation as it was experienced by one of its participants. Referring to the bi-annual meetings of the CRG, Newman noted that

> . . .to me this was one of the peak experiences, [these] twice yearly meetings with this group of people, where we developed this critique. We started

> almost from nothing and we took every issue. I mean, back then there were not even any prospects of genetic engineering of crops.. . . But we had anticipated it – and the genetic engineering of humans, well, actually, it hasn't happened yet – [but] I started talking about it, you know, 20 years ago.. . . So that became my primary issue within the group, and for a long time, I was kind of a lone voice, because I would always bring this up at the end of every meeting, "you know, we're not dealing with, you know, human genetic modification.". . .
>
> On the Friday before our board meetings . . . we would have [non-CRG] people from the Boston area . . . come to a series of working groups.. . . And so we would always have new people coming in. We had . . . a number of people that were involved in disability rights and we got a real education on the eugenics. . . of ordinary medical genetics. And that was really an eye opener.
>
> It was just an incredible, educational experience and we [all]. . . just fed off it, and it enhanced our ability to be educators and writers. . . . You know, each of us would be called to speak on this or that at various points. So there was a depth to our own analysis, people were working on issues that we weren't individually working on. We saw it as a whole, or at least we had the sense that we were seeing at as a whole, and not just little parts of it (phone interview, October 24, 2004).

Intellectual encounters of the sort that Newman describes also took place beyond the purview of any single organization. In the U.S., a particularly important social space where anti-GE activists generated ideas was the Biotechnology Working Group (BWG). The BWG was formed in the late 1980s when a dozen activists working on various aspects of food and agriculture, environmental issues, trade policy, and biotechnology got together for the first time**,** thanks to a grant from two small foundations. In the process of meeting together for several years, the group's members began to constitute themselves as a collective actor (Melucci 1996).

The BWG played a catalytic role in bringing these activists' diverse trajectories to converge, both intellectually and organizationally, on the issue of biotechnology. The BWG was an important place for gathering and exchanging information, and for forming a collective political analysis. When they got together, BWG members would discuss recent developments in the technology and industry, and brainstorm action strategies. In 1990, the BWG published a report entitled "Biotechnology's Bitter Harvest: Herbicide Tolerant Crops and the Threat to Sustainable Agriculture." This report reflected a synergy of ideas among people from diverse backgrounds and organizations.[20] This pattern of co-authorship became a common means by which the ideational work

of grievance formation took place in the proto-mobilizational phase of the anti-GE movement.

The face-to-face interactions among BWG members were crucial in forging the intimate personal relationships and strong sense of commitment, solidarity, and mutual support that helped to sustain this fledgling movement and made it hum with energy, tension, humor, and excitement. For BWG members, they were an important source of inspiration and morale-building. "I have really fond memories [of the BWG] because initially it was really a wonderful group," one member nostalgically recalled. "I mean, I've been to some [other] meetings, and people go, 'oh, this was like the BWG in the old days.'"[21]

Virtually from the beginning, ideas moved back and forth across the Atlantic as well as between the north and south, as critical observers and activists in North America, Europe, and a number of countries from the global South (e.g., Malaysia, the Philippines, India, etc.) sought contact with one another, met and talked, and read one another's work. Through such encounters, activists widened the scope of the movement's knowledge base and its intellectual community, facilitating the spread of ideas and the development of a more encompassing analytical framework.

There were various ways and sites in which such exchanges took place. One was in the context of discussion among members of transnational NGOs that were concerned with food, agriculture, and development issues, such as the International Coalition for Development Action (ICDA), the International Organization of Consumers Unions (IOCU), and the Pesticide Action Network. These were organizations with offices in multiple countries, and in which people would debate problems of agriculture and rural poverty with others from different parts of the world.[22] Another important site of intellectual exchange and framework building was international activist conferences and "teach-ins." In 1987, the core group from the Rural Advancement Fund International (RAFI) helped to organize a major workshop on the socioeconomic impact of the new biotechnologies on health and agriculture in the Third World, held in Bogève, France. The event attracted close to forty participants from twenty-two countries.[23] People from development, food and agriculture, and "appropriate technology" NGOs attended, with "each one bring[ing] a perspective on the issue that broadened the

understanding of the subject" (Fowler et al. 1988: 11). At the four-day workshop, participants presented papers, raised issues, and engaged in intense debate (op. cit.). The workshop culminated in the hammering out of a collective position on the concerns posed by the new biotechnologies, known as the "Bogève Declaration."

A third vehicle for transnational intellectual exchange was the movement of people – and their ideas – across continents, in some cases on a fairly prolonged basis. In 1986, for instance, a young Minister of the European Parliament for the German Greens named Benny Haerlin came to Washington DC, where he met a woman named Linda Bullard, who introduced him to her employer and co-worker, Jeremy Rifkin. At the time, Rifkin was one of the leading critics of genetic engineering, writing books on the topic, giving public talks, and trying to raise public awareness of the threats posed by the new technology. After this chance meeting, Haerlin returned to Brussels and began working on the biotechnology issue. A year or so later, he hired Bullard to come to Brussels to become a biotechnology advisor to the German Green Party. The exchange among Rifkin, Haerlin, Bullard, and other European critics of genetic engineering and life patenting continued for many years, and played an important role in helping to make biotechnology into one of the central political and legislative issues occupying the Greens.[24]

The dynamism of activists' ideas

The development of a critical framework on biotechnology took place over time and reflected both the activists' increased contact with one another, as already intimated, as well as concrete changes in the world they were studying. A critical analysis of biotechnology emerged synchronically with changes in the science of genetic engineering, in the legal and regulatory systems governing it, and in the industry. No sooner would a development occur than one or more members of this critical community would be thinking, talking, and writing about it. In the process, these actors created a broader – and more comprehensive – interpretative framework.

In the mid-1970s, when the techniques of rDNA were still in their infancy, the major issues concerning those observing the biosciences were the health and safety of lab workers, and the potential, albeit still only vaguely defined, environmental problems that could arise from the practice of "deliberate release."[25] In the early 1980s, however, changes

in the legal regime governing patents and intellectual property rights started to command more of these activist-intellectuals' attention as the Supreme Court made the famous Chakrabarty decision noted above, and the Board of Patent Appeals subsequently affirmed the patenting of plants and their constituent parts in a 1985 administrative decision known as *ex parte Hibberd* (Boyd 2003; Kloppenburg Jr. 1988).[26] The political economic significance of these legal changes – that private parties would now be able to patent life forms and farmers would lose the right to replant seed – subsequently became a cornerstone of the movement's analytical critique (Fowler et al. 1988; Kloppenburg Jr. 1988).[27] The movement's analysis expanded again in the 1990s – this time, to include more specific human health and environmental concerns – as additional scientific data became available.[28] Spearheading this shift was a small group of environmental scientists who had incorporated themselves into the movement, largely from existing environmental organizations.

It was not only the scope of the movement's analysis that changed as activists worked on the issue; so did their capacity to analyze relevant developments. People relied on a combination of formal training, personal interest, and experience in the sector to become experts on specific aspects of biotechnology. Such was the case with Michael Hansen from Consumer International, who developed a deep knowledge of the toxicological issues associated with GM food safety, and Becky Goldburg from Environmental Defense, who became a specialist on the ecological issues associated with GMOs. Andrew Kimbrell and Joe Mendelson of the Center for Food Safety in the United States, and Steve Emmott and Dan Leskien from Friends of the Earth-Europe, accumulated tremendous knowledge of the legal issues as a result of the string of lawsuits they brought against government regulatory agencies. These individuals' growing knowledge of the field and of particular issues increased their capacity to address new developments in the technology.

The sense of analytical depth and dynamism reflected in the ideational work of these activists is absent from the framing literature, which tends to take as given the frames constructed by activists and to focus primarily on their impact on movement participation. By concentrating mainly on the relationship between core activists and the movement's mass base, frame theorists fail to explore fully the dynamic interaction between core activists and the *issue.* Consequently, frame theory does

not reveal the processes by which the core ideas embodied in particular frames actually get generated. In the case of the anti-GE movement, activists' framing of the issue was driven not primarily by the politics of movement mobilization but by the dynamic processes through which their intellectual work kept pace with developments in the industry and the technology itself. A focus on this "thinking work" helps explain their persistent efforts to develop cogent and critical frames even in the absence of a mass movement.

Motivating cognition: Morality and value commitments

Activists' ideas and their normative sensibilities served to reinforce and reinvigorate each other in the process of grievance formation. A profound sense of moral outrage about the course society was taking and the manner in which technology decisions were being made motivated anti-GE activists to scrutinize the new world of genetic engineering. At the same time, these activists' analysis and interpretation of empirical trends served to fuel their moral outrage.

As suggested earlier, the roots of this group's outrage can broadly be traced in the ideological variants of 1960s counterculture and the critiques of capitalism mounted by the "new" social movements of the 1970s and 1980s. Many of those who looked on the new scientific-industrial developments with foreboding rejected the predominant values of late capitalist society, and embraced alternative value schemes and moral codes. These alternative schemes rejected mainstream society's utilitarian views of nature and consciously placed the well-being of society and the environment ahead of the profitability of corporations.

A major outrage for many derived from the widely shared perception that corporations had come to wield an unprecedented and dangerous degree of power in society, which they readily and quite typically abused. "[I]f people think it's about food, I don't think so," observed one of our interviewees, who worked on the issue for many years. "I think it's about the domination of the means of reproduction of genes and the means of development, proteins. This is about 'the corporations are done with zinc and trees' and now, instead of owning the field – instead of enclosing the field you just own [the] soybeans."[29] Another made explicit the connection between his concern about what these corporations were doing and his lifelong commitment to the issue. "Their answer – by 'them,' I mean, the technologists

and the corporations – they say, 'no, we're not going to change our technologies so they fit life, we're going to change life so it fits our technology.' That's why I became so involved in biotechnology. That larger image for the last 20 years has been so horrific to me, that larger proposal."

The introduction of these new technologies in the context of economic globalization was especially worrisome to many individuals and it drove their desire to document and publicize the new trends. "[Biotechnology] comes on the scene when corporations have too much power in the world," observed an activist in her mid-fifties. "Especially in the global environment, where there aren't in fact any governance structures, it's especially dangerous, because it's going to be driven with greed and opportunity."

Early activists were deeply distressed by the lack of democratic input into decisions about these literally life-altering technology choices. Indeed, what was identified by many as the biggest offense of the corporations arose from the activists' perception that corporations were unilaterally making decisions about technology choices that carried profound repercussions for the rest of society, indeed, for the whole world, without any public participation:

> [H]ere you're unleashing a science and a technology, that we have no idea [what it] means to the long-term evolution of the ecology. And it just dumbfounded me. I mean it really did stop me on a gut level and I said, "This is wrong. We need moral debate. We need public debate. We need scientific debate." We're completely eliminating a democratic process for discussing this technology.

Such sensibilities about the lack of democratic process and choice were connected to a deeply felt anger that the giant life sciences corporations had aggressively pushed for the "right" to patent life, and had actively been supported in their quest by the U.S. government and courts. The notion that life could or should be patented revolted many activists and confirmed in the clearest of terms their analysis of the seamy side of capitalism. "This is grandiose in my opinion, in terms of human history," noted one activist. "This is the taking of control of the means of reproduction and the means of development. This is bio-commerce. This is turning the living world into [a] product. Products, we become products! We become viewed as items of utility." In the eyes of many of these actors, the commodification of life was redolent of a profoundly alienated society, one in which human beings had reached a terrible and unacceptable state of spiritual emptiness and disconnectedness, from

each other as well as from non-human nature. For such individuals, the view that life was something that needed to be improved upon – that *could* be improved upon – reflected the moral impoverishment and excessive utilitarianism inherent in late industrial society. "I think this is the most powerful technology we are going to confront in this century, and it does, it will, ask us what it means to be human," claimed one activist. "[T]o look at every living thing and think of it as just a big Lego set – just a bunch of genes that you can put together in different ways so they can serve our purposes better – that's not the relationship I think we should have to nature." This array of related concerns created a powerful feeling that one *had* to do something to alter the course of history around these new genetic engineering technologies, regardless of what the odds were for change or how long the battle was likely to endure.

What is striking about these quotes is not only the depth of conviction they convey, but the extent to which they reveal an intimate relationship between these activists' normative views, their emotions, and their sociological and political-economic analysis of the institutions of advanced capitalism. Activists' moral convictions and value commitments provided a critical impetus for their intellectual work, helping to inspire and sustain their analytical efforts over several decades, even though many felt themselves to be working on a "lost cause" and in the midst of impermeable political-economic structures (author interviews). At the same time, activists' intellectual activities fueled their moral outrage, as their analyses revealed patterns, connections, and structures that were inimical to their senses of a good society. In revealing the close and mutually reinforcing nature of this relationship among ideas, values, and moral principles, our analysis pushes the social movements literature to recognize the role played by normative concerns in the "thinking" work of movement intellectuals (see also Smith 1996; Jasper 1997).

From ideas to action

While all social movements embrace some critique of the *status quo* (or else they would not be organizing to change it), not every critical analysis that gets articulated in society becomes the basis for a movement.[30] Much depends on the ability of activists to translate the ideas developed by the critical community into effective and sustained political engagement with their adversaries. As indicated in our introduction, anti-biotech activists were able to achieve this by the late 1990s on

both sides of the Atlantic, though only in Europe did the movement gain a broad popular base.[31] In this section, we show how the expansion and thickening of activist networks was driven by the thinking work of movement intellectuals. As more people were exposed to these activists' ideas, many became concerned enough to start working on the issue. This spurred a process of movement formation.

One of the key achievements of the early activists was to bring the GE issue within the purview of activist and public watchdog organizations working on a variety of related issues *and* to enable such organizations to coalesce around its potential impacts. Thus, for example, the prospect of "deliberate release" of the technology brought citizens concerned about the environmental and health hazards of these new organisms into discussions with citizens concerned about gene patenting, corporate concentration, loss of biodiversity, and the potential impacts on countries in the global South. The range of overlapping concerns and coalitional possibilities was well demonstrated by the first groups to get involved in the issue in Western Europe, which included the German Green Party, Greenpeace-Switzerland, the UK Green Alliance, the UK Genetics Forum, the International Coalition for Development Action (which later moved to Barcelona and was renamed Genetic Resources Action International, or GRAIN), and Compassion in World Farming. Activist-intellectuals played a critical role in the expansion of this network. For instance, as noted earlier, Linda Bullard, who had worked for Rifkin's Foundation for Economic Trends, moved to Europe to help Benedict Haerlin set up the GenEthics network, which played a key role in "spreading the word" about these new gene technologies. Similarly, Pat Mooney played an influential role in linking the development-oriented work of the International Coalition for Development Action to concerns about the release and patenting of GE seeds, through his establishment of the ICDA Seeds Campaign.

European activists were particularly successful in broadening the appeal of their arguments because they were able to place the politically powerful concepts of societal *risk* (cast in terms of health, environment, ethics, and culture) and consumer rights at the core of their analysis of the meanings of the new gene technologies (Byrne 2001; Tiberghien and Starrs 2004). Civil society associations that focused on risk – especially environmental organizations such as Greenpeace, Friends of the Earth, and the British Soil Association, as well as farmers' organizations such as the Confédération Paysanne in France – had already established a strong watchdog presence in European countries.

Some of these organizations were mass-membership organizations with traditions of direct action. Many of their leaders had skills and experience in local organizing, planning and carrying out direct actions, and working adroitly with the press. A central facet of the movement's success in Europe was that these organizations took up the issue as influential members read or heard about the analysis of the anti-biotech *intelligentsia* and were persuaded enough by their ideas to get involved (author interviews; Purdue 2000). As they did so, the movement both changed form and shifted into a new phase, expanding its popular base and its repertoire of contentious actions.

Although it is difficult to pinpoint this shift precisely, one landmark was the decision by Greenpeace International in 1996 to initiate a major new campaign on GMOs, spearheaded by fifteen full-time campaigners and coordinated by Benedict Haerlin. Organized around Monsanto's first introduction of GE seeds into European markets, the campaign kicked off with a blockade of the ports into which Monsanto was importing its seed, unlabeled and mixed in with non-GE soy seed (Charles 2001). Activists represented this as a secretive and devious effort to contaminate European seed stocks irrevocably and thereby to impose food technologies on consumers with effects that were both risky and ineradicable. In an atmosphere of increased public sensitivity to food issues, heightened apprehension, and suspicion of corporate motives, a number of European NGOs developed new campaigns around genetic engineering, and many began to work in coalitions (Levidow 1999; Purdue 2000).[32] At the same time, several private foundations started funding groups to work specifically on genetic engineering issues. For instance, the Goldsmith Trust, a large environmental foundation, started financing a campaign against GE foods in Britain, including providing financial support to the Genetics Forum, a coalition of 31 groups involved in anti-biotech work (Purdue 2000).

Buoyed by these developments and the energy that flowed into the movement as the press began to pick up their stories, a plethora of European NGOs and activist groups surged into action. They organized mass demonstrations, conducted supermarket campaigns, organized public debates, attacked the biotech industry, and engaged in civil disobedience by illegally pulling up field trials of GE crops. They also continued the style of "intellectual" politics that early activists had developed in the 1980s, which included questioning the quality of scientific analysis on which governments based their regulatory decisions,

critically reviewing the legal framework of property rights that governments were developing, and studying the changing structure of the industry. As this expanding body of people and organizations engaged with the issue in its various facets, they utilized and "framed" the ideas developed by the coterie of intellectuals described above, and transformed them into politically meaningful action (see, for instance, Levidow 2000).

In the United States, a similar thickening and expansion of activist networks occurred in the late 1980s and 1990s, as activists in distinct but related issue-areas began to see a need to address the potential power of this new technology. As indicated in Table 1, the number of groups with one or more persons working on biotechnology rose from three in the 1970s, to fourteen in the 1980s, to nearly thirty in the 1990s. The Biotechnology Working Group (BWG) rapidly doubled in size from a dozen or so people to twice that number. Several representatives from family-farm groups joined, as did one from the National Toxics Campaign, the Minnesota Food Association, and the United Methodist Church in Washington DC. But the individual who had the greatest impact on expanding the anti-GE movement in the United States (and to some extent, globally) was Jeremy Rifkin. Among those who worked at Rifkin's "shop" (the Foundation on Economic Trends) in the 1980s and early 1990s were Andy Kimbrell and Joe Mendelson, two lawyers who moved on to form and staff the International Center for Technology Assessment, and the Center for Food Safety; Linda Bullard, whose role in connecting the U.S. and European anti-GE movements was described earlier; Ronnie Cummins, who became head of the Organic Consumer's Association; Howard Lyman, who came from the National Farmer's Union and later founded the organization, Voice for a Viable Future; Nicanor Perlas, who later become head of the Center for Alternative Development Initiatives in the Philippines; and John Stauber, co-editor of the Madison, WI-based *PR Watch* and co-author of *Toxic Sludge Is Good for You* and a book on mad cow disease in the United States. Thus, from a loosely interlocking network of activists who had come together to work on an issue of shared personal concern, this emergent critical community began to build a firmer organizational base in public advocacy groups. It was from here that the movement began to launch many of its actions.

At the heart of the development of an organizational movement base was the interactive and collective thinking work of movement

Table 1. Growth of the U.S. anti-biotech movement, 1975–2002. Groups with One or More Staffpeople Working on Agricultural Biotechnology (approximate date organization started working on the issue)

1970s	1980s	1990s to present
Coalition for Responsible Genetic Research (offshoot from Science for the People), and the Coalition for the Reproductive Rights of Workers. These groups merged to form the Committee for Responsible Genetics, later renamed the Council for Responsible Genetics (CRG) (mid-1970s)	Council for Responsible Genetics (CRG)	FOET
	FOET	CRG
	RAFI	RAFI-USA[b]
	Environmental Policy Institute (1983)	RAFI/ETC Group
	Earth First! (Strawberry Liberation Front) (1986)	Union of Concerned Scientists (1992)[c]
	Concerned Citizens of Monterey (1986)	Center for Science in the Public Interest
	Concerned Citizens of Tulelake (1986)	Environmental Defense
	National Wildlife Federation (1988)	PANNA
Foundation on Economic Trends (FOET) (1977)	Consumers Union[a] (1989)	Edmonds Institute (circa 1993)
National Sharecroppers Union/Rural Advancement Fund Int'l (RAFI) (1978)	Environmental Defense (1988)	Pure Food Campaign[d] (circa 1996)
	National Farmers Union (1989)	International Center for Technology Assessment (ICTA) (1994)[e]
	Center For Rural Affairs (1989)	Institute for Agriculture and Trade Policy (IATP) (1994)

(*Continued on next page*)

Table 1. (*Continued)*

1970s	1980s	1990s to present
	Pesticide Action Network North America (PANNA) (1989)	Center for Ethics & Toxics (mid-1990s)
	National Toxics Campaign (1989)	National Family Farm Coalition
		Greenpeace Int'l (1996)
		Greenpeace USA (1996)[f]
		Institute for Food and Development Policy (circa 1996)
		Mothers for Natural Law (1996)
		Center for Food Safety (1997)[g]
		Institute for Social Ecology-Biotechnology Project (1997)
		US Public Interest Research Group (USPIRG) (circa 1997)
		Washington Biotech Action Council (circa 1999)
		The Campaign to Label GE Foods (1999)
		Greenpeace-USA (2000)
		Organic Consumers Association (1998)[h]
		Northeast, Bay, Northwest, Down South and Grain RAGE[i] (1998–2000)
		Gateway Green Alliance, St. Louis (later became the Biodevastation committees) (1998–2002)[j]
		Vermont Genetic Engineering Action Network (circa 1997)
		National Environmental Trust (1999)

(*Continued on next page*)

Table 1. (*Continued)*

1970s	1980s	1990s to present
		Friends of the Earth (1999)
		Clean Water Fund (Boston) (2000)
		Minn. Genetic Engineering Action Network (2000)
		Genetic Engineering Action Network (2000)
		Sierra Club (2000)

Sources: author interviews; the Internet; Krimsky (1988); Tokar (2001); and published materials from these organizations.

[a]Consumers Union is formerly named Consumers International, previously known as the International Organization of Consumers Unions, or IOCU.

[b]In 2001, Pat Mooney and Hope Shand of RAFI broke off from RAFI-USA and changed their group's name to the ETC Group, or the Action Group on Erosion, Technology and Control. RAFI-USA continues as a separate entity to work on biotechnology as one of its issue areas.

[c]The Union of Concerned Scientists began working on this issue when Margaret Mellon and Jane Rissler of the National Wildlife Federation moved to UCS in 1992.

[d]The Pure Food Campaign originated in Rifkin's FOET, and split off in the 1990s, where it has since been run by Ronnie Cummins.

[e]Started by Andy Kimbrell, from FOET.

[f]Greenpeace USA has worked on the biotechnology issue in fits and starts and its participation has been highly uneven.

[g]CFS was started by Andy Kimbrell and Joe Mendelson from ICTA.

[h]The OCA was started by Ronnie Cummins, formerly of the Pure Food Campaign (see above). The Pure Food Campaign is now part of OCA.

[i]RAGE stands for Resistance Against Genetic Engineering. All of these are local/regional groups.

[j]The GGA was the first group to organize a "biodevastation" conference, which has since become an annual, grassroots event. Biodevastation 2 was held in India, Biodevastation 3 in Boston, MA, Biodevastation 4 in San Diego, and Biodevastation 5 in Toronto.

intellectuals. For instance, Jack Doyle, the activist who discovered genetic engineering and plant patenting as a result of his work on the energy sector, learned about the oil companies' motivation for investing in the seed industry from Cary Fowler.[33] Jeremy Rifkin and members of the CRG organized protests at the NIH in the 1970s, and worked together on the human cloning issue together in the early 1980s.[34] Doyle's, Howard and Rifkin's, and Fowler and Mooney's books all

had a major influence on pulling other activists into the movement, and shaping their thinking, writing, and activism. One activist reported that it was his reading of Mooney's and Fowler's work while he was overseas that brought him back to the United States in 1984 to work on sustainable agriculture issues, while another (an anti-pesticides activist) noted that it was Doyle's powerful book that had sparked her concern about the new genetics. A third individual, who helped to channel foundation money into the movement, was strongly influenced by Rifkin's, Mooney's, and members of the CRGs' analyses (author interviews). In his view, Mooney was a "real visionary," and Rifkin, a "prophetic voice."

As this expanding network of activist intellectuals built on the ideas of such "visionaries" to develop their own specific but synergetic critiques of the technology, their activities had two effects that were crucial for movement building. First, they generated new publicly accessible knowledge about the technology, as it was being developed, that articulate spokespeople could frame to directly challenge the claims of industry and government. Second, they attracted a small but steady flow of financing from liberal private foundations, such as the Joyce Foundation, the Merck Foundation, and the CS Fund, which saw research-based advocacy organizations as playing an important watchdog role in a time of deregulation.

At the same time, the professional and analysis-oriented character of the movement shaped the way it developed as the frequency and intensity of contacts between activists and their adversaries increased.[35] For the first fifteen or so years, the movement's main direct actions against the industry and government consisted of lawsuits, such as the aforementioned lawsuit against the company trying to release its GE "ice minus" bacteria in California; efforts to try to keep bovine somatotropin (a growth hormone) out of the market; and a string of legal assaults and scientifically-based challenges that a small group of NGOs levied against U.S. government agencies and regulatory policies (see Center for Food Safety website; Schurman and Munro 2003). These strategies drew on the expertise of activist intellectuals and also aimed in part to bring into the public eye information and data that would bolster their analysis. As they did so, they also promoted coalitions between analysis-driven organizations such as Environmental Defense, advocacy organizations such as the Sierra Club, and direct-action organizations such as Friends of the Earth.[36]

In the latter part of the 1990s, the U.S. movement went through a significant growth spurt. One reason behind this was the demonstration effect of movement successes in Europe. Another reason was that the movement received a significant new financial boost in 1997 when members of the anti-GE *intelligentsia* persuaded the Environmental Grantmakers Association to make biotechnology a central issue, and the EGA directed a sizeable pot of money towards it.[37] In 1998, a coalition of seven U.S.-based organizations (the Turning Point Coalition) initiated a major ad campaign directed at convincing the public of the risks of biotechnology, an initiative that received an enormous fillup when a highly publicized experimental study by Cornell University entomologist John Losey in 1999 appeared to show that genetically engineered corn ('Bt corn') could be lethal to Monarch butterfly caterpillars. This study not only gave agricultural biotechnology a great deal of popular media coverage but also inspired one of the movement's most visible symbols – the butterfly wings worn by activists in mass demonstrations from Seattle to Sydney. U.S. activists also launched several new campaigns designed to pressure processors and supermarkets not to use or sell genetically engineered foods. In 2000, responding to the expanding range of groups, organizations, and campaigns becoming involved, members of the CRG and BWG orchestrated the formation of the Genetic Engineering Action Network to coordinate the flow of information, publicity, and actions, and to strengthen coalitions between national organizations and local actions.

In both Europe and the United States, then, the thinking work of early activists led to a progressive expansion and thickening of activist networks that brought the movement to a new phase – the campaign phase – in the mid-to-late 1990s. In both contexts, this process grew out of the interactions of activist-intellectuals, and was driven not only by mutual respect for the thinking work of core thinkers but also by increasingly collaborative intellectual labor. In both cases, this dynamic process also pushed the issue onto the agendas of advocacy and activist organizations, and resulted in additional funding that fed back into movement development by supporting more research, more conferences, and even direct actions. It was marked by its transnational character, as ideas and activists flowed back and forth across the Atlantic, and more generally, around the world. By the mid-1990s, when GE products began to come onto the market on a significant scale, a robust grievance frame was in place. It is in this way that one can trace the development of a critical community of thinkers into a collective political actor.

Conclusion

Over the last two decades, social movement scholars have returned to an age-old question: Why do people rebel? What explains people's willingness to fight for social change, even under the most inhospitable and seemingly unchangeable conditions? In this article, we have sought to deepen existing perspectives on the importance of "idea work" in social movements by specifying processes by which new analytical frameworks get constructed, and by highlighting the fundamentally constitutive role that idea work plays in movement formation. In other words, what people think in their heads, as well as hold in their hearts, really matters.

In advancing this argument, our work contributes to a growing body of social movement theory that addresses the role of ideas, moral values, and emotions in motivating and sustaining collective action (Aminzade and McAdam 2002; Eyerman and Jamison1991; Goodwin and Jasper 2004; Goodwin, Jasper and Polletta 2001; Gould 2002; Jasper 1997; Oliver and Johnston 2000; Rochon 1998). As we have argued here, many social movements do not arise because organizing conditions suddenly become more favorable or because new resources become available in a world characterized by widespread social dissatisfaction. They arise because small groups of activists work individually and collectively to create new frameworks of understanding that render particular aspects of the *status quo* problematic. These alternative frameworks bring together a theory of how the world works with an analysis of empirical evidence, and they "make sense," not only to those who create them, but to others around them. In the process of developing a perspective that defines particular political, economic, and/or social-natural relations as immoral, wrong-headed, or intolerable, these movement thinkers *create* a grievance.

Our empirical analysis of the ideational work done by activists in the anti-GE movement identified four cognitive and social processes by which a critical community of activists constructed their interpretative frameworks *in situ*. It also showed how crucial those alternative conceptual frameworks were for later generating a social movement. Much of this work occurred in the "proto-mobilization" phase of a movement's life cycle, and was necessary for the movement to form. These processes included the plethora of activities, from data collection to political analysis, that Oliver and Johnson refer to as "thinking work"; the heretofore unrecognized *intellectual* aspects of networking,

involving the frequent exchange of ideas, discussions, and debates that typically go on among people who share a certain level of trust; the ongoing, collective attempt to make sense of a constantly changing reality; and the mutually reinforcing relationship between activists' ideas and ideological orientations, on the one hand, and their moral convictions, value commitments, and emotions, on the other. As more and more people embraced the ideas developed through these processes, activist networks expanded and thickened, leading to the formation of a movement.

Inevitably, these processes do not take the same form in all movements. Much depends on the nature of the issue. Grievances that involve very obvious forms of human oppression, injustice, or social exclusion are likely to require different levels and perhaps types of intellectual formulation and articulation than the kind of grievance analyzed here. In general, we suspect that the processes identified by our analysis will be most relevant for quality-of-life type movements, or what have often been referred to as "new social movements." Nonetheless, all movements must engage in *some* degree of idea work to form a social grievance. It is through this idea work that activists "re-cognize" and ultimately change the world.

Notes

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2. The only possible exception to this assertion is the contamination of native corn landraces in Mexico with GE corn. Yet despite the fact that many environmentalists and Mexicans see this as an environmental disaster, it is not widely considered as such by the broader public.
3. Here we use the term "quality of life" type movements to refer to movements that are primarily concerned with the various excesses of late capitalism or the spiritual emptiness of modern life rather than with social exclusion. Movements of this type are characterized, at least in part, by the "non-obviousness" of their grievances. Examples of "quality of life" type movements include the environmental movement, the anti-nuclear movement, and spiritual movements such as the Hare Krishnas or Rajneesh movements.
4. This is not to say that Snow and colleagues and their followers do not see activists as thinkers, for they do. But the thinking work in which they see members of SMOs as being engaged, is largely aimed at crafting frames for public consumption and greater palatability among potential participants in a movement. This is evident in their respective discussions of the four processes of frame alignment, i.e., frame amplification, frame bridging, frame extension and frame transformation. Given the explanatory focus of their theory (how newcomers get attracted to a movement), they should not be faulted for this, but their conceptualization of these processes is of limited value for explaining the process by which movement leaders *themselves* come to develop their ideas, sensibilities, and commitment to a cause and movement.

5. Oliver and Johnston's argument resonates with Mayer Zald's concept of "ideologically structured action," which also calls attention to the importance of ideology for motivating action (see Dalton 1994; Zald 2000).
6. The social structures, institutions, and networks that *embody* a movement are not of particular interest to Eyerman and Jamison, who see the distinctiveness of social movements ("indeed their very historical significance") as lying in their "impermanence, disorganization, transience." "Organizations can be thought of as vehicles or instruments for carrying or even producing the movement's meaning. But the meaning, we hasten to add, should not be reduced to the medium" (Eyerman and Jamison 1991: 59–60). What interests them, then, is less how movements work than how they make new knowledge possible.
7. Rochon defines culture as "the linked stock of ideas that define a set of commonsense beliefs about what is right, what is natural, what works. These commonsense ideas are not universal, but are instead typically bounded by time as well as space" (Rochon 1998: 9).
8. Rochon borrows from Ricoeur's definition of a discourse as "a shared set of concepts, vocabulary, terms of reference, evaluations, associations, polarities and standards of argument connected to some coherent perspective on the world" (Rochon 1998:16, citing Ricoeur 1971).
9. Seeing the process in these terms enables us to distinguish this approach from the argument made by some that movements emerge only when conditions are perceived as *both* intolerable and amenable to resolution, on the one hand (McAdam 1982; Melucci 1996; Piven and Cloward 1977); and from the "cycles of protest' approach (Tarrow 1998) in which leaders' strategies are driven directly by the fortunes of the movement, on the other. It also helps us to comprehend the adoption of strategies that seem clearly contrary to movement interests.
10. See *Food First: Beyond the Myth of Scarcity*, which Fowler co-authored with Frances Moore Lappé and Joseph Collins in 1977 (Lappé, Collins, and Fowler 1977).
11. Personal interview, Washington DC, June 2002.
12. Personal interview, Cambridge, MA, January 2002.
13. In February of 1975, a prestigious group of scientists assembled themselves at the Asilomar Conference Center in Pacific Grove, California to discuss safety and other issues associated with the new DNA technologies. For an insightful analysis of these meetings, see Wright (1994).
14. This was true both of the United States and in Europe, although the composition of the early movements differed somewhat in the two contexts. In Europe, animal rights activists (especially in Britain), and anti-eugenicists (particularly in Germany) were more prominent, while in the United States, those whose primary concerns were political-economic played a more important role. In both contexts, critically minded scientists, feminists (largely because of the reproductive technology issues), and environmentalists were among the earliest critics.
15. Doyle's analysis drew heavily on the work of Cary Fowler and Pat Mooney, the former of whom actually introduced him to the issue in the early 1980s (Charles 2001). We focus on Doyle's work here because it circulated more widely than Fowler's and Mooney's early writings, which focused on the loss of plant genetic diversity. Their analyses can be found in Fowler (1979); Mooney (1983); Fowler et al. (1988), and Fowler and Mooney (1990). Pat Mooney, Cary Fowler and Shand were (and remain) a critical part of the movement's early *intelligensia*, and had been working on the biotech issue since the late 1970s.
16. Indeed, the appendix to their book comprises an annotated bibliography with hundreds of sources of information (complete with directions on how to obtain them), ranging from scientific journals and newsletters, to regulatory statutes, to technical reports, to industry trade magazines. (Phone interviews with Ruth McNally, December 2004, and Peter Wheale, January 2005.)
17. This is now happening again, as some "gene revolution" critics have turned their attention to nanotechnology, see Mooney 2001.
18. The Council for Responsible Genetics was originally called the Committee for Responsible Genetics, and was in part an offspring of the radical science group, Science for the People.

Among the earliest members of this collective were Ruth Hubbard, Professor of Biology at Harvard University; Jonathan King, Professor of Biology at MIT; Stuart Newman, Professor of Cell Biology and Anatomy at New York Medical College; Liebe Cavalieri and Barbara Rosenberg, both cancer researchers and faculty members at the Memorial Sloan-Kettering Cancer Center in New York; Sheldon Krimsky, Professor of Urban and Environmental Studies at Tufts University; Tony Mazzocchi, a leader of the Oil and Chemical and Atomic Worker's Union; Susan Wright, an historian of science at the University of Michigan; Philip Bereano, Professor of Technical Communications at the University of Washington in Seattle; Claire Nader, an activist in the Washington-based public interest community; and Colin Gracey, an Episcopal Chaplain at Northeastern University. The CRG, based in Cambridge, MA, remains an important part of the anti-GE movement, though many of its original members have moved on (Hubbard and Krimsky 2003).

19. A number of our interviewees mentioned particular books by name that had influenced their thinking. Andrew Kimbrell, a lawyer and major actor in the U.S. anti-GE movement, described being profoundly affected by reading Rachel Carson, Jacques Ellul, and E.F. Schumacher, for example, while Philip Bereano identified Marcuse's *One Dimensional Man* as having had a powerful effect on him (authors' interviews). Peter Wheale, the co-author of several books that became quite influential in Europe, had been a student at Manchester University, where his professor Harry Rothman introduced him to the science and technology studies (STS) scholarship.
20. The co-authors of the report were Rebecca Goldburg, Jane Rissler, Hope Shand, and Chuck Hassebrook. At the time, Goldburg worked at the Environmental Defense Fund in New York, Shand at Rural Advancement Foundation International in North Carolina, Rissler at the National Wildlife Federation in Washington, and Hassebrook at the Center for Rural Affairs in Nebraska.
21. Interview with Ellen Hickey, July 7, 2000.
22. In 1979, Pat Mooney began a "Seeds Campaign" within ICDA, which was concerned with the problem of the loss of plant genetic diversity around the world. Michael Hansen was one of the first members of IOCU-US to work on genetic engineering, and frequently conversed with his counterparts in Penang about the issue (author interview). In the early 1980s, IOCU, which was based in Malaysia, gave birth to another transnational organization that took interest in the biotechnology issue, namely, the Pesticide Action Network (author interviews with Hansen, Monica Moore of PAN-North America, and Henk Hobbelink of Genetic Resources Action International).
23. Among the other organizers of the conference were the International Baby Food Action Network (IFBAN), Health Action International, Pesticide Action Network, and Seeds Action Network. The workshop was sponsored and funded by the Dag Hammarskjold Foundation in Uppsala, Sweden.
24. Interviews with Jeremy Rifkin, 2001, and Benny Haerlin, December 2004.
25. The term "deliberate release" simply refers to the purposeful introduction of these new GE organisms into the environment.
26. In an interview, Rifkin succinctly summed up his interpretation of the Court's decision: "There were only a few of us there [at the Supreme Court hearing] and I knew that that would be the commercial begetting of the next two centuries" (author interview).
27. Such political-economy concerns became increasingly paramount as activists watched the large life sciences firms buy up the seed industry and a whole string of biotechnology "startups," furthering the process of industry consolidation and control (Fowler et al. 1988).
28. Among the most important health and environmental issues raised were the possibility that people could experience serious allergic reactions to GMOs; that they would suffer from other health problems associated with the ingestion of GMOs; the development of insect resistance to a bioengineered insecticides; and the possibility of transgene contamination of a crop's wild relatives. In the late 1990s, John Losey from Cornell University published an important (albeit highly disputed) paper which suggested that GMOs might be toxic to Monarch butterflies.

29. This section is based entirely on the authors' personal interviews with anti-GE movement activists, who will not be individually cited here.
30. We thank an Editor of *Theory and Society* for pushing us to recognize and develop this point.
31. Because of space limitations, we cannot address the question of why the anti-GE movement was more effective in building a mass base in Western Europe than it was in the U.S. As we have argued elsewhere, (see Schurman 2005), the explanation lies in the different institutional, cultural, and political environments in which these movements unfolded, as well as in the internal politics of the EU (Tiberghien and Starrs 2004).
32. Public concern about food safety in Europe was galvanized by a rash of public health scares in the late 1980s and 1990s. These included the scare over "mad cow' disease and its human variant, Creutzfeldt-Jakob disease, dioxin in chicken-feed, listeria-contaminated cheese, and contaminated Coca-Cola. Europeans were also angered by U.S. "food imperialism,' fueled by intense resistance from the industry and the U.S. government to GE food labeling.
33. Interview with Jack Doyle, June 19th, 2002.
34. Interview with Jeremy Rifkin, June 20th, 2002.
35. Indeed, the professional orientation of the movement may have inhibited its ability to build a mass base in the United States.
36. In 1997, for instance, seventy nonprofit organizations filed a petition against the U.S. Environmental Protection Agency to stop the release of Bt crops. Though it failed, the initiative increased public pressure on the government to strengthen its regulatory oversight of the industry.
37. Interview with a key organizer of the EGA annual meeting where this was decided, who invited many of the presenters to the meeting.

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