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DIOXIN IN THE NEWS: FROM ECOLOGISM TO 'ENDURING VALUES'
IN PRESS COVERAGE OF A SCIENCE/TECHNOLOGY CONTROVERSY

By

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of English

1991

ABSTRACT

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Dioxin became news about 1970 as a technical term in two controversies, defoliation in Vietnam and pesticide use in the United States. Soon it developed into a controversy in its own right, culminating in 1983 and 1984 in the federal buyout of Times Beach, Missouri, the out-of-court settlement of a massive suit by U.S. veterans exposed to Agent Orange in Vietnam, and other incidents. Media coverage of the controversy, which was voluminous and intense, was widely criticized for exaggerating the human health risks of dioxin exposure, both explicitly and because of the extent and intensity of the coverage. Yet few have studied dioxin news coverage systematically or thoroughly.

This dissertation examines New York Times coverage of the emergence of the dioxin controversy out of its precursors in the late 1960s, then goes on to study dioxin coverage through 1988 in the Times and selected magazines. Through an index search, more than 700 Times items on dioxin and closely related matters were identified and their abstracts were examined in the New York Times Index. More than 250 of these items themselves, as well as more than 190 magazine articles, were carefully examined. The study focused primarily on aspects of the controversy involving

defoliation in Vietnam, the 1976 contamination of Seveso, Italy, the contamination and buyout of Times Beach, and the Agent Orange litigation.

The examination revealed that press coverage of dioxin involved a much broader range of tasks than merely the transmission of health risk information to the public. It is argued that the presence of dioxin in the environment posed conflicts in what sociologist Herbert Gans identified as the "enduring values" of the news, and that the main business of dioxin coverage was to expose and then reaccommodate those conflicts within a centrist, mainstream American ideology. In doing so, it is argued, the coverage marginalized a more radical ecologicistic challenge to mainstream ideology out of which the dioxin controversy originally emerged.

ACKNOWLEDGMENTS

Raymond Pfeiffer of the philosophy department at Delta College has been a part of this dissertation from the beginning. His skeptical enthusiasm and enthusiastic skepticism, communicated in our many long talks, have been invaluable.

I am grateful to Wendell Mullison, a retired Dow Chemical Company scientist, who has been generous with his time and his library. His knowledge of my topic saved me from numerous factual errors. (I am responsible for any that remain.) I know that he disagrees with some of what is written here. His willingness to assist, regardless, exemplifies his commitment to the process of free, rational inquiry.

Mitchell Hall of the History Department at Central Michigan University read an early version of Chapter Eight and offered suggestions and encouragement. My colleague in the Journalism Department at CMU, Dennis Jeffers, did likewise with early versions of Chapters Five and Six. The clarity and sense of the manuscript benefitted from several critical readings by Lois Palen. Help also came from Douglas Noverr of Michigan State University and from anonymous referees for the Association for Education in Journalism and Mass Communication, and the Midwest Regional Conference of Journalism and Mass Communications Historians.

During work on this dissertation, I received welcome financial support through a College Graduate Fellowship from the MSU College of Arts and Letters.

I am grateful for their support to my colleagues at CMU, especially Jerome Fitzhenry, Jack Hartman, Ronald Marmarelli, Guy Meiss, Joan Memering, Suzanne Nichols, Michael Petrick, Jean Raber, Larry Reynolds, Tom Rood, Carol Sanford, Alice Tait, James Wieghart and Ted Zolty. Departmental secretaries Jacqueline Robert and Jacqueline Pappas and students Jennifer Wilson, Jennifer Williams and William Ferguson worked cheerfully and carefully on my behalf.

I welcome the opportunity to thank my dissertation advisers. The committee chair, James McClintock, urged me on, helped me focus, and gave me confidence. Discussions with David Wright and Victor Howard were always stimulating. I owe more than I can say to the scholarship and teaching of Philip Shepard and Norman Pollack.

TABLE OF CONTENTS

INTRODUCTION: DIOXIN AND THE JOURNALISM OF SCIENCE CONTROVERSY

I.	An Example of Central Difficulties	1
II.	Scholarly Treatments	5
III.	Methodology and Limitations	9
IV.	Summary of Findings	12
V.	Plan of the Dissertation	21

PART I: A Pre-Systematic Account of the Controversy

CHAPTER ONE: BEGINNINGS

I.	Origins and Toxicity	24
II.	Early Products Containing Dioxin	27
III.	Industrial Exposures	29
IV.	Later Studies of Industrial Exposure	32
V.	Ranch Hand: Defoliation in Vietnam	36
VI.	The Bionetics Study	41
VII.	Domestic Uses of 2,4,5-T	44

CHAPTER TWO: SEVESO AND AGENT ORANGE

I.	Seveso	49
II.	Agent Orange	56
III.	Agent Orange Research and Legislation	62
IV.	The Settlement	66
V.	Post-Settlement Research Findings	68

CHAPTER THREE: DIOXIN FIRESTORM IN 1983

I.	Regulating Pesticides	72
II.	Regulating 2,4,5-T	76
III.	Times Beach	82
IV.	Firestorm of Coverage	86

PART II: Assessing Media Performance

CHAPTER FOUR: RISK COMMUNICATION AND BEYOND

I.	Consensus in Coverage	91
II.	Evaluating the Coverage: Error	98
III.	Evaluating the Coverage: Context	101
IV.	Evaluating the Coverage: Amount and Intensity	109

PART III: Fact/Value Separation

CHAPTER FIVE: FACTS IN SCIENCE/TECHNOLOGY CONTROVERSY

I.	Lowrance and Risk Assessment	114
II.	Mazur and the "Science Court"	119
III.	But Facts Don't Settle Controversies	125

CHAPTER SIX: WHY FACTS DON'T SETTLE CONTROVERSIES

I.	Value Neutrality in Science	133
II.	Doing Science vs. Doing Controversy	138
III.	Implications for the Dioxin Controversy	145

PART IV: Emergence of the Dioxin Controversy

CHAPTER SEVEN: PESTICIDES AND THE NATURAL WORLD

I.	Attitudes Toward Nature	153
II.	Insects and Pesticides	157
III.	Challenges to the Status Quo	163

CHAPTER EIGHT: DEFOLIATION IN VIETNAM

I.	Operation Ranch Hand	171
II.	The Bionetics Report	174
III.	Searchlight on 2,4,5-T	177
IV.	The Focus of Controversy Shifts	181
V.	Domestic Coverage Was Anthropocentric	184
VI.	Significance of Dioxin's Emergence	188

PART V: The Mature Controversy

CHAPTER NINE: SEVESO AND JOURNALISM'S "ENDURING VALUES"

I.	Ecologicistic Perspectives	197
II.	The Enduring Values of the News	200
III.	Why Seveso Was News	203
IV.	Social Disorder	204
V.	The Public Threat	206
VI.	Ethnocentrism	208
VII.	Leadership	209
VIII.	Scientific and Technical Knowledge	212
IX.	"The Questions Persist"	214
X.	Two Conflicting Versions	217

CHAPTER TEN: TIMES BEACH: REQUIEM FOR A WAY OF LIFE

I.	Laying Blame	221
II.	Ecologicistic Issues Unexplored	224
III.	Why Times Beach Was News	228
IV.	Failure of Leadership	229
V.	The Authority of Science and Technology	234
VI.	Small-Town Pastoralism	237

CHAPTER ELEVEN: AGENT ORANGE AND THE MARGINALIZED INDIVIDUAL

I.	Differences and Similarities	241
II.	Moral Disorder in Government and Business	246

III.	The Threat From the Veterans	252
IV.	The Individual at War and After	256
V.	Working Out the Conflicts	260
VI.	The Authority of Science	264
	CHAPTER TWELVE: EPILOGUE	271
	BIBLIOGRAPHY	276

INTRODUCTION: DIOXIN AND THE JOURNALISM OF SCIENCE CONTROVERSY

I. An Example of Central Difficulties

Coverage of dioxin comes up virtually whenever science journalism is discussed. Along with Three Mile Island, Love Canal, acid rain and the ozone layer, the dioxin story is said to exemplify some of the central difficulties of reporting on science and technology controversies. These include their technical complexity, the inconclusiveness of scientific research, and the phenomenon of expert disagreement. Also included are such journalistic constraints as tight deadlines, limited space and resources, and reporters' lack of scientific sophistication, limitations which are said to push coverage toward oversimplification and, in the view of some critics, a bias against science and technology. In addition, dioxin and similar controversies are said to demonstrate a science-illiterate public's difficulty in understanding and making rational decisions about such issues¹. In a 1984 report, the

¹ Various aspects of this characterization of the science/journalism problem are discussed in Twentieth Century Fund, Science in the Streets: Report of the Twentieth Century Fund Task Force on the Communication of Scientific Risk (New York: Priority, 1984); Sharon M. Friedman, Sharon Dunwoody and Carol L. Rogers, eds., Scientists and Journalists: Reporting Science as News (New

Twentieth Century Fund Task Force on the Communication of Scientific Risk spread the responsibility for dealing with these problems broadly among journalists, scientists, government, industry and educators². The American Medical Association had been more blunt in 1983 when it accused the media of conducting a dioxin "witch hunt" that resulted in public "hysteria"³.

The attention focused on dioxin coverage is understandable. For one thing, everything about the chemical itself seems to be in the superlative. Not only is the 2,3,7-8 isomer of tetrachlorodibenzo-p-dioxin one of the most toxic substances ever tested on laboratory animals, it was at the center of some of the earliest, longest-lasting and most bitterly contested environmental issues of the post-World War II era. In 1962 U.S. Air Force planes were beginning in earnest to spray South Vietnamese forests with dioxin-contaminated herbicides just as Rachel Carson's Silent Spring energized and redirected environmental controversy at home. Within a few years disagreement over the U.S. defoliation program in Vietnam had become part of the maelstrom of controversy generated by the war.

York: Free 1986); and Dorothy Nelkin, Selling Science: How the Press Covers Science and Technology (New York: Freeman 1987).

² Twentieth Century Fund 6-14.

³ Reported in Philip J. Hilts, "AMA Votes to Fight Dioxin 'Witch Hunt,'" Washington Post, 23 June 1983, A1. For a similarly critical view of the coverage, see Hugh D. Crone, Chemicals and Society: A Guide to the New Chemical Age (Cambridge: Cambridge UP 1986) 180-193.

Meanwhile, government efforts to ban a popular weed killer contaminated with dioxin, 2,4,5-T, were fought strenuously for nearly 15 years by one of the nation's largest chemical manufacturers, Dow Chemical Company. Hundreds, and by one account thousands, of research papers were published, making dioxin one of the most thoroughly technically studied chemicals in history.⁴

Dioxin also figured in one of the most serious instances before the 1984 Bhopal disaster of a general population's exposure to poison released in an industrial accident -- the contamination of the Seveso area in northern Italy in 1976. Seven years later, dioxin's presence at Times Beach, Missouri, led to the first federal buyout of an entire environmentally contaminated community. Dioxin was at the center of both the longest jury trial in U.S. history -- a suit against Monsanto by 65 persons exposed during a spill -- and the nation's biggest class action suit and largest tort settlement, the Agent Orange

⁴ Book-length treatments of the dioxin controversy as a whole are Alastair Hay, The Chemical Scythe: Lessons of 2,4,5-T and Dioxin (New York: Plenum 1982) and Michael Gough, Dioxin, Agent Orange: The Facts (New York: Plenum 1986). A useful article-length account is Fred H. Tschirley, "Dioxin," Scientific American 254-2 (1986): 29-35. Carson's famous book was published in 1962 by Houghton-Mifflin of Boston; on its impact see Frank Graham Jr., Since Silent Spring (Boston: Houghton 1970). U.S. Veterans Administration, Review of Literature on Herbicides and Associated Dioxins v. 2, Annotated Bibliography (Washington: U.S. Veterans Administration 1980) n.p., lists approximately 1,200 research papers on the topic. An estimate that 40,000 research papers have been written about dioxin is given in "Dioxin: Emergency Herbicide Ban Precipitates a Battle Over Chemicals' Rights -- Are They Innocent Until Proven Guilty?" SciQuest July/Aug. 1979: 28-9.

litigation leading to a \$180-million payment by chemical companies into a fund for veterans claiming exposure to dioxin-contaminated defoliants in Vietnam.⁵

The magnitude, persistence and intensity of dioxin coverage also have invited attention. The New York Times alone, for example, published more than 700 news articles, columns, editorials and letters on dioxin or closely related topics from 1965 to 1988, ranging from two-and three-paragraph news items inside the paper to page-one series treatment of the issues. As well as the Times, other newspapers, magazines and broadcast news organizations gave the controversy extensive play. In 1983, for example, dioxin was a key factor in these developments, among others:

- * evacuation and federal buyout of Times Beach;
- * the ongoing Agent Orange litigation;
- * allegations of preferential treatment of industry by an already-beleaguered Environmental Protection Agency;
- * controversy over dioxin in the environment in Michigan, New Jersey and elsewhere;

⁵ On Seveso, see Thomas Whiteside, The Pendulum and the Toxic Cloud (New Haven: Yale UP 1979); on Times Beach, Gough, Dioxin 121-36; on Agent Orange, Peter H. Schuck, Agent Orange on Trial: Mass Toxic Disasters in the Courts (Cambridge, MA: Harvard UP 1987), and A. L. Young and G. M. Reggiani, eds., Agent Orange and Its Associated Dioxin: Assessment of a Controversy (Amsterdam: Elsevier 1988); on the Monsanto suit, see Lee Griggs, "In Illinois: The Longest Jury Trial Drones On," Time 23 March 1987: 1.

* fears in New York City that gefilte fish, an important part of Passover, had been contaminated. Mayor Edward Koch told the New York Times that "he planned to eat gefilte fish tonight but then, 'to be on the safe side,' he will not eat any for the next two months."⁶

In that year more than 350 items were listed under "dioxin" or equivalent terms in indexes to the New York Times, Chicago Tribune, Washington Post, and Reader's Guide to Periodical Literature. In June alone the New York Times published 39 items on dioxin issues, five of them on page one.

II. Scholarly Treatments

While often mentioned as an example of the problems of risk communication in the mass media, however, the journalism of the dioxin controversy has been much less often examined thoroughly

⁶ On alleged EPA preferential treatment, see "Dow Chemical Urging Got EPA to Soften 1981 Dioxin Water Report, Officials Say," Wall Street Journal 16 March 1983: 4, and Howard Kurtz, "Dow Got to Suggest Dioxin Report Changes," Washington Post 16 March 1983: A1+; on EPA's other troubles, Philip Shabecoff, "Environmental Agency: Deep and Persisting Woes," New York Times 6 March 1983: 1+; on Michigan contamination, Robert Reinhold, "E.P.A.'s Dow Tests Find High Toxicity," NYT 1 April 1983: 1+; on New Jersey contamination, Joseph F. Sullivan, "High Level of Dioxin Found at Jersey Site; Food Center Is Shut," NYT 3 June 1983: 1+; on gefilte fish, Robert Reinhold, "New York Area Is Receiving Carp From Toxin-Tainted Michigan Bay," NYT 28 March 1983: 1+; Marian Burros, "Mayor Says U.S. Should Inspect Fish," NYT 28 March 1983: B8; Robert D. McFadden, "New York Area Callers Seek Reassurance on Eating Carp," NYT 29 March 1983: B3.

or systematically. Two studies were published by the Media Institute, a Washington, D.C., media research organization. In one, Edward J. Burger Jr. carried out case studies of print media coverage of polychlorinated biphenyl (PCB), cancer chemotherapy and dioxin. In the other, the institute conducted a content analysis and audience survey on print and television news about ethylene dibromide (EDB), a Louisiana train wreck involving chemicals, and dioxin contamination in Times Beach⁷. In addition to these two studies, Dorothy Nelkin of Cornell University, as part of her ongoing inquiry into the inter-relationships of science, technology and society, briefly examined dioxin themes in her book on media/science issues, Selling Science.

Burger, director of the Georgetown University Institute for Health Policy Analysis and associate professor at Georgetown's medical school, examined items in the New York Times, the Washington Post and the New Yorker on the controversy over U.S. defoliation in Vietnam. Noting several factual inaccuracies, he also criticized the material as biased and politically motivated and found a "tendency to sensationalize issues" and "a clear tendency to simplify factually complex issues and uncertainties into seemingly simple and unadorned constructs."⁸ Similarly, the

⁷ Edward J. Burger, Jr., Health Risks: The Challenge of Informing the Public (Washington: Media Institute 1984); and Media Institute, Chemical Risks: Fears, Facts and the Media (Washington: Media Institute 1985).

⁸ Burger 23-39, 49.

institute's study of the Times Beach episode criticized coverage as sensationalized, speculative, anecdotal and imbalanced, with too much emphasis on health risks and too much reliance on government and citizen sources instead of industry.⁹ Adopting a different mode of inquiry, Nelkin found that major daily newspapers and news magazines had treated dioxin in terms of sharply polarized themes. Dioxin was portrayed as a peril of technology, a "monster" from the chemical lab, but also as an unjustly maligned chemical, victimized by politics and bad reporting. It was also treated as a "mystery" to be solved by science, and as an aberration to be corrected by improved regulatory control of industry. Most articles, however, "raised no structural questions about the nature of industrial practices that contributed to the dumping of toxic waste, or more generally to the risks of technological development"¹⁰.

All three scholarly treatments of dioxin coverage have their limitations. In the decade after the first defoliation stories appeared in the New York Times in 1965, that newspaper published more than 80 items directly related to the controversy. Yet Burger examined fewer than 20 articles from the Times and the Washington Post, without making clear why he selected some and not others. Media Institute more systematically studied 76 Times Beach items published in three newspapers during a

⁹ Media Institute 19-40.

¹⁰ Nelkin 64-9; quotation 67-8.

specified time period, as well as 26 segments from network nightly newscasts. Defoliation and Times Beach, however, were only two aspects of the complex dioxin controversy. In addition, both studies make unexamined assumptions about the nature of scientific/technical controversy and the role of experts, media and the public. The assumptions are that objective human health risks are the sole or at least most important issue in these controversies, that science is society's authoritative guide to dealing with them, and that the function of the media is to communicate scientific information to the public with as little distortion as possible¹¹. As I will argue, when these assumptions are problematized -- that is, when they are made the focus of critical inquiry -- a different set of questions arises. Critical examination of several of just these assumptions has been an important feature of Nelkin's work,¹² but her treatment of dioxin news, while suggestive, deals with a limited sample of articles in an important but limited time frame, the spring of 1983.

¹¹ Burger 1-9; Media Institute v-xiii.

¹² In addition to Selling Science, see Dorothy Nelkin, "Science, Technology, and Political Conflict: Analyzing the Issues," in Controversy: Politics of Technical Decisions, 2d ed., ed. Dorothy Nelkin (Newbury Park CA: Sage 1984) 9-24; and "Background Paper," Twentieth Century Fund 21-84.

III. Methodology and Limitations

I have attempted to look at coverage of the dioxin controversy more systematically and thoroughly than others have done. In order to get an overall sense of the course of the controversy, I identified and examined more than 700 abstracts of news stories in the New York Times Index between 1965 and 1988 about dioxin and closely related controversies. In addition, I carefully examined more than 250 of the news items themselves on New York Times microfilm, as well as more than 190 articles in magazines and journals, located serendipitously or identified through Reader's Guide to Periodical Literature and Business Periodicals Index. I examined the items in the light of critical interrogation of widely held assumptions about the relationship among science, technology, media and society. At the same time, I tried to arrive at a clearer formulation of that relationship by examining the material. The process involved a constant back-and-forth movement between explanation and data, with ongoing mutual adjustment: What I conceived to be the role of media in science and technology controversy was influenced by what I saw in the coverage, but I also saw there what my understanding of the relationship led me to look for. Only at the end of the process did the two fall into something approaching a stable relationship. Although I did use several simple quantitative techniques, such as counting, on the whole I

did not focus on quantitative data. Rather, through the identification and analysis of themes in the texts, I tried to understand in cultural terms the meaning of the dioxin controversy and its coverage in the press. Thus I worked within the cultural, qualitative and critical traditions, rather than the positivistic tradition, of media scholarship¹³.

The size, length and complexity of the dioxin controversy made choices necessary. Because it seemed that the story could not be told otherwise, I have paid most attention to the following central aspects:

- * Defoliation in Vietnam;
- * The battle over regulating domestic use of 2,4,5-T;
- * Contamination of the town of Seveso, Italy, in 1976;
- * The Agent Orange litigation on behalf of Vietnam veterans;
- * The contamination and federal buyout of Times Beach, Mo.

I have dealt hardly at all with a major dioxin incident at Newark, N.J., because it seemed repetitive in many respects. Likewise but for other reasons, I have seldom mentioned an important dioxin contamination controversy at Midland, Mich. I edited the local newspaper, the Midland Daily News, from 1975 to 1983. The pressure to justify (or criticize in hindsight) my own

¹³ See Clifford G. Christians and James W. Carey, "The Logic and Aims of Qualitative Research," and Robert S. Fortner and Clifford G. Christians, "Separating Wheat From Chaff in Qualitative Studies," both in Research Methods in Mass Communication, ed. Guido H. Stempel III and Bruce H. Westley (Englewood Cliffs: Prentice 1981) 342-74; Michael R. Real, Super Media: A Cultural Studies Approach (Newbury Park: Sage 1989).

journalistic performance I have dealt with through avoidance. Numerous other localized incidents involving dioxin offered tempting possibilities for analysis, which I resisted. They offer opportunities for further research.

Another limitation of this study is its focus on one elite newspaper, the New York Times, and on less than a dozen national magazines. I chose to examine coverage in the Times for several reasons. One is the convenience and completeness of its index, the only newspaper index that provided abstracts of items throughout the entire period of the controversy. The abstracts saved me countless hours in locating items dealing with dioxin as well as in gaining an overall sense of the coverage.

Additionally, however, the New York Times is an appropriate choice for study because of its importance as a source of news for several hundred thousand readers, its accessibility to millions more through its index and microfilm service, and its influence on other newspapers and on the wire services.

Accessibility to large numbers of readers was also one reason for choosing the magazines whose coverage was examined. The publications were all indexed either in Reader's Guide to Periodical Literature, or Business Periodicals Index, two widely available reference works. Another reason for choosing to look at magazine coverage was the different perspectives it provided, in material written for relatively narrowly defined audiences ranging from the technically oriented readers of Chemical &

Engineering News and Science to the liberal constituency of the Progressive and the Nation.

Overall, I looked at printed material which would have been reasonably accessible to any reader with the time and interest to research the subject in a public library. I did not examine broadcast coverage, a limitation which restricts conclusions about what Americans were told and shown about dioxin. My study would, however, contribute toward such a larger undertaking by providing a thorough, systematic textual analysis of an important part of the overall journalistic performance.

IV. Summary of Findings

Two decades after dioxin was first mentioned in the news, a recurring interpretation of media coverage of the controversy has emerged. This interpretation held that the long-term human health risks of environmental exposure to dioxin were exaggerated in the press, with the result that people were needlessly frightened and resources needlessly spent. Next time, it was said, we must do better. Far from being a neutral judgment, however, this standard interpretation was itself a move -- and a powerful one -- in the ongoing dispute. While it focused attention on the assertion that health risks were exaggerated (a case which there is data to support), it disinvited examination of two important assumptions. One was that long-term human health risk from environmental exposure was the dioxin issue with

which journalism was concerned. The other was that the press should be judged entirely or at least primarily on how well it transmitted that risk information to the public. In reality, both the coverage itself and the media's role in the controversy were more complex than that.

Coverage of the controversy can better be seen, I believe, as a "constructed reality"¹⁴ in which conflicts among strongly held values were first exposed and then reaccommodated within a centrist, mainstream American ideology. That ideology is one in which industrial capitalism and democracy are believed to march amicably hand in hand. One group of participants believed strongly in the authority of positive science as a basis for responsible, orderly, progressive American capitalism. The dioxin controversy, emerging out of a conflict between this belief and emerging ecologicistic values of the environmental movement, went on to expose conflicts with such strongly held residual values as small-town pastoralism, individualism, and participatory democracy¹⁵. More than merely a transmitter of risk information, the media were an institution in which these

¹⁴ See for example David L. Altheide, Creating Reality: How TV News Distorts Events (Beverly Hills, CA: Sage) 1976, and Gaye Tuchman, Making News: A Study in the Construction of Reality (New York: Free) 1978.

¹⁵ On "emergent" and "residual" cultural forms, see Raymond Williams, "Base and Superstructure in Marxist Cultural Theory," Contemporary Literary Criticism: Literary and Cultural Studies 2d ed., ed. Robert Con Davis and Ronald Schleifer (New York: Longman 1989): 378-90.

value conflicts were exposed, debated, evaded, smoothed over, reshaped, redefined and in a limited way resolved. Eventually an accommodation was found that preserved the ideology's essential features. While the media did transmit a great deal of risk information over more than a quarter century of coverage, their real labor was to preside over the revision and preservation of the ideology.

A normative objection can be raised to this interpretation of the media's role. Even though the dispute as constructed in the news did include conflicts over values, one could object, it should have been carried out more rationally; facts should have been dealt with separately from values, enabling issues to be clarified and factual questions to be decided by science while value questions were left to politics. In this scheme of things, exaggeration of health risk in the media would be a cardinal flaw, because it would fail to provide an adequate factual basis for political decisions. I could, of course, respond that I am only interested in describing what actually happens in media coverage of science and technology controversy, not in what should be the case. In fact, however, I am interested in both, and so I have had to examine the question of fact/value separation in some detail.

I have concluded that while it may be possible to decide factual and value issues separately at the core of some supposedly "pure" science, it is demonstrably impossible to do so

in science/technology controversy. Once one is in the public arena of controversy, I argue, every introduction of fact involves an inseparable judgment that the fact is relevant to the issues at stake -- and deciding which issues are at stake requires value judgment. To make the point another way, one might successfully separate facts from values in science; but in disputes like those over dioxin, one is not "doing" science. One is doing social and political controversy. Conflicts over values are inescapable.

What, then, were the values in conflict in the dioxin controversy?

Initially dioxin appeared in the news as a technical detail in two controversies that pitted the emerging belief system of ecologism against aspects of the American ideology of industrial capitalist democracy. One was the use of defoliants in the Vietnam War, while the other was the use of synthetic chemical pesticides in domestic agriculture and forest management. Ecologism offered radical challenges to certain fundamental aspects of the dominant ideology -- principally its underpinning in a centuries-old anthropocentric view of the relation between humans and nature. In this view, nature existed to be used by man for his purposes; human risks were direct and of paramount concern; they could be controlled, averted or avoided by manipulating nature. In the ecologicist view, by contrast, many of the products of modern industrial capitalism threatened the

complex web of relationships of all living things. Risk to humans was less direct, subordinated within the risk to nature itself. The prudent course was to "go along" with natural processes to a greater extent, relinquishing some measure of human control in return for the enhanced safety and well-being of the biota. Both world views were represented in the controversies over domestic pesticide use and Vietnamese defoliation. Introduction of dioxin into these controversies, however, allowed them to shift toward less radical ground -- the terrain of direct human health risk from pesticide residues that had been scuffled over and to some extent mapped and rationalized since widespread use of arsenical insecticides began in the late 19th century.

This shift in focus was crucial. At its most uncompromising, emergent ecologism claimed that pesticides were a problem precisely because they did what they were designed to do -- kill living things man had defined as "pests." But if attention shifted to a "flaw" in pesticides -- if the problem was dioxin rather than the products it contaminated -- then several technical arguments available to manufacturers, arguments which were marginally relevant before, grew more to the point. These arguments were that 1) dioxin was an unintended contaminant of useful products; 2) that it had been virtually eliminated; and 3) that its environmental human health risks were minimal and had been blown out of proportion by the media. Concerned

increasingly with long-term human health risks of environmental exposure to dioxin, the controversy after about 1970 was fought out on this less radical terrain.

Even after its deradicalization, however, what had emerged as the dioxin controversy exposed flaws and weaknesses in the ideology of industrial capitalist democracy, particularly those aspects of it which Herbert Gans identified as the "enduring values" of journalism¹⁶. These identify ethnocentrism, responsible capitalism, altruistic democracy, individualism, small-town pastoralism and respect for authority as non-contradictory and even complementary values in the American way of life. Much of dioxin coverage was not concerned with transmitting risk information at all; instead, it was busy responding to the danger to the ideology's integrity posed by those flaws and weaknesses -- first exposing them, then analyzing what had gone wrong and seeking solutions, and finally reassuring its audience that the American way of life had adjusted for the better, but without fundamental change.

For example, contradictions between the ideal of pastoral, small-town life and the realities of industrial capitalism were exposed by the dioxin contamination of Seveso and Times Beach, whose small-town aspects were stressed. (In fact, both are in urbanized areas). The threat posed to the ideology by this

¹⁶ Herbert Gans, Deciding What's News: A Study of CBS Evening News, NBC Nightly News, Newsweek, and Time (New York: Pantheon 1979): 39-69.

contradiction was dealt with and brought to closure in news stories chronicling the restoration of normality at Seveso and the process of "mourning" and renewal following the "death" of Times Beach. The main business of the news coverage, over time, was to provide a stage where the conflict was worked out and eventually resolved.

In addition to small-town pastoralism, another "enduring value" in the American ideology is responsible capitalism, the belief that business operates unexploitively in a regulated free market for the ultimate good of all. A great deal of coverage focused on -- and in effect punished -- what appeared to be transgressions of this value, such as industry's continued manufacture and sale of Agent Orange and 2,4,5-T after knowing they contained a contaminant that caused cancer and birth defects in laboratory animals. On the positive side, the news dealt at length with industry's development of technical responses to the dioxin problem, including cleanup measures and scientific research. These stories showed the "system" working to punish irresponsibility at the same time that capitalism as a whole was acting responsibly.

Many dioxin stories included individual narratives, the stories of residents or veterans with illnesses or other damage they blamed on dioxin. Within a framework of risk information transmission, this technique is vulnerable to criticism as "anecdotal." What such stories accomplished, however, was to

expose, examine and resolve conflicts between the values of responsible capitalism and individualism. Characteristically, individual narrative functioned as a story-telling device, a way to establish the conflict. The individuals' stories were seldom if ever followed through; instead, the conflict is shown as being resolved either through the authority of science or the workings of the democratic process -- and sometimes both.

Perhaps the most fundamental ideological fault-line exposed by the dioxin controversy was the conflict between respect for the authority of science and the value placed on democratic decision making. The press devoted substantial coverage to this conflict, focusing attention on legislative, regulatory and judicial attempts to resolve the controversy in ways consistent with science. And just as apparent corporate irresponsibility was punished in the press, instances of lax regulation of industry and of public "hysteria" over dioxin were publicly exposed as threats to the appropriate working of democratic government. Government-sponsored research was also an important story, for perhaps the most reassuring evidence of the consistency of democracy with science was the grounding of government decisions in scientific research.

There are other instances as well of coverage whose raison d'être lies in the ideological stresses and strains brought about by dioxin. By the mid-1980s, the following consensus had emerged in the news: The main threat from dioxin-containing pesticides

was posed by dioxin itself and was of long-term human illness from environmental exposure; science, the authority, eventually had come down on the side of the manufacturers, whose behavior was for the most part vindicated. Meanwhile the political system, including the courts, handled the conflict in a way that was reasonably fair and responsive to individuals and small-town communities, yet was also reasonably consistent with science; in addition, irresponsible parties were exposed and punished. Finally, the media were criticized, not least by themselves, for having blown the controversy out of proportion.

In working through to this consensus, the news carried out three important functions. It exposed certain conflicts in the dominant ideology of industrial capitalist democracy, served as a forum for discussion of the conflicts, and worked out an accommodation that incorporated some change while preserving the ideology's essential features. These are legitimate functions, and the news is at least as appropriately judged on how well it carried them out as on the reductively narrower question of how well it transmitted risk information. In my judgment, that part of journalism studied here did its ideological work conscientiously, with commitment and a high degree of professionalism. Nevertheless, in perhaps the most important finding of my research, the job was done within a far less radical framework than that in which ecologism presents its challenge to industrial capitalist democracy. The dioxin

controversy did not deal with ecologicistic issues; rather, it was a way of marginalizing them. In that sense, the press may have carried out its responsibilities less than well.

V. Plan of the Dissertation

From this point on, the dissertation proceeds through 12 chapters. Chapters One, Two and Three present a pre-systematic account of the dioxin controversy as a whole, organized more or less chronologically and based on scholarly, scientific and journalistic sources. The pre-systematic account is not intended as a preferred, objective account of the controversy against which coverage is to be judged. Rather, its purpose is to provide a framework of convenience to facilitate reading of the thematic analysis which comes later. I tried to write it in such a way that readers with widely differing views on the merits of dioxin coverage could agree that the pre-systematic account is reasonably complete, fair and balanced and has documentary support. Chapter Four sets out widely held criticisms of dioxin coverage and argues that while they are supported to some extent by the evidence looked at here, there is also significant evidence to the contrary. Chapters Five and Six examine whether fact/value separation would have been a helpful strategy for dealing with the controversy, concluding not. Chapters Seven and Eight establish the background of the pesticide and defoliation

controversies and chart the emergence of dioxin as a technical term introduced into those disputes. Chapters Nine, Ten and Eleven carry the analysis forward through three major dioxin controversies -- the contamination of the Italian community of Seveso in 1976, the contamination and federal buyout of the Missouri community of Times Beach, from 1971 through 1983, and the Agent Orange litigation from 1978 through 1988. An epilogue summarizes and draws conclusions.

PART I

A Pre-Systematic Account of the Controversy

CHAPTER ONE: BEGINNINGS

I. Origins and Toxicity

According to one theory initially proposed by Dow Chemical Co. scientists, dioxin is as old as ordinary fire, one of the "myriad of initial pyrolysis products formed during combustion (and) jumbled at low concentrations in a sea of chemical reactions. . . ." ¹ If it has indeed been present that long and is virtually everywhere in the environment, as research at Dow and elsewhere indicates, nevertheless sampling of lake bottom sediments indicates its presence in the environment took an upward turn in the 1940s. That coincided both with the increased use (and disposal by burning) of plastics and the large-scale production of the industrial chemical 2,4,5-trichlorophenol, from which weed and germ killers are made. In addition to being produced when plastic and other materials are burned in municipal and industrial incinerators, dioxin is a controllable but inevitable contaminant in the production of the chemical intermediate trichlorophenol, of which an estimated 150,000 tons per year were manufactured in the early 1980s. Trichlorophenol

¹ R. R. Bumb, et al., "Trace Chemistries of Fire: A Source of Chlorinated Dioxins," Science 210 (1980): 385-90; quotation, 386.

is no longer made in the United States, but in its heyday it was chemically transformed in industrial-size batches into the germ killer hexachlorophene and the weed killer, 2,4,5-T (2,4,5-trichlorophenoxyacetic acid)².

Dioxin is one of the chlorinated dibenzo-p-dioxins, an extended family of 75 chemical "next of kin" -- isomers, or compounds made up of the same kinds and numbers of atoms but differing in structural arrangement. It has four chlorine atoms linked laterally to two benzene molecules, which are in turn connected by two oxygen atoms. The lateral connecting points are identified by chemists as the 2, 3, 7 and 8 positions, giving the compound its technical name, 2,3,7,8-tetrachlorodibenzo-para-dioxin³. When tested in laboratory animals, not only is it the most acutely toxic member of its family, it is one of the most toxic substances known. Vanishingly small amounts cause extensive and often fatal damage to the liver⁴.

A common standard of toxicity in laboratory animals is the "LD₅₀," or dose of a poison that kills 50 percent of a test group. For guinea pigs given dioxin this lethal dose is quite small,

² Alastair Hay, The Chemical Scythe: Lessons of 2,4,5-T and Dioxin (New York: Plenum 1982): 5-23; Michael Gough, Dioxin, Agent Orange: The Facts (New York: Plenum 1986): 27-41. A chemical intermediate is a substance produced as a necessary stage between raw material and final product.

³ Following lay usage, I will use the term "dioxin" throughout to refer to the 2,3,7,8 isomer of tetrachlorodibenzo-p-dioxin.

⁴ Hay 5-23, 28-36.

0.0005 to 0.002 thousandths of a gram (milligram) per kilogram of body weight. Dioxin's deadliness varies from species to species, however. The LD₅₀ for female rats is 0.044 milligrams per kilogram. For dogs it is 1.0⁵. Thus depending on the animal being tested, dioxin is an acute poison whose potency is roughly equivalent to botulinum toxin and nerve agents. By comparison, aspirin is considered only slightly toxic, with a lethal oral dose in rats of about 1,000 milligrams per kilogram of body weight⁶. Dioxin also causes cancer, birth defects and embryonic and fetal death in laboratory animals, but a 1980 summary of research by Air Force herbicide consultant Alvin L. Young has not been overturned: "There is no conclusive evidence at this time that TCDD (dioxin) is mutagenic, teratogenic, or carcinogenic in man."⁷

⁵ Rodney W. Bovey and Alvin L. Young, The Science of 2,4,5-T and Associated Phenoxy Herbicides (New York: Wiley 1980): 172-3; Hay 5-23.

⁶ Hugh D. Crone, Chemicals and Society: A Guide to the New Chemical Age (Cambridge: Cambridge UP 1986): 28-35; on aspirin toxicity, see U.S. Department of Health and Human Services, National Institute of Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances, 1981-82 vol. 3 (Washington: U.S. Department of Health and Human Services 1983): 567.

⁷ Bovey and Young 192; Gough 218.

II. Early Products Containing Dioxin

However, the work establishing dioxin's severe effects on laboratory animals and investigating its long-term effects on humans was done primarily in the 1970s and 1980s. Neither its potency nor its presence were suspected when the two major commercial derivatives of trichlorophenol, hexachlorophene and 2,4,5-T, came on the market soon after World War II. Hexachlorophene was first sold by the Swiss chemical firm Givaudan in the late 1940s as a weapon against staphylococcus bacteria. Later it fell into disuse when its risks came to be considered more serious than its benefits. A toxic compound apparently irrespective of its contamination with dioxin, hexachlorophene was found in 1971 to cause cerebral fluid accumulation, brain lesions and paralysis in rats, and the next year it was implicated in France in the death of 36 infants and serious nerve damage to 145 more after it was mistakenly mixed with talcum powder. In the 1940s, however, staphylococcus infections and epidemics were a frequent and often fatal occurrence in nurseries; hexachlorophene was found to be efficient against the organism and rapidly became the germ killer of choice⁸.

The herbicide 2,4,5-T, whose synthesis was first reported in 1941, was likewise marketed as a response to problems, those

⁸ Hay 71-75.

caused by or perceived to be caused by weeds. Weed-caused losses to agricultural output have been estimated at \$3 billion to \$5 billion annually in the United States, but in the words of one textbook, unwanted plants also cause difficulties in many other aspects of "our modern industrialized, suburbanized culture," including "forestry, highway, waterway, and public-land management, arboretum, park, and golf course care, and home landscape maintenance."⁹ After undergoing military tests during World War II, 2,4,5-T went on the market in 1948 as a broadleaf weed killer approved for use on rangeland, pastures, fence rows, farm lands and rights of way. Like 2,4-D (2,4-dichlorophenoxyacetic acid), an even more widely used herbicide with which it was eventually to be mixed in Agent Orange, 2,4,5-T is a synthetic plant growth regulator which works by causing cells to elongate. One of its most valuable characteristics as a weed killer is its selectivity. In general, it kills broad-leaved plants while leaving cereal crops, grasses and conifers alone. By 1960 U.S. chemical firms were making nearly eight million pounds a year of it, 2.7 million of which were exported¹⁰.

⁹ Alden S. Crafts, Modern Weed Control (Berkeley: U of California P 1975): 13-4.

¹⁰ Bovey and Young 1-2, 50. By way of comparison, production of 2,4-D was 36 million pounds in 1960. See Gale E. Peterson, "The Discovery and Development of 2,4-D," Agricultural History 41 (1967): 243-53.

III. Industrial Exposures

With large-scale trichlorophenol production picking up after the war, however, the record of harmful industrial exposure to what was later found to be dioxin began almost immediately. A runaway reaction caused an explosion in a 500-gallon trichlorophenol reactor at a Monsanto factory in Nitro, W. Va., on March 8, 1949. Clean-up crews complained of skin, eye and respiratory irritation, headaches, dizziness and nausea. Weeks later other symptoms appeared: an acne-like skin eruption, severe muscle pain (requiring hospitalization in some cases), fatigue, nervousness, shortness of breath, decreased sex drive and intolerance to cold. Doctors found liver enlargement, nerve damage, elevated blood fat levels, and a strong phenolic body odor when several of the men were together in a room. The skin eruption, developed by approximately 120 workers as a result of the explosion, was chloracne, a disfiguring, persistent skin disease commonly associated with chemical workers. Doctors didn't know it then, but within a few years dioxin would be identified as one of its principal causes¹¹.

Chloracne among workers did not motivate the chemical industry to cease trichlorophenol production, however. Nor was

¹¹ Hay 98-100; Gough 27-33; 157-62; R. R. Suskind and V. S. Hertzberg, "Human Health Effects of 2,4,5-T and Its Toxic Contaminants," JAMA: Journal of the American Medical Association 251 (1984): 2372-2380.

the industry successful in eliminating harmful exposures. Reactor explosions at chemical plants continued periodically for more than a quarter century after the one at Nitro. In 1953 a trichlorophenol reactor blew up at the Badische Anilin & Soda-Fabrik (BASF) plant in Ludwigshaven, West Germany, affecting 75 workers. In 1956, a 2,4,5-T reactor exploded at a Rhone-Poulenc facility at Pont de Claix, France, exposing 17 people to dioxin. Trichlorophenol reactors blew up in 1963 at a Philips-Duphar plant in Amsterdam, Holland, with 106 persons exposed, and five years later at a Coalite and Chemical Products Ltd. plant at Bolsover, Derbyshire, U.K. Only eight workers were in the building at the time, one of whom was killed by falling masonry, but more than 80 came down with chloracne from dioxin contamination after the plant was reopened. The 1976 accident at Seveso was also a reactor explosion, but in this case it was the public, not workers, who were most numerous exposed¹².

In addition, by the count of British dioxin authority Alastair Hay, there have been at least 19 instances of exposures at chlorinated phenol plants, involving a total of many hundreds of workers, during routine production processes as a result of poor industrial hygiene. These include incidents at Nordrhein-Westfalen and Boehringer plants in West Germany (1949 and 1952-54), Rhone-Poulenc in France (1953-71), Diamond Alkalai in Newark, N.J., and Hooker in Niagara Falls, N.Y. (both 1956),

¹² Hay 95-146.

Melegnanesi Saronio in Italy and Thompson-Hayward in Kansas City (both 1959), Diamond Shamrock in the United States (1960), a 1964 incident somewhere in the Soviet Union, Dow in Midland, Mich. (1964), Spolana in Czechoslovakia (1964-69), Coalite in the U.K. (1970), a 1970 incident somewhere in Japan, a 1972 incident in the USSR, Linz Nitrogen in Austria (1972-73), Bayer in West Germany (1974), and Monsanto in the U.K. (1976)¹³.

All in all, Hay concluded, "(t)wo thousand men have developed a most disfiguring skin condition, chloracne, as a result of their involvement" in trichlorophenol production. Symptoms of chloracne include straw-colored cysts, black-heads, pustules and abscesses, which may eventually leave scars. The skin takes on a dirty gray appearance, so severe in one case that a Southern white worker with strong racial prejudices developed emotional problems because he was often regarded as black. Under Jim Crow laws he was forced to use segregated facilities. In severe cases, the eruptions appear on the neck, shoulders, genitals, chest, lower trunk and, in worst cases, the hands, feet and legs. The disease is also persistent. A study of Monsanto trichlorophenol workers in 1979 found 29 men who had had chloracne for 30 years¹⁴.

¹³ Hay 96-97.

¹⁴ Hay 90-1; quotation, 138; Gough 167-68. The study cited is Marion Moses, et al., "Health Status of Workers With Past Exposure to 2,3,7,8-Tetrachlorodibenzo-p-dioxin in the Manufacture of 2,4,5-Trichlorophenoxyacetic Acid: Comparison of Findings With and Without Chloracne," American Journal of Industrial Medicine 5 (1984): 161-

On the other hand, damage to the liver and nervous system that doctors had found in victims of the Nitro explosion had subsided by 1953, and the chloracne had improved. Industry's approach was to treat the chloracne, monitor workers' health and try to limit their exposure. At Nitro, a hazard-pay surcharge was negotiated with the union, and men were allowed to refuse to work in the trichlorophenol or 2,4,5-T processes. After 1957, when dioxin was identified as the cause of chloracne among trichlorophenol workers by Dr. George Schulz of the University of Hamburg, steps could also be taken to limit the amount of dioxin by controlling production temperatures¹⁵.

IV. Later Studies of Industrial Exposure

In the 1970s and 1980s, after the exposure of civilian and military populations to dioxin had become controversial, there was increased research interest in what could be learned from the industrial exposures. Here the pre-systematic account leaps ahead chronologically to summarize that research.

The 1949 Nitro explosion was the first, and workers there have been studied the longest. In the 1980s, researchers found that they do not seem to have died as a result of dioxin exposure, or to have developed cancer or heart disease. Nor does

¹⁵ Hay 98-102; Gough 29-33, 157-71, 183-92.

their exposure seem to have caused them to father fewer children, or children with birth defects. They did suffer -- many of them severely, many for decades -- from chloracne. In addition, studies have found other health differences between exposed and unexposed workers. For example, exposed workers experienced a significantly higher incidence of gastrointestinal ulcers and "farmer's skin," a condition in which the skin swells when exposed to sunlight. Also, smokers exposed to dioxin had poorer lung function than smokers who had not been exposed. The ulcers and poor lung function were not associated with the presence of chloracne, however, weakening the case that they might have been caused by dioxin. Although there seemed to be no association between dioxin exposure and heart disease, there was an increase in heart-disease risk factors -- elevated blood cholesterol and triglycerides. Studies also found an association between dioxin exposure and complaints of decreased sex drive and impotence¹⁶.

Studies have also been carried out on the health and/or mortality of workers exposed to dioxin at the BASF plant in West

¹⁶ My summary of the research follows Hay 98-102 and Gough 157-71. Major Nitro studies include Judith A. Zack and Raymond R. Suskind, "The Mortality Experience of Workers Exposed to Tetrachlorodibenzodioxin in a Trichlorophenol Process Accident," Journal of Occupational Medicine 22-1 (1980): 11-14; R. R. Suskind and V. S. Hertzberg, "Human Health Effects of 2,4,5-T and Its Toxic Contaminants," JAMA: Journal of the American Medical Association, 251-18 (1984): 2372-80; Marion Moses, et al., "Health Status of Workers With Past Exposure to 2,3,7,8-Tetrachlorodibenzo-p-dioxin in the Manufacture of 2,4,5-Trichlorophenoxyacetic Acid: Comparison of Findings With and Without Chloracne," American Journal of Industrial Medicine 5 (1984): 161-82.

Germany in 1953, the Philips-Duphar plant in Holland in 1963 and the Coalite plant in England in 1968, as well as of some of the routine production exposures¹⁷. As in the Nitro studies, workers were found to have suffered persistent chloracne and a variety of other complaints, but there was no firm evidence that workers were dying early or of unusual causes. "(M)en who participated in trichlorophenol and 2,4,5-T manufacture are neither dying like flies nor displaying symptoms that suggest that their lives will be shortened," Gough concluded. "Although many were clearly exposed to dioxin because they came down with chloracne, life-threatening and life-shortening diseases are no more frequent among them than can be expected."¹⁸

Almost as persistent as the chloracne, however, was the ambiguity of the studies in regard to cancer, heart disease and birth defects. For example, a study of BASF workers found an excess of gastrointestinal cancer. Although the number of cancers was small, three or four, the incidence was two to three times the expected rate. Such data not only permit but require interpretation. The authors of the study concluded that the incidence of stomach cancer "cannot be adequately explained as a

¹⁷ Gough 173-82 and citations.

¹⁸ Gough 182.

mere chance event."¹⁹ Gough, however, interpreted the situation this way:

If that excess (of stomach cancers) is actually related to dioxin, there must have been something special about exposure at BASF, because no excess of stomach cancers is seen in other dioxin-exposed workers. Alternatively, the BASF workers might have shared another common exposure that was associated with their cancers, or the cluster of three stomach cancers might have occurred by chance, unrelated to any common exposure²⁰.

Similarly in the Philips-Duphar case, no excesses of heart disease among production workers were found, but four of seven heart disease deaths recorded among men at the plant were of workers hired especially to clean up the factory after the accident. That was above the statistical norm. British dioxin authority Alastair Hay's interpretation is that the use of organic solvents to remove paint may have exposed the cleanup crew to more dioxin than usual, which could also account for an unexpected high incidence of chloracne. The picture is complicated, he noted, by the fact that crew members were professionally exposed to a "variety of toxic substances both before and after coming into contact with dioxin."²¹ Gough, on the other hand, while noting many of the same complicating factors, suggests that "other exposures could at least partly

¹⁹ A.M. Thiess, et al., "Mortality Study of Persons Exposed to Dioxin in a Trichlorophenol-Process Accident Which Occurred in the BASF AG on November 17, 1953," American Journal of Industrial Medicine 3 (1982): 179-89; quotation 188.

²⁰ Gough 174.

²¹ Hay 109.

explain the excess of heart disease deaths" at Philips-Duphar, which he finds "more of a puzzle than an indication of an association."²²

There were 12,500 to 16,000 accidental workplace deaths annually in the United States in the years 1949-76²³. In that context, chlorinated phenol plant accidents whose only unambiguous link was not with cancer or heart disease but with a skin ailment, even a sometimes disfiguring one, were not a major social problem. They did not become major news stories. A search of the New York Times Index failed to find any contemporaneous news accounts of the explosions at Nitro in 1949, BASF in West Germany in 1953, Philips-Duphar in Amsterdam in 1963, or Coalite in Bolsover, U.K., in 1968. Trichlorophenol workers, in fact, were seldom the focus of media interest in their own right. Their symptoms did command attention, however, often being used to describe the possible ill effects of dioxin in a context seemingly far removed from chemical factories, the forests of South Vietnam.

V. Ranch Hand: Defoliation in Vietnam

Although it was considered for use in both World War II and the Korean War, the first military application of 2,4,5-T

²² Gough 174.

²³ National Safety Council, Accident Facts: 1988 Edition (Chicago: National Safety Council 1988): 35.

apparently was by the British in Malaya in the 1950s. They sprayed it on forests to increase visibility and reduce the danger of ambush, and also used herbicides to destroy crops grown by and for communist insurgents²⁴. Denying the enemy food and forest cover were likewise the twin goals of the U.S. defoliation program in Vietnam, which began with small-scale tests in 1961 and peaked in 1967-69 before being phased out in 1970-71. Upwards of 20,000 herbicide missions were flown over South Vietnam, by crews whose motto was "Only We Can Prevent Forests" and whose crest was a green field bisected by a swath of brown. About 19 million gallons of herbicide, mostly 2,4,5-T and 2,4-D, but also including another plant growth regulator named picloram and an arsenical compound, cacodylic acid, were sprayed on an estimated 8.5-10 percent of the land area of the country, or 6,600 square miles²⁵.

Herbicide barrels were color-coded in Vietnam. Agent Blue, cacodylic acid, was widely used to destroy rice crops, on which the growth regulators are ineffective. It was used from beginning to end of the operation, 1962 to 1971, as was Agent

²⁴ Arthur H. Westing, "Herbicides in War: Past and Present," Herbicides in War: The Long-Term Ecological and Human Consequences, ed. Arthur H. Westing (London: Taylor 1984): 4; Hay 149.

²⁵ William A. Buckingham Jr., "Operation Ranch Hand: Herbicides in Southeast Asia," Air University Review 35 (July-August 1983): 42-53; Hay 147-85; Westing 5-7; Gough 43-61; motto and crest, Michael Uhl and Tod Ensign, GI Guinea Pigs: How the Pentagon Exposed Our Troops to Dangers More Deadly Than War: Agent Orange and Atomic Radiation (N.p.: Playboy 1980): 111-135.

White, a mixture of 2,4-D and picloram. Neither was contaminated with dioxin. About 5.6 million gallons of White were used, and about 1.1 million gallons of Blue. The herbicides with the highest levels of dioxin contamination, Purple, Pink and Green, were used from 1962 to 1965. Based on only a very few samples, scientists later concluded that Pink and Green may have contained around 65 parts per million of dioxin, and Purple half that much. About 145,000 gallons of Purple, 123,000 gallons of Pink and only 8,200 gallons of Green were used. Agent Orange came into use in 1965, after its major supplier, Dow Chemical Co., had reduced the dioxin level in its 2,4,5-T as the result of a chloracne outbreak at its Midland, Mich., plant in 1964. From 1965 until 1971 more than 10.5 million gallons of Agent Orange were used, with Dow's product mixed with that of other suppliers, some of which had far higher dioxin levels. However, at an average estimated at 1.98 parts per million, Agent Orange was less contaminated with dioxin than its forerunners.²⁶

The program was called Ranch Hand. Military assessments were that it was tactically successful, but it was also controversial almost from the start²⁷. In the early 1960s, before dioxin

²⁶ Janice R. Long and David J. Hanson, "Dioxin Issue Focuses on Three Major Controversies in U.S.," Chemical & Engineering News 6 June 1983: 23-36, especially 29; Peter H. Schuck, Agent Orange on Trial: Mass Toxic Disasters in the Courts (Cambridge: Harvard UP 1987): 85-7; Gough 184-5; .

²⁷ Buckingham 44-8. For a contrary view on its tactical usefulness, see James William Gibson, The Perfect War: Technowar in Vietnam (Boston: Atlantic Monthly 1986): 123-4.

became an issue, there seem to have been three overlapping controversies:

- 1) whether herbicides and other chemical agents used in Vietnam constituted chemical warfare;
- 2) the morality of using crop destruction and hence starvation as a weapon;
- 3) and the overall impact of the war on the ecology of Vietnam.

The fear of being accused of conducting chemical warfare had been one reason the U.S. decided against using herbicides in World War II²⁸. In the Vietnam era, the issue was raised early by the editors of the New Republic, by British philosopher and pacifist Bertrand Russell and by the Federation of American Scientists, among others.²⁹ Among those protesting against the use of herbicides to destroy food crops -- a tactic which arguably hurt civilians more than enemy troops -- was Harvard nutrition professor Jean Mayer. Food denial and chemical warfare were also issues for biochemist John Edsall and molecular biologist Matthew Meselson, both of Harvard, who led a drive that garnered signatures of 5,000 scientists on a petition presented

²⁸ Hay 149.

²⁹ See "One Man's Meat," New Republic 23 March 1963: 5; Bertrand Russell, "Correspondence: Chemical Warfare in Vietnam," New Republic 6 July 1963: 30; Federation of American Scientists, "FAS Statement on Biological and Chemical Warfare," Bulletin of the Atomic Scientists October 1964: 46-7. The variety of chemical agents used by the U.S. military in Vietnam is discussed in M. F. Kahn, "Vietnam," CBW: Chemical and Biological Warfare, ed. Steven Rose (Boston: Beacon 1969): 87-98.

to President Lyndon B. Johnson in 1967. One specific concern was that the United States might be violating the 1925 Geneva Protocol prohibiting chemical and biological warfare³⁰.

Criticism of herbicide spraying in Vietnam, however, came to be focused most strongly on the ecological impact of the war. Some members of the American Association for the Advancement of Science, led by E. W. Pfeiffer, a zoologist at the University of Montana, and Arthur Galston, a Yale biologist, began seeking a AAAS investigation of ecological damage as early as 1966. The association's leaders instead approached the government, which the next year hired Midwest Research Institute to assess the likelihood of long-term environmental damage to Vietnam by reviewing the literature on domestic uses of 2,4,5-T. In 1968 the institute reported no clear danger of long-term damage. Later that same year an on-the-spot investigation by U.S. Department of Agriculture botanist Fred H. Tschirley concluded that Ranch Hand had caused ecological damage, particularly to mangrove forests, but that the damage probably could be reversed over time³¹.

³⁰ Jean Mayer, "Starvation as a Weapon," Ecocide in Indochina: The Ecology of War, ed. Barry Weisberg (San Francisco: Canfield 1970): 79-88, originally under the same title in Scientist and Citizen 9 (August-September 1967): 115-21. On the scientists' petition, see Hay 153, and Harold M. Schmeck Jr., "U.S. Review Urged on Chemical War," New York Times 15 Feb. 1967: 1+.

³¹ Hay 152-5; Walter Sullivan, "War Defoliation Studied in Report," New York Times 7 Jan. 1968: 3; Fred H. Tschirley, "Defoliation in Vietnam," Science 163 (1969):779-86.

A field study the next year by Pfeiffer and University of Washington zoologist Gordon Orians, sponsored by the Society for Social Responsibility in Science, was harsher. While acknowledging the military value of the herbicides, Pfeiffer and Orians reported that South Vietnam was being environmentally devastated. Meanwhile, the leadership of AAAS, the nation's most prestigious umbrella organization for scientists, remained divided over the wisdom of singling out Vietnam for ecological concern. Anthropologist Margaret Mead was reported to have called Vietnam "just peanuts" compared to technological intrusions such as the Aswan High Dam in Egypt. There was also reluctance to get involved in the politically polarized Vietnam War controversy. Calls for study of long-term alteration of the world environment were passed in 1967 and 1968, without mentioning Vietnam. Finally, in December 1969, the AAAS voted to investigate herbicide damage in Vietnam and asked Meselson to head the study³². By then, however, the controversy had taken a dramatic new turn.

VI. The Bionetics Study

In 1965 the National Cancer Institute hired a private laboratory, Bionetics Research Laboratories of Litton Industries, to investigate a number of chemicals for cancer- and birth

³² Hay 153-60; Mead quotation, 157; Gough 55-7.

defect-causing potential. One of the substances was 2,4,5-T, and in 1966 the herbicide was found to be teratogenic, that is, to cause birth defects in laboratory animals. The information was not disclosed for nearly three years, until an associate of Ralph Nader leaked it to a student of Matthew Meselson, the Harvard molecular biologist who was also active in seeking a scientific evaluation of the U.S. defoliation program in Vietnam. Meselson, Arthur Galston and other scientists took the information to Lee DuBridge, a friend of Galston's and science adviser to President Richard M. Nixon. In October 1969 DuBridge set the defoliation controversy on its ear by making the Bionetics findings public and announcing that use of 2,4,5-T in Vietnam would be restricted to areas remote from the population³³.

DuBridge's announcement had little immediate effect on Ranch Hand. The Department of Defense maintained it was already limiting spraying to remote areas. Arguing for the program's military necessity, it made no changes. The Bionetics results did galvanize the AAAS, however. The organization called for an immediate halt to 2,4,5-T use in Vietnam in the same December 1969 meeting in which it authorized the ecology study. The resulting Herbicide Assessment Commission was headed by Meselson and directed by Arthur H. Westing, another early critic of defoliation and a botany professor at Windham College in Vermont. The HAC was at work by February 1970 and arrived in Vietnam in

³³ Hay 158-9.

July. Meanwhile, the pace of activity and controversy quickened on other fronts. Government agencies carried out reviews of the Bionetics research, journalist Thomas Whiteside published highly critical articles on defoliation in the New Yorker, and the Commerce Subcommittee on Energy, Natural Resources and the Environment, chaired by Sen. Philip A. Hart, D-Mich., opened hearings on 2,4,5-T. Later in the summer, Congress mandated a National Academy of Sciences study of the effects of herbicides in Vietnam. In April, the Defense Department announced the suspension of use of 2,4,5-T-based Agent Orange (but not other herbicides) in Vietnam³⁴.

Back from Vietnam since August, the Herbicide Assessment Commission presented a highly critical report to the AAAS in December 1970. The commission found that Ranch Hand had caused "extremely serious harm" to land and people in Vietnam. One-fifth to one-half of South Vietnam's mangrove forests had been destroyed, it reported, along with perhaps half the trees in the hardwood forests north and west of Saigon. It reported that the crop denial program actually denied food not to enemy soldiers but to civilians, and it called for further study of reported increases in stillbirth and birth defect rates among South Vietnamese. Forewarned that the study had harsh things to say,

³⁴ Hay 159-61; Gough 57; "Meselson to Head Herbicides Study," Science 167 (1970): 37. Whiteside's New Yorker articles, appearing in the 7 Feb. and 14 March issues, are reprinted in Thomas Whiteside, Defoliation (New York: Ballantine 1970): 1-53.

the White House announced on Dec. 26, 1970, that spraying would be phased out rapidly. Except for brush control around military bases, herbicide use was terminated in Vietnam in February 1971³⁵.

VII. Domestic Uses of 2,4,5-T

Disclosure of the Bionetics research also directed attention to domestic use of 2,4,5-T. The herbicide thus joined a lengthening list of pesticides -- DDT, aldrin/dieldrin, heptachlor and chlordane -- under attack by environmentalists in the courts and under increasingly critical scrutiny in regulatory agencies³⁶. In the same October 1969 statement in which DuBridge announced restrictions on Ranch Hand, he also announced that the U.S. Department of Agriculture would in effect ban 2,4,5-T's use on food crops after Jan. 1, 1970, unless a safe residue level could be established by then by the Food and Drug Administration. His announcement had as much effect domestically as in the war zone. The Department of Agriculture ignored it, testifying in the spring of 1970 that 2,4,5-T did not pose a hazard on food

³⁵ Hay 161-2; Philip M. Boffey, "Herbicides in Vietnam: AAAS Study Finds Widespread Devastation," Science 171 (1971) 43-7.

³⁶ See Graham, Since Silent Spring, and Thomas R. Dunlap, DDT: Scientists, Citizens, and Public Policy (Princeton: Princeton UP) 1981.

crops that required cancellation or suspension, although no safe tolerance level had been established by the FDA³⁷.

Controversy continued to build in early 1970. In February, Rep. Richard D. McCarthy, D-N.Y., held informal hearings at Globe, Arizona, where residents had complained of deformed animal offspring, human illness and damaged vegetation near a national forest area sprayed with herbicides including 2,4,5-T. An investigating team headed by Fred Tschirley, who two years earlier had investigated ecological damage in Vietnam, cleared the herbicides of all but minor damage to plants. Whiteside's New Yorker article, appearing the same month, was credited with spurring the Senate Commerce subcommittee hearings chaired by Hart. Convening in April, the panel heard testimony on the one hand that the Bionetics birth defects might not have been caused by 2,4,5-T at all, but by its contaminant, dioxin. The committee was told that dioxin was present in higher concentrations in the Bionetics samples, around 27 parts per million, than in current production grades (under 1 ppm). On the other hand, the panel was told that even 2,4,5-T with less than a half part per million

³⁷ Nicholas Wade, "Decisions on 2,4,5-T: Leaked Reports Compel Regulatory Responsibility," Science 173 (1971): 614-5; Congressional Quarterly, Almanac: 91st Congress, 2nd Session 1970 (Washington: Congressional Quarterly 1971): 495-6.

dioxin was associated with birth defects, and that the product was widely available for casual use by consumers³⁸.

While the hearings were still under way, the government announced that liquid formulations of 2,4,5-T could no longer be used around homes or on lakes, ponds or ditch banks, and that the Department of Agriculture was canceling the registration of non-liquid forms around homes and on food crops, including rice. The product was still registered for use in many areas, however, including range and pasture land, forests, and rights of way. Dow Chemical Company quickly appealed the cancellation on rice and asked for a scientific advisory committee to investigate, as provided under the federal pesticide act. Filing the appeal allowed use on rice to continue³⁹.

The nine-member advisory committee, chaired by James G. Wilson, a research pediatrics and anatomy professor at University of Cincinnati, submitted its report in May 1971. It recommended that all uses of 2,4,5-T be restored, but with limitations on the amount of residue allowed on food or in drinking water, as well as limitations on dioxin contamination. For example, no more than 0.1 ppm of dioxin would be permitted in future production. The committee's advice, however, was rejected by William D.

³⁸ Bovey and Young 11-13; U.S., Congress, Senate, Committee on Commerce, Effects of 2,4,5-T on Man and the Environment, Hearings Before the Subcommittee on Energy, Natural Resources and the Environment, 91st Cong., 2nd sess.

³⁹ Bovey and Young 13; Donald E. Davis, "Herbicides in Peace and War," BioScience 29 (February 1979): 93.

Ruckelshaus, the first administrator of the new Environmental Protection Agency, which had taken over responsibility for pesticide regulation from the Department of Agriculture in December 1970. Ruckelshaus instead called for public hearings⁴⁰.

Ruckelshaus' rejection of the committee's expertise as a sufficient basis for decision shocked some scientists. It also set off a long series of complex legal and administrative developments involving manufacturers, environmental groups and the government. Hearings were scheduled to begin in April 1974, then delayed. A scientific conference held in Washington in March 1974 brought together representatives of all sides for technical discussions. In June the EPA dropped its cancellation of 2,4,5-T's registration for use on rice and announced that it no longer intended to hold hearings, saying it had run into methodological problems in trying to monitor residues on food⁴¹.

In addition to precipitating the end of Ranch Hand and directing attention toward domestic uses of 2,4,5-T, the Bionetics report also set off a wave of dioxin research. Studies published in the early 1970s generated data on dioxin's acute toxicity, teratogenicity and carcinogenicity in laboratory animals, as well as its chemical characteristics and sources in industrial processes and techniques for detecting it in increasingly minute concentrations. By the mid 1970s, the

⁴⁰ Bovey and Young 14-17.

⁴¹ Bovey and Young 14-26.

defoliation controversy seemingly was closed out except for decisions on disposal of surplus stocks of Agent Orange. (The last of it was burned at sea in 1977). Meanwhile, regulatory moves against 2,4,5-T were on hold awaiting new scientific information, which was accumulating rapidly⁴². The pace of controversy had slackened, but only for a time. It would pick up again in 1976, with the reactor explosion that exposed thousands of Italian citizens to dioxin, and gain even more force in 1978 and 1979, as veterans of the Vietnam war began to associate their illnesses and misfortunes with exposure to Agent Orange during the war.

⁴² Bovey and Young 133-205; on disposal of surplus Agent Orange see Hay 162-3.

CHAPTER TWO: SEVESO AND AGENT ORANGE

I. Seveso

The dioxin controversy entered a new phase when a reactor at the Industrie Chimiche Meda Societa Anonima (ICMESA) plant near Seveso, in the Lombardy region of northern Italy, overheated and blew its safety valve shortly after noon on Saturday, July 10, 1976. The formation of dioxin increases at high temperatures, and a cloud of trichlorophenol contaminated with an estimated half pound of the contaminant escaped. Previous such releases had exposed a relatively few industrial workers inside factories. This one escaped the plant into a community. It drifted downwind, settling over a densely populated, socially and economically diverse -- and already industrially polluted -- area of about 37,000 people. The countryside included family farms, homeyard animal breeders, small handicraft shops and furniture factories, in addition to chemical plants like ICMESA¹.

Officials of the company and of local government appear not to have realized the seriousness of the situation at first.

¹ Alastair Hay, The Chemical Scythe: Lessons of 2,4,5-T and Dioxin (New York: Plenum 1982): 197-227; Thomas Whiteside, The pendulum and the Toxic Cloud (New Haven: Yale UP 1979).

ICMESA, a subsidiary of the Givaudan and F. Hoffmann-LaRoche chemical firms, made trichlorophenol at Seveso for processing into hexachlorophene. Since trichlorophenol was also used to make herbicides, however, company officials decided to warn residents not to eat vegetables from the area. It took days to determine that dioxin had been released, and more than two weeks to begin evacuations. Meanwhile, animals sickened and died. Area residents, many of them children, developed skin inflammations that probably were the result of chemical burns. At least a dozen children were hospitalized shortly after the explosion as a precautionary measure, and on July 20 eight persons were hospitalized with skin inflammation and vomiting. They had handled and presumably eaten contaminated fruit and vegetables².

Residents had only to look around to see disaster. "Bird life appeared to have been devastated," wrote Thomas Whiteside, who continued in Italy the dioxin reportage he had begun in Vietnam. "(F)ields, gardens, and orchards were littered with the carcasses of swallows, martins, warblers and goldfinches, also with those of thousands of rats, mice, and moles."³ An estimated 81,000 farm animals lived in the areas later defined as contaminated, including almost 25,000 domestic rabbits and 55,000 poultry and other small animals. By the end of August 1976,

² Hay 197-202.

³ Whiteside, Pendulum 38.

2,062 rabbits and 1,219 small farmyard animals had died.

Eventually the entire farm animal population of the area was slaughtered⁴.

When officials did finally determine that the cloud which had settled over the area contained dioxin, they marked out geographical zones roughly corresponding to the severity of soil contamination and began moving residents out. The area south/southeast of the plant was divided into three zones: Zone A, the most heavily contaminated, comprised 269 acres. Dioxin was found there in concentrations up to 21,000 micrograms per square meter. Zone B, less heavily contaminated, contained 669 acres, and Zone R, a precautionary "Zone of Respect," 3,575 acres. Several towns were wholly or partially within the boundaries. In late July and early August all of Zone A was evacuated, about 730 people. Women in the first trimester of pregnancy in Zone B also were ordered out, and other safety precautions were imposed. The remaining Zone B residents, for example, were urged to "refrain from procreation," as Alastair Hay put it, and were told not to plant crops or to consume fruits and vegetables grown in the area. They also were advised to wash regularly. Steps were taken to limit children's contact with

⁴ Francesco Pocchiari, et al., "Environmental Impact of the Accidental Release of Tetrachlorodibenzo-p-dioxin at Seveso (Italy)," Accidental Exposure to Dioxins: Human Health Aspects, eds. Frederick Coulston and Francesco Pocchiari (New York: Academic 1983): 5-35.

contaminated soil, but inevitably, Hay observed, "some of these rules were flouted."⁵

The initial skin inflammations cleared up quickly, but five to six weeks after the explosion, chloracne began to appear among children. Perhaps they were more susceptible because of their age or because they played outside and were less careful about hygiene. Eventually, about 187 cases of chloracne, mostly among children, were confirmed. In Zone A, an estimated 7 percent of the population came down with the disease, a total of 50 cases. Eleven were determined to be severe and eight very severe. The rest were mild. (One case was still classified as severe 18 to 24 months after the accident, but by 1980, four years after, everyone's chloracne had cleared up. This contrasts with the persistence of chloracne often observed in industrial exposures.)⁶

Because of research showing that dioxin caused birth defects among laboratory animals, the contamination at Seveso also generated considerable concern about pregnancies under way at the time. Seven months before the explosion, abortion had been legalized in Italy to preserve the mother's physical and psychological health. Thirty-four women in the Seveso area are

⁵ Hay 197-202, 220-1.

⁶ Hay 212-4; Gough 152; Francesco Pocchiara, et al., "Human Health Effects from Accidental Release of Tetrachlorodibenzo-p-dioxin (TCDD) at Seveso, Italy," Annals of the New York Academy of Sciences 320 (1979): 311-20.

known to have obtained legal abortions after the explosion, but because of strong anti-abortion pressure from local doctors and politicians and the Catholic Church, an undetermined number obtained abortions in Switzerland or Britain⁷. This was to be only one of many complicating factors as scientists tried to determine the health effects of the disaster.

For residents, the aftermath was long and difficult. People evacuated from Zone A did not begin returning to their homes until late 1977. (As late as 1982 large areas of the zone were still uninhabited. Many of the homes were purchased by Hoffmann-LaRoche and demolished). Meanwhile, residents had to contend with restrictions on raising crops and advisories regarding their personal hygiene. Contaminated soil was scraped up and deposited in a landfill nearby. Lives were disrupted in other ways as well. Whiteside, in a visit to the region two years after the accident, found serious economic dislocation in the important furniture and timber import industries. "Few outsiders," he wrote, "wanted to take the chance of living with furniture that might be impregnated with dioxin."⁸

Even the experience of being subjected to long-term scientific studies was a strain. A factory worker told a reporter in 1983, "We are tired of doctors and technicians invading our homes and inspecting us like laboratory animals.

⁷ Hay, 214-5.

⁸ Whiteside, Pendulum 78; Hay 218-22; Gough 151-5.

What will happen has happened."⁹ The research was also a strain on those trying to conduct it. Two characteristics of the Seveso disaster made it very difficult for epidemiology, the study of diseases in populations, to be carried out. One was the complexity of what happened there. As one scientist put it, a large, densely populated area was

heavily polluted by an extremely toxic substance, capable of affecting several organs and systems both acutely and chronically. The involvement of a general population and the etherogenicity at (sic) the types of exposure, acute and chronic, heavy and light, in every possible combination . . . made it extremely difficult to design and carry out an epidemiological strategy¹⁰.

The other problem for epidemiologists was that Seveso turned out to be a different kind of disaster than they had feared. Severe health effects were expected in much of the population, and refined studies using standardized protocols or control groups were not thought to be necessary. After it became clear that gross, widespread damage to health had not occurred, according to the scientist, "the lack of well-designed epidemiological studies . . . made it impossible to rule out that minor health effects had affected large portions of the

⁹ Jon Nordheimer, "Dioxin's Effects in Italy Less Severe Than Had Been Feared," New York Times 31 Jan. 1983: 13.

¹⁰ Paolo Bruzzi, "Health Impact of the Accidental Release of TCDD at Seveso," Accidental Exposure to Dioxins, ed. Coulston and Pocchiari 215-6.

population . . . or that very serious effects had occurred in very limited subgroups."¹¹

An international committee which reviewed the research into health effects at Seveso concluded in 1984 that, except for chloracne, no adverse health effects had been observed. Four years later scientists reported finding no evidence of increased birth defect risk, but noted that low risks might have slipped through the net. If dioxin exposure did increase the chances of birth defects, the study concluded, "the overall risk is unlikely to be large or might be limited to very rare and specific birth defects."¹²

Meanwhile, clean soil was trucked into an area where contaminated soil had been scraped up, and grass and trees were planted to make a park. The park was donated to a foundation. Residents filed about 6,000 civil claims against the company, which eventually paid about \$80 million in damages to individuals and governments. Some company officials received jail sentences for failing to prevent the accident. In 1980 the plant's chief engineer was assassinated, apparently by left-wing terrorists.

¹¹ Bruzzi 216.

¹² Pierpaolo Mastroiacovo, et al., "Birth Defects in the Seveso Area After TCDD Contamination," JAMA: Journal of the American Medical Association 259 (1988): 1668-72; Gough 154.

His was the only fatality known without doubt to have resulted from the release of dioxin at Seveso¹³.

II. Agent Orange

Two years after the release of dioxin at Seveso, the controversy had calmed. In June 1978 the New York Times reported an announcement by Hoffmann-LaRoche that "scientific findings permit the 'confident assumption' that no serious and permanent damage to health occurred."¹⁴ Almost simultaneously, however, the first stirrings occurred of a new dimension to the dioxin controversy, one that would eventually overshadow Seveso: U.S. veterans of the Vietnam War became convinced that their health and that of their offspring had been damaged or destroyed by exposure to Agent Orange.

One point of origin was the work of a benefits counselor in the Chicago Veterans Administration regional office, Maude DeVictor. DeVictor noticed what she believed to be a common history of Agent Orange exposure among veterans coming to her office to inquire about benefits for health problems. Compensation was denied by the VA, on grounds that there was no evidence Agent Orange had caused the problems. DeVictor pressed

¹³ Hay 218-22; Gough 151-5; "Owners of Chemical Plant in Italy Paying \$80 Million in '76 Mishap," New York Times 21 May 1980: 10.

¹⁴ Paul Hofmann, "Company Says '76 Blast in Italy Caused Little Injury," New York Times 25 June 1978: 4.

the issue, however, and a documentary was broadcast March 23, 1978, on Chicago television station WBBM-TV, detailing her efforts to help what the liberal Progressive would soon call "the latest victims of the Vietnam War." The documentary, titled "Agent Orange: The Deadly Fog," seems to have been the first major news treatment of this domestic aspect of the defoliant controversy. Inquiries and disability claims quickened, and the VA in late 1978 set up a registry of information gleaned from physical examinations of veterans claiming Agent Orange-related illnesses¹⁵.

Another starting point was the illness and death of Paul Reutershan, a former Army helicopter crew chief in Vietnam. Before he died of cancer in December 1978, Reutershan helped organize Agent Orange Victims International and filed a lawsuit against three defoliant manufacturers. The organization would be one of the spearheads of the veterans' fight for recognition and compensation, and the suit eventually ballooned into a massive class action against the manufacturers. "I got killed in Vietnam," Reutershan said, "and didn't know it."¹⁶

¹⁵ Peter H. Schuck, Agent Orange on Trial: Mass Toxic Disasters in the Courts (Cambridge: Harvard UP 1987): 23-4; Michael Uhl and Todd Ensign, "Blowing the Whistle on Agent Orange," Progressive 42 (June 1978): 28-30.

¹⁶ Schuck 37-8; Reutershan quotation, Richard Severo, "Vietnam Veteran's Family Vows to Continue His Fight," New York Times 19 Dec. 1978: B2.

In its final form, the Agent Orange litigation begun by Reutershan was a mammoth action against seven industrial corporations with possible damages in the billions of dollars. The leading plaintiffs' attorney through most of the battle was Victor Yannacone, who had been instrumental in the litigation to ban DDT a decade earlier, but as many as 100 plaintiffs' lawyers also were involved. Many of them worked on a contingency basis: They would get paid if their clients won. The defendants were Dow Chemical Company, Monsanto Company, Diamond Shamrock Corporation, Uniroyal, Inc., T. H. Agriculture and Nutrition Company, Thompson Chemical Corporation and Hercules, Inc., all manufacturers of 2,4,5-T. More than 80,000 veterans sought tests at VA clinics for what they thought might be Agent Orange-related illnesses, and eventually more than 244,000 claim forms were filed with the court seeking compensation for a host of injuries and illnesses. Veterans believed Agent Orange had caused cancers, birth defects among their children, miscarriages by their wives, skin rashes, nervousness, loss of sex drive and other problems. The manufacturers argued throughout that no one could have received a high enough exposure to dioxin in Vietnam to have been harmed by it.¹⁷

¹⁷ Schuck 37-57, 76, 99-100, 193, 206-7. A convenient summary of the case on the eve of trial is Ralph Blumenthal, "Vietnam Agent Orange Suit by Veterans Is Going to Trial," New York Times 6 May 1984: 1+.

Even before assuming its final shape, the case raised numerous issues that had to be disposed of. Among them were whether the veterans would be allowed to sue as a class (they were), whether state law or federal common law would apply (a question eventually "defined out of existence" by an imaginative judge),¹⁸ and whether the government could be sued by plaintiffs or manufacturers. On this last issue, U.S. District Judge George Pratt of the Eastern District of New York ruled in late 1980 that the doctrine of "sovereign immunity" protected the government from suit not only by veterans but by manufacturers. (The makers maintained that any injury caused by Agent Orange was the result of government negligence. They wanted to sue the government to pay any damages assessed against the companies.) Let off the hook by Pratt, however, the government was dragged back into the case by Chief Judge Jack B. Weinstein of the Eastern District of New York, who replaced Pratt as the trial judge in October 1983. Weinstein ruled in December 1983 that sovereign immunity did not exempt the government from suit by wives, parents and children of veterans¹⁹.

Another important question explored in the pre-trial period was, What did the manufacturers and the government know about the risks of Agent Orange, when did they know it, and how did they act on the knowledge? This was important in regard to the

¹⁸ Schuck 128.

¹⁹ Schuck 67, 110, 131-8.

"government contractor defense" adopted by the manufacturers. This line of defense argued that the government controlled and dictated the manufacture and use of Agent Orange; therefore, if any harm had been done, the government and not the makers was responsible. After an outbreak of chloracne among trichlorophenol workers in Midland, Mich., in 1964, Dow Chemical Company notified Michigan health authorities and called a meeting of its competitors to warn of the health hazard and share analytical techniques. The fact of the meeting had been known for years²⁰, but so-called "smoking gun" memoranda from participants, quoted in pre-trial documents in April 1983, indicated industry's fear that publicity would bring federal regulation. There were "alarming amounts" of dioxin in some manufacturers' 2,4,5-T, one memo was quoted as saying, "and if the Government learns about this the whole industry will suffer."²¹

The question was, did the manufacturers hide risk information from the government that would have led to more cautious use of Agent Orange in Vietnam? No, said Dow in a motion to dismiss the suit. The company offered three arguments. One was that the

²⁰ A Dow official, Julius E. Johnson, discussed it in testimony before Sen. Philip Hart's environmental subcommittee in 1970. See U.S., Congress, Senate, Committee on Commerce. 1970. Effects of 2,4,5-T on Man and the Environment, Hearings Before the Subcommittee on Energy, Natural Resources and the Environment. 91st Cong., 2d sess., testimony of Julius Johnson.

²¹ Schuck 61, 85-7, 99-100.

risks of which the company was aware involved extremely high workplace exposures of 6,000 to 10,000 parts per million, orders of magnitude above any dose veterans could have received in Vietnam. Therefore, the company argued, there were no relevant hazards to report to the government. Dow's second line of argument was that middle-level government officials knew plenty about the potential hazards of dioxin and its presence in Agent Orange. For example, the Rand Corporation had warned the government in 1967 that Vietnamese peasants' fears of the toxicity of Agent Orange were founded on more than solely Vietcong propaganda. Finally, the company argued, even if the government had been told more, it would not have acted differently²².

In their case against dismissal, veterans' attorneys said in a motion that since the mid-1960s,

Dow had information that Agent Orange supplied to the Government contained large levels of dioxin, far in excess of anything Dow considered safe or necessary Dow also knew that its own product would be mixed with that of others and used in this manner on the battlefield.

What did Dow do with this information? It concealed it from the Government and asked others, its co-defendants, to do the same²³.

²² Schuck 99-100; see also David Burnham, "Dow Says U.S. Knew Dioxin Peril of Agent Orange," NYT 5 May 1983: 18. On the level of workplace exposures, see E. R. Russell, "U.S. Government's Early Knowledge of Dioxin in Agent Orange," ltr, NYT 15 July 1983: 22. Russell was director of public issues for Dow.

²³ David Burnham, "Dow Says U.S. Knew Dioxin Peril of Agent Orange."

In May 1983, in what legal scholar Peter H. Schuck calls "one of the most important decisions in the long, tortuous history of the Agent Orange case," Pratt ordered the trial to go forward. Saying that the government "had a considerable amount of knowledge about dioxin and its health hazards going back to the 1940s," he nevertheless ruled that only a jury could decide whether Agent Orange was indeed safe or whether knowledge had been withheld that would have changed the government's course of action²⁴.

III. Agent Orange Research and Legislation

Pratt's ruling refocused the attention of lawyers on both sides on how to present the issue of whether Agent Orange had in fact caused any illnesses or death. Parallel with these developments in the courtroom, a number of research projects were undertaken to attempt to answer just that question. In addition to more than 50 federally-sponsored studies costing more than \$100 million, research was also sponsored by veterans organizations and by some of the states. Among the more important epidemiological studies was an Air Force investigation of the deaths and illnesses (mortality and morbidity) of airmen directly involved in Operation Ranch Hand. In addition, four

²⁴ Schuck 98-102; quotation from judge's ruling, Michael Winerip, "U.S. Judge Clears Way for Trial on Agent Orange," New York Times 13 May 1983: 12.

projects were planned by the federal Centers for Disease Control. These were to study selected cancers among Vietnam veterans; birth defects among children fathered by Vietnam veterans; the mortality and morbidity of military personnel who served in Vietnam (the so-called "Vietnam Experience" project), and the mortality and morbidity of ground troops likely to have been exposed to Agent Orange²⁵.

The CDC investigation of troops most likely to be exposed to Agent Orange was never carried out at all. Hampered by the difficulties of determining just who had been exposed to how much, the study was eventually scrapped after investigators decided not enough troops had been significantly exposed to allow meaningful science to be done²⁶. Results from the birth defects, cancer and Vietnam Experience studies began to come in only years later, after the Agent Orange suit was settled. One study had gone forward, however. That was the investigation of the men in the "Ranch Hand" crews who had actually carried out the spraying.

The first results of Ranch Hand came out in early 1984. The basic conclusion was that the men were not dying at high rates, at early ages, or from unusual diseases. Nevertheless, hopes that science would neatly resolve the controversy were dashed on the

²⁵ Gough 68-75, 95-97, 108-114. A convenient summary of research in progress as of late 1982 is Philip M. Boffey, "Agent Orange: Despite Spate of Studies, Slim Hope for Answers," New York Times 30 Nov. 1982: C1+.

²⁶ Philip M. Boffey, "Lack of Military Data Halts Agent Orange Study," New York Times 1 Sept. 1987: 1.

study's inconclusiveness. Part of that inconclusiveness lay in the fact that although the great majority of Ranch Hands were studied, there were only about 1,300 of these. Statistically, the study's power to detect anything other than sizable health effects was limited²⁷. Inconclusiveness also marked the findings themselves. Although overall the study gave Agent Orange a clean bill of health, it did find some unexplained differences, some not statistically significant, some not plausibly connected with Agent Orange exposure. Ranch Hands reported more past liver disease than controls and had poorer pulses in their feet, for example, and those over 40 who smoked had more heart disease than non-Ranch Hand smokers. Most noticeably, Ranch Hands' offspring died in the first 28 days of life more often than the offspring of the control group, and enlisted Ranch Hands reported more psychological and neuropsychiatric symptoms and performed less well on behavior and personality tests²⁸. Predictably, both sides claimed vindication. The veterans' attorneys noted the high infant death rates and liver and circulatory problems, while Dow said the results offered "overwhelming" evidence that Agent Orange was not responsible for a variety of diseases for which it was being blamed²⁹.

²⁷ "Air Force Under Fire for Agent Orange Study," Chemical Week 21 May 1980: 18.

²⁸ Gough 68-75, 80-81.

²⁹ Kenneth B. Noble, "Defoliant Study Sets Off Debate," New York Times 26 Feb. 1984: 33.

Along with the research projects, legislative responses also were under way. Medical care and compensation for those who believed they had been injured by Agent Orange were among a broad range of issues raised by veterans who had received less than a hero's welcome back home. The study that eventually was scrapped by the CDC got its start in Congress in 1979, which passed a bill requiring the Veterans Administration to study the health effects of Agent Orange on veterans. President Carter vetoed the bill on constitutional grounds but pledged the research would be done anyway. Veterans, however, were suspicious of the VA's ability to carry out an impartial study, and the project was plagued with disagreements over design. Responsibility for the study was transferred to the CDC in 1982³⁰. Two years later, after numerous attempts by legislators sympathetic to the veterans, Congress passed and President Reagan signed legislation that for the first time mandated disability compensation for veterans with a limited number of dioxin-associated symptoms other than chloracne. The payments were to be "interim," however, until a scientific advisory panel could review claims in the light of future research results, and it took a court challenge by veterans to dislodge the VA from drawing the line at chloracne³¹.

³⁰ "Carter Veto Cites Procedure on Study of Defoliant," New York Times 3 Jan. 1980: 17; "Agency to Yield on Herbicide Issue," New York Times 16 Oct. 1982: 6.

³¹ Sheldon P. Yett, "What Is Agent Orange?" Congressional Quarterly Weekly Report 16 Dec. 1989: 3430.

IV. The Settlement

Approach of the Agent Orange trial date in May 1984 found all sides debating the first Ranch Hand findings as well as the plans for additional studies and Congressional proposals to compensate the veterans. Meanwhile, the Agent Orange litigation had changed dramatically under Weinstein, a liberal and innovative judge who had concluded that the veterans deserved compassion but that their case was very shaky on the causation issue³². The litigation reached a turning point on May 7, with the announcement that the suit had been settled out of court. Urged on by Weinstein, whose every action after taking over the case seemed designed to push for a settlement, lawyers negotiated an agreement over the weekend whose main features, according to legal scholar Peter Schuck, had been drawn by the judge himself³³.

The defendant companies, while not admitting any liability for health problems of veterans, agreed to set up a \$180-million fund for veterans and their families, in return for the suit against them being dropped. Eventually, more than 200,000 veterans filed claims for compensation from the fund. Ruling that there was no way to connect specific diseases with Agent Orange exposure, Weinstein approved a plan to award most of the

³² Schuck 111-42, 155.

³³ Schuck 143, 159-60.

money to the totally disabled and to the families of deceased veterans. The money was to be paid regardless of the nature of their illness, so long as they were among the 50 percent thought to be most heavily exposed to Agent Orange. Under that plan, about 50,000 veterans were to receive payments, which began to be made in 1989, 11 years after the suit was first filed by Paul Reutershan³⁴.

Reactions to the settlement and distribution plan were mixed. Many veterans were angered at being left out of the negotiations toward a settlement, at being deprived of a chance to have a jury decide on their claims, and at Judge Weinstein's evident conclusion that they had no case on the merits. Al Marcotte of Yonkers, N.Y., told the New York Times, "I don't think they (the manufacturers) should get off this easy. I have no feeling for this country anymore. They have total disregard for us when they can plea bargain behind a closed door without notice to us." Lawyers for the veterans, however, told the newspaper the large settlement amounted to an admission of responsibility by the companies. Yannacone called the amount "insignificant in view of the damages, but the point has been made." The veterans won "the final battle of the Vietnam War," he said. A Dow Chemical Company spokesperson called the agreement a "compassionate, expedient and productive means" of meeting the needs of all

³⁴ Schuck 143-67; 206-23; Stephen Labaton, "Five Years After Settlement, Agent Orange War Lives On," NYT 8 May 1989: D1+.

parties. "Despite the strength of the scientific case, it would be difficult for the jury to sort out the issues in this highly emotional case," the company said³⁵.

V. Post-Settlement Research Findings

At the time of the settlement, Dow was not the only party to interpret the veterans' case as lacking scientific merit. Judge Weinstein himself had reached the same conclusion, despite the fact that results had been obtained in only one of the major studies of veterans, the one involving Ranch Hands. In the years after the settlement, however, scientists worked through the huge amount of research undertaken to settle the veterans' contentions. Like the studies of industrial exposure, the results were marked by ambiguity while offering no positive support that Agent Orange veterans were dying, falling ill or fathering defective children in unusual numbers. Again it is necessary to leap ahead chronologically to summarize the findings.

The first Ranch Hand results, the reader may recall, came out just before the settlement in early 1984 and suggested that while crew members were not dying early or from unusual causes, there were some unexplained health differences³⁶. Later that same

³⁵ Ralph Blumenthal, 'Veterans Accept \$180 Million Pact on Agent Orange,' NYT 8 May 1984: 1; Schuck 171-3.

³⁶ Gough 68-75, 80-81.

year, a birth defects study by the Centers for Disease Control was published. It found that Vietnam veterans appeared to be at no unusual risk of fathering children with defects, although it did find an association between exposure to Agent Orange and four specific defects, including spina bifida. The results were questioned, however, because of the difficulty of determining who was exposed to how much Agent Orange in Vietnam³⁷.

In 1986 a new technique allowed scientists to measure individual levels of dioxin by analyzing blood samples. Matching blood sample with military records and interviews indicating potential Agent Orange exposure, a CDC pilot study concluded, in the words of federal health official Vernon Houk, that "it is not possible to get a sufficient number of exposed people through military records to do a meaning study of ground troops." The conclusion was questioned on the grounds that the military records did not give an accurate picture of potential exposure. In addition, the Times reported,

various panelists suggested that a limited number of troops, perhaps 20,000 to 60,000 from among the 2.9 million who served in Vietnam, might have received significant exposure to Agent Orange. But the C.D.C. argues that except for a few thousand people who regularly sprayed the chemicals, no practical means exists to find most of those with higher exposures. Testing all Vietnam veterans' blood would be prohibitively costly and would overwhelm laboratory capacity, Federal scientists say³⁸.

³⁷ Gough 108-15.

³⁸ Philip M. Boffey, "Lack of Military Data Halts Agent Orange Study," New York Times 1 Sept. 1987: 1+; David J. Hanson, "Science Failing to Back Up Veteran Concerns About Agent Orange," Chemical

Almost simultaneously, the Veterans Administration announced results of a routine study of Vietnam veterans, many of whom served after Agent Orange spraying was halted. The study found that Marines (but not Army personnel) who served in Vietnam were dying significantly more often from non-Hodgkins lymphoma and lung cancer. Again there was no way to tell whether those deaths were related to Agent Orange. Also in 1987, the CDC's "Vietnam Experience" study concluded that Vietnam veterans were not dying of cancer at unusual rates³⁹. In 1990 the CDC's study of cancer among Vietnam veterans found them more likely to develop the cancer, non-Hodgkins lymphoma. However, the lymphomas tended to be among sailors, rather than ground troops more likely to be exposed to Agent Orange. Though it was not designed to answer questions about Agent Orange, the study said no evidence was found that the defoliant had injured troops⁴⁰.

As is the case with Seveso and industrial exposures, research into the health of Vietnam veterans seems to indicate that if there were long-term health effects (other than chloracne) they are of the kind or magnitude that can't be caught in the net of epidemiology or unequivocally inferred from animal studies. Much of the research seems to indicate that dioxin is not as severe a

& Engineering News 9 Nov. 1987: 7-14.

³⁹ Hanson, "Science Failing to Back Up Veteran Concerns" 8-9.

⁴⁰ Andrew Purvis, "Clean Bill for Agent Orange," Time 9 April 1990: 82.

health threat as it was once considered to be, but as to just how serious it is, the research contains large areas of uncertainty. Nevertheless, some authorities see an emerging scientific consensus. Gough summarizes the overall dioxin health risk controversy this way:

After a decade and a half of studies and debates, harm from environmental exposure to dioxin has been assessed as nondetectable. Although concern about risk remains, exposures have been reduced, so that the level of risk has decreased. The consensus among most scientists -- that harm has been limited to highly exposed industrial populations and that none has been shown from environmental exposures -- may often be ignored, and the old claims about harm will be brought up again and again. But I am confident that the information gathered by science will eventually prevail. We are putting the dioxin problem behind us⁴¹.

⁴¹ Gough 257.

CHAPTER THREE: DIOXIN FIRESTORM IN 1983

I. Regulating Pesticides

In leaping ahead chronologically to summarize Agent Orange research, two other aspects of the dioxin controversy were placed to the side. Both were to combine with the Agent Orange litigation to produce the media firestorm of 1983-84. One was the federal effort to regulate the herbicide 2,4,5-T, culminating in the manufacturers' decision to drop the fight for the product. The other was the dioxin contamination of Times Beach, Mo., leading to federal buyout of the town in the spring of 1983. Both of these additional strands of the dioxin controversy need to be placed in historical context.

Until 1970, regulating pesticides was primarily the responsibility of the U.S. Department of Agriculture, although the Food and Drug Administration had some jurisdiction as well. The USDA had been given the task by the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), which was initially enacted in 1947. Political scientist Christopher J. Bosso, however, has described pre-1970 regulation as being overseen by a tightly controlled "pesticides subgovernment" made up of the agriculture committees in Congress, plus industrial and

agricultural companies and trade associations and the USDA. All participants in the process shared a belief in what Bosso has called the "pesticides paradigm" -- the conviction that herbicides, insecticides and other agrichemicals were the key to economic survival for farmers in the postwar economy. FIFRA's purpose was to assure farmers that the pesticides they purchased were of good quality. This it did by requiring manufacturers to register new products and to promise that they were effective and safe. Under the watchful eye of the pesticides subgovernment, the net effect of the law was to facilitate pesticide use. In Bosso's view, FIFRA was "a label law and little more."¹

In the climate of enhanced environmental awareness of the early 1970s, however, the mission of the new Environmental Protection Agency was to protect the environment, not to promote chemical agriculture. When the EPA took over pesticide regulation, it was evident that FIFRA was inadequate to the task. A major rewriting resulted in the Federal Environmental Pesticides Control Act of 1972 (FEPCA). This law tightened registration requirements and streamlined the procedures through which EPA could cancel or suspend products that posed unreasonable risks. It also allowed citizens a standing in court

¹ Christopher J. Bosso, Pesticides and Politics: The Life Cycle of a Public Issue (Pittsburgh: U of Pittsburgh P 1987): 32-3, 79-108; "label law" quotation, 51. See also James Whorton, Before Silent Spring: Pesticides and Public Health in Pre-DDT America (Princeton: Princeton UP 1974).

on cancellation and suspension actions. From a political perspective, according to Bosso, passage of the law

marked a critical change in the relationship among competing interests and between each interest and the government . . . The pesticides subgovernment that so long had dominated the direction of policy was forced to compromise with those who did not share full faith in the pesticides paradigm. . . . Environmental and health views that once had been almost automatically screened out in committee were now integral to policy deliberations. . .
. ²

Legislation is one thing and implementation another, however, and in Bosso's analysis the young EPA soon found itself overwhelmed by the large tasks and short deadlines given it by Congress. EPA was charged with developing uniform comprehensive guidelines for registering pesticides by 1974. In addition, it was charged with reregistering about 50,000 products and uses by October 1977. The agency failed to meet either deadline. The fundamental problem was the sheer lack of data. Registration of pesticides depended on accurate and comprehensive knowledge, "but the ad hoc, case-by-case process of USDA registration before the 1970s left the EPA with very little uniform data in its files," Bosso determined. Much of what it had was 10 to 20 years old, and new technologies and testing protocols made much of it "suspect, if not totally unreliable." Registrants were asked to fill in gaps in the data, but EPA made little effort to verify their validity. Such practices culminated in the Industrial Biotest scandal of 1976, in which charges of spurious tests and

² Bosso 176-7.

data falsification at a private laboratory sent company executives to jail and called into question the registration of about 200 pesticides³.

Meanwhile, EPA's first administrator, William Ruckelshaus, wanted to act quickly to establish the agency's environmental credentials. He did so by moving responsibility for enforcement of the act to the Office of General Counsel, which was staffed by lawyers instead of the scientists who had run enforcement at USDA and FDA. Often disregarding the scientists' views, the lawyers moved dramatically against several of the so-called persistent organochlorines -- such as DDT -- that were the main focus of environmental concern. Controversy followed. Finally in 1975, Bosso concluded, efforts by EPA to cancel the registrations of the pesticides chlordane and heptachlor brought such pressure for moderation from Congress and the administration of President Gerald Ford that EPA chief Russell Train reined in the Office of General Council⁴.

The agency then entered a period of routinized regulation, in which litigation and media coverage were de-emphasized and caution was stressed. One important administrative tool that

³ Bosso 178-84, 199.

⁴ Bosso 178-83. The crucial role played by OGC in the banning of one such organochlorine in 1974 is examined in Brendan Gillespie, Dave Eva and Ron Johnston, "Carcinogenic Risk Assessment in the USA and UK: The Case of Aldrin/Dieldrin," Science in Context: Readings in the Sociology of Science, eds. Barry Barnes and David Edge (Cambridge: MIT P 1982): 303-35.

helped EPA proceed more cautiously was the so-called Rebuttable Presumption Against Registration, or RPAR. This was a less formal procedure adopted by EPA in 1975 which allowed the agency to serve notice that it perceived a problem with a pesticide, but stopped short of more formal suspension or cancellation procedures. Served notice that EPA was concerned, the manufacturer was allowed to "rebut the presumption" that a problem existed⁵.

II. Regulating 2,4,5-T

It was within this framework that EPA continued to seek a satisfactory solution to the problem of regulating 2,4,5-T. Regulatory attention had focused on the herbicide, it was recounted in Chapter One, after Bionetics Research Laboratories found that it caused birth defects in animals. For a time the controversy over domestic regulation was interwoven with the Ranch Hand matter, but after defoliation ended in Vietnam the two controversies went their separate ways. In May 1970 uses of 2,4,5-T most likely to result in human exposure were suspended or cancelled, although the herbicide continued to be sprayed on pastures, rangelands, forests, right-of-way, miscellaneous non-agricultural areas and (because a cancellation order was under appeal) on rice. A scientific advisory committee recommended

⁵ Bosso 175.

that all its uses be restored, with restrictions on food residues and dioxin contamination. Ruckelshaus rejected the committee's advice, however, and announced plans to hold public hearings -- an example of bringing people into the decision-making circle who in Bosso's words "did not share full faith in the pesticides paradigm."⁶ In March 1974, scientists from industry, government, academia and environmental groups attended a two-day conference in Washington, D.C., discussing technical and legal issues. Three months later, in June 1974, EPA announced that it lacked sufficient data to proceed. It withdrew both its rice cancellation and its intention to hold public hearings.

This decision was sharply attacked by environmentalists and some EPA staff members. The chief of the toxic effects branch at the National Environmental Research Center, Dianne Courtney, testified before a Senate Commerce subcommittee that dioxin was "by far the most toxic compound known to mankind." The EPA defended its decision, however, and said more research was planned⁷. During the next several years the research picture was indeed filled in by both industry and government scientists. Scientists examined such questions as the breakdown of dioxin metabolically and in the environment, its environmental fate in soils and water, its uptake in plants, its bioaccumulation, its

⁶ Bosso 176-7.

⁷ Boyce Rensberger, "E.P.A. Ends Drive to Ban Defoliant," NYT 27 June 1974: 8; David Burnham, "Scientist Urges Congress to Bar Any Use of Pesticide 2,4,5-T," NYT 10 Aug. 1974: 13.

residues in soil, water and air, and its carcinogenic and teratogenic effects in laboratory animals. In general, scientists found dioxin and dioxin-contaminated 2,4,5-T to be potent animal toxins, carcinogens and teratogens, for which there were, however, dosages so small they were associated with no apparent effects⁸. By 1978 the agency felt it had enough data from animal studies to require it to move again against 2,4,5-T. Specifically, it claimed to have research showing carcinogenic and teratogenic effects from 2,4,5-T containing as little as 0.05 parts per million of dioxin. Since current formulations of the herbicide were allowed to contain as much as 0.099 parts per million, EPA in April 1978 published a notice of "rebuttable presumption" against the continued registration of 2,4,5-T for any use⁹.

At about this same time, a high school teacher from Alsea, Ore., Bonnie Hill, began a grass-roots research project, gathering information from area women relating their miscarriages to the dates of spraying of 2,4,5-T in nearby forests. She wrote letters to numerous government agencies, and news media did stories about her. As a result, the EPA commissioned researchers at Colorado State University to look into the situation, and

⁸ The research is summarized in U.S. Environmental Protection Agency, "Rebuttable Presumption Against Registration and Continued Registration of Pesticide Products Containing 2,4,5-T," Federal Register 43-78 (1978): 17,124-43.

⁹ U.S. Environmental Protection Agency, "Rebuttable Presumption," 17124, 17128.

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after quickly conducting an epidemiological study they reported a strong correlation between 2,4,5-T spraying and the miscarriage rate. Citing an "imminent hazard" to humans, the agency in March 1979 took the most drastic action it could, issuing an emergency suspension of the registration of 2,4,5-T for forestry, right-of-way and pasture use, about 75 percent of its remaining uses.

Emergency suspensions are drastic because they take the suspended product off the market immediately, unlike notices of rebuttable presumption or intent to cancel, which allow challenged uses of the product to continue until a final determination is made¹⁰.

The Colorado State research was severely criticized by scientists at Oregon State University and elsewhere, leading to charges that EPA had acted on the basis of flawed science. Michael Gough, a senior analyst with the federal Office of Technology Assessment, observed in his assessment of the controversy that the Oregon State critique was itself flawed, and that neither study nor critique has been published in the refereed scientific literature. "On balance," he concluded,

the critics are probably more right than are the original investigators. The study does not prove anything about the connection between 2,4,5-T or dioxin and spontaneous abortions, except that such a study may be impossible to do, given small populations and uncertain information about exposures and outcomes.¹¹

¹⁰ Gough 139-43; Hay 173-5; U. S. Environmental Protection Agency, "Decision and Emergency Order Suspending Registrations for the Forest, Rights-of-Way and Pasture Uses of 2,4,5-T," Federal Register 44-52 (1979): 15,874-97.

¹¹ Gough 143-5.

Nevertheless, Alsea was not the only arrow in EPA's quiver, and the suspension continued in effect while the process of "rebuttable presumption" moved ahead. The herbicide was still allowed to be used on rice, rangeland, fences, hedgerows and such sites as airports, lumber yards, refineries, vacant lots, tank farms and industrial sites. In July 1979 EPA announced in a "preliminary determination" that the presumptions of risk resulting from these uses had not been rebutted, called for a public hearing, and sent the issue to a Scientific Advisory Panel for review¹².

In September the advisory panel issued a report concluding that while 2,4,5-T posed some cancer risk to humans, the risk apparently was not substantial. As far as birth defects and other teratogenic effects were concerned, it said that an apparent "no-observable-effect level" of about 0.001 microgram of dioxin per kilogram of body weight had been established "for all practical purposes" in animal studies. It recommended against a public hearing, urging instead that further efforts be made to reduce the level of dioxin in 2,4,5-T. The EPA, however, argued that more information was needed on the extent to which humans were exposed to 2,4,5-T in the environment, and that "for all practical purposes" wasn't good enough. In December 1979 the

¹² U.S. Environmental Protection Agency, "Preliminary Determination Concerning the Rebuttable Presumption Against Registration of Certain Uses of Pesticide Products Containing 2,4,5-Trichlorophenoxyacetic Acid," Federal Register 44-138 (1979): 41531-43, especially 41531 and n. 3.

agency concluded that the remaining uses of 2,4,5-T posed risks of cancer, fetal toxicity and birth defects that did not appear to be justified by benefits. Moving from rebuttable presumption to more formal action, it ordered a public hearing to determine whether the remaining uses should be cancelled¹³.

This hearing, combined with a hearing on the uses suspended after Alsea, began in March 1980. After nearly a year in which more than 100 witnesses were heard, 1,500 exhibits were entered and 23,000 pages of transcript were taken, the presiding administrative law judge put the hearing on hold while negotiations toward a settlement took place. The talks were fruitless. In 1983, a year marked by many hundreds of dioxin stories in the media, one was a story reporting a decision by Dow Chemical Co. to drop its fight for 2,4,5-T. Spokesmen said the company still did not believe the herbicide was harmful, but that the cost of appealing EPA regulatory actions far outweighed any revenue that could be gained. Other manufacturers quickly followed suit. By 1984, after more than 35 years on the market, 2,4,5-T was a dead product¹⁴.

¹³ U.S. Environmental Protection Agency, "Final Determination Concerning the Rebuttable Presumption Against Registration for Certain Uses of Pesticide Products Containing 2,4,5-T," Federal Register 44-241 (1979): 72316-28.

¹⁴ Mark A. Stein, "Dow Ends Bid to Market Herbicide," Los Angeles Times 15 Oct. 1983: 1+; U.S. Environmental Protection Agency, "2,4,5-T and Silvex Products; Intent to Cancel Registrations of Pesticide Products Containing 2,4,5-T and Silvex," Federal Register 48-202 (1983): 48434-7.

III. Times Beach

That did not occur, however, until after the other major dioxin controversy, the contamination of Times Beach, Mo., had been woven into the story. Through the 1970s, regulatory efforts in regard to dioxin had focused primarily on its possible ingestion as residue resulting from the application of 2,4,5-T. In the latter years of that decade, however, chemical waste disposal gained visibility as a social problem, symbolized by Love Canal. This was the Niagara Falls, N.Y., neighborhood whose chemical contamination led to passage of the Environmental Response Compensation and Liability Act of 1980, or "Superfund." Dioxin was a relatively minor aspect of the Love Canal controversy. Only one of hundreds of chemicals disposed of by Hooker Chemical Co. in the abandoned canal, its presence was not discovered until seven months after the state health commissioner declared a serious threat to health in the neighborhood¹⁵. The Love Canal controversy did help draw attention, however, to Times Beach, where dioxin was the central concern. Although careless disposal of waste dioxin came to a head in Times Beach in 1983, however, it was virtually a statewide problem that had begun 12 years earlier, diagonally across the state, in the small town of Verona.

¹⁵ Adeline Gordon Levine, Love Canal: Science, Politics, and People (Lexington, MA: Heath 1982): 20, 95-8.

There, in 1971, a company that manufactured hexachlorophene from trichlorophenol hired a waste oil hauler named Russell Bliss to dispose of dioxin-contaminated production wastes, or "still bottoms." Bliss' company took away 18,500 gallons of residues. An estimated 50 pounds of dioxin was spread around several dozen locations in Missouri, in waste oil sprayed to control dust at horse arenas and on unpaved roads. Dioxin was eventually found in soil at levels as high as 1.8 parts per million¹⁶.

As at Seveso, the effect was obvious first in the animals. At a stable near Moscow Mills northwest of St. Louis, 62 horses died or had to be put down. Birds fell dead from the arena's rafters. A dozen horses died at a stable near Jefferson City. Children and adults became ill but recovered. One girl was hospitalized with severe bladder inflammation and bleeding. The federal Centers for Disease Control investigated, and in August 1974 notified the Missouri health department that dioxin had been found in soil at the two horse arenas. With the help of stable owners who surreptitiously followed Bliss' trucks on their rounds, the CDC began mapping the path of the dioxin. Meanwhile, 13 pounds of still bottoms, contaminated with dioxin at 300 parts per million, were found at the site of the hexachlorophene plant, which had closed in 1972. In 1980, investigators found 90 buried

¹⁶ Gough 121-36.

drums, corroded and leaking, with dioxin levels up to 2,000 parts per million¹⁷.

Press interest in the Missouri situation, at least judging from coverage in the New York Times, was minimal. A 1974 item, reporting that dioxin had been identified as the cause of animal fatalities and human illnesses in Missouri, was not followed up¹⁸. Likewise, the level of EPA interest in Missouri dioxin contamination apparently fluctuated in the early years of the Reagan Administration. The Environmental Defense Fund brought the situation to public attention, however, by publishing a list of 14 confirmed and 41 possible dioxin sites in the state. The federal government tested several of the sites, including Times Beach, a western rural suburb of St. Louis where Bliss had sprayed dioxin-contaminated oil on 23 miles of unpaved roads from 1972 to 1976. The last soil samples from Times Beach were sent off for analysis on Dec. 3, 1982. Coincidentally, this was one day before a flood on the Meramec River forced the evacuation of the town. The analysis showed dioxin in the soil in concentrations as high as 300 parts per billion. Two days before Christmas 1982, the CDC recommended that Times Beach residents, driven out by the flood, stay out because of the dioxin¹⁹.

¹⁷ Gough 121-36.

¹⁸ "Deaths of Animals Laid to Chemical," NYT 28 Aug. 1974: 36.

¹⁹ Gough, 121-36.

Meanwhile, EPA had troubles of its own. President Ronald Reagan's first-term program for the EPA called for budgetary and staff cutbacks, a less confrontational stance toward industry, and an easing of regulation. The program was highly controversial, and by late 1982 Reagan's first appointment as EPA administrator, Anne M. Gorsuch, was battling Congress over access to EPA documents amidst charges of "mismanagement, politicization, favoritism to business and corruption."²⁰ Among the charges were allegations that Superfund money had been delayed or speeded up in order to influence elections in California and Indiana. Agency officials also were accused of failing to disqualify themselves from acting on matters involving former employers, committing perjury in congressional testimony, compiling "hit lists" tracking the political views of staff members, failing to vigorously enforce environmental laws, and entering into "sweetheart deals" with polluters²¹.

A beleaguered Anne Gorsuch Burford flew to Missouri in February 1983 to announce that \$33 million in Superfund money would be used to buy out the town of Times Beach, including 437

²⁰ Philip Shabecoff, "Environmental Agency: Deep and Persisting Woes," NYT 6 March 1983: 1+. Gorsuch married in the midst of the controversy and became Anne Burford.

²¹ Stuart Taylor, Jr., "E.P.A. Inquiries Center on Four Issues," NYT 13 March 1983: 36; Shabecoff, "Environmental Agency," 1, 38.

permanent homes, 364 mobile homes and 40 to 50 businesses²². The show of decisive action did not save Burford, however, who resigned on March 10.

IV. Firestorm of Coverage

Within a week dioxin was in the news again, in stories by the NBC and CBS television networks reporting that the EPA in 1981 had softened a draft report on dioxin contamination at the urging of Dow Chemical Co. The disclosure fueled criticism that EPA was too close to the industries it was charged with regulating²³. The dioxin controversy increased in intensity with the disclosure in April of dioxin contamination at Dow Chemical's home-base factory in Midland, Mich., and in June at an abandoned Diamond Alkalai plant in Newark, N.J. Also in April came the uproar over the "smoking gun" memoranda in the Agent Orange case -- documents detailing the 1964 meeting between Dow and its competitors on the high dioxin levels in some of the companies' 2,4,5-T. In October Dow decided to abandon the fight for 2,4,5-T, and in May 1984 the Agent Orange suit was settled. These were decisive and dramatic months for those whose lives were affected by dioxin, and the developments were covered intensively by the press.

²² Robert Reinhold, "U.S. Offers to Buy All Homes in Town Tainted by Dioxin," NYT 23 Feb. 1983: 1+.

²³ Howard Kurtz, "Dow Got to Suggest Dioxin Report Changes," Washington Post 16 March 1983: 1.

In the New York Times alone, for example, there were 188 items (including news stories, editorials, letters, columns and photographs) on aspects of the dioxin controversy during 1983. That is an average of one item every other day. Using the number of items as a criteria, the Missouri controversy was the most heavily covered, with about 70 items. Disputes over the dioxin contamination of the Ironbound section of Newark and of other New Jersey sites occasioned about 40 items²⁴, and about 25 items dealt with the Agent Orange litigation, then moving toward a trial date in 1984. The dioxin controversy in Michigan, home base of Dow Chemical Company, was explored in about 15 items²⁵.

These were the major focal points of press attention in 1983. Additional coverage, a few items each, was devoted to a number of other places where dioxin had become an issue. These included New York state, Illinois, Arkansas, Ohio, Connecticut and Nova Scotia. In New York, for example, items mentioning dioxin had to

²⁴ See for example these page-one items: Joseph F. Sullivan, "High Level of Dioxin Found at Jersey Site; Food Center Is Shut," NYT 3 June 1983: 1+; Douglas C. McGill, "Kean Tours Area Near Dioxin Site," NYT 5 June 1983: 1+; McGill, "Tests at Newark Show More Dioxin," NYT 8 June 1983: 1+; McGill, "Kean Orders 3d Dioxin Site Shut," NYT 19 June 1983: 1+.

²⁵ See for example these page-one items: Shabecoff, "Scheuer Says E.P.A. Aide Let Dow Delete Dioxin Tie in Draft Report," NYT 16 March 1983: 1+; Shabecoff, "Dow Has Refused to Give E.P.A. Data," NYT 17 March 1983: 1+; Leslie Maitland, "E.P.A. Aides Charge Superiors Forced Shift in Dow Study," NYT 19 March 1983: 1+; Reinhold, "New York Area Is Receiving Carp From Toxin-Tainted Michigan Bay," NYT 28 March 1983: 1+; Reinhold, "E.P.A.'s Dow Tests Find High Toxicity," NYT 1 April 1983: 1+; Iver Peterson, "Reduced Levels of Dioxin Found in Michigan Fish," NYT 17 July 1983: 1+.

do with a 1981 fire in a state office building in Binghamton, a planned incinerator at the Brooklyn Navy Yard, and the fact that gefilte fish available in New York City originated in a bay where carp were contaminated with dioxin²⁶. The Illinois story reported that dioxin had been found in two dump sites known to have been used by Missouri waste hauler Russell Bliss²⁷.

Other items dealt with the aftermath of the Seveso incident, including an eight-month international search for 41 barrels of chemical waste from the plant, and with the disclosure that Pennsylvania prison inmate volunteers had been deliberately exposed to dioxin in a research project in the 1960s²⁸. In the midst of these events, the press itself became an issue. The American Medical Association condemned the coverage as a "dioxin witch hunt" and voted to conduct a publicity campaign to alleviate public fears²⁹.

²⁶ See for example "Dioxin Level Down in State Building," NYT 13 Jan. 1983: B2; Barry Commoner, "Transmuting Trash," NYT 15 Jan. 1983: 23; Reinhold, "New York Area Is Receiving Carp From Toxin-Tainted Michigan Bay," NYT 28 March 1983: 1+; Marian Burros, "Mayor Says U.S. Should Inspect Fish," NYT 28 March 1983: B8; Robert D. McFadden, "New York Area Callers Seek Reassurance on Eating Carp," NYT 29 March 1983: B3.

²⁷ "Dioxin Found at Illinois Sites," NYT 15 Feb. 1983: 21.

²⁸ See for example, E. J. Dionne Jr., "Europe's Dioxin Drama: A Slaughterhouse Finale," NYT 13 June 1983: 2; William Robbins, "Dioxin Tests Conducted in 60's on 70 Philadelphia Inmates, Now Unknown," NYT 17 July 1983: 16.

²⁹ See Bayard Webster, "A.M.A. Plans Drive to Counter Reports of Dioxin as Hazard," NYT 23 June 1983: B11; Francis X. Clines, "Reagan Asks Doctors to Support Freeze in Their Medicare Returns," NYT 24 June 1983: D14; Reinhold, "A.M.A. Disavows Jab at Dioxin

The complex dioxin controversy was moving toward conclusion on many fronts. In late 1983, Dow Chemical Company dropped its fight to keep 2,4,5-T on the market, and was soon joined by the other manufacturers of the product. In Missouri, although some holdouts would remain for years, the buyout of Times Beach was moving toward completion. In mid-1984, the Agent Orange suit was settled, although conflicts over the distribution of the money would continue for years. Meanwhile, dioxin research projects continued to bear fruit, moving toward a consensus view that "harm has been limited to highly exposed industrial populations and that none has been shown from environmental exposures."³⁰ On all fronts, the controversy began to move into a new stage, one in which loose ends would be tied up. One of these loose ends was an assessment of media performance. The pre-systematic account completed, the dissertation turns to that topic.

Reports," NYT 1 July 1983: 6.

³⁰ Gough 257.

PART II

Assessing Media Performance

CHAPTER FOUR: RISK COMMUNICATION AND BEYOND

I. Consensus on Coverage

Along with the emerging consensus on health risks of dioxin, there also has emerged a consensus on media coverage of the controversy. While not universal, the assessment is generally subscribed to by those scientists, science policy experts and media scholars who have written on the topic -- and even by some professional journalists. Washington Post ombudsman Richard Harwood and Pulitzer Prize-winning science writer Jon Franklin are two who have sharply criticized media performance on dioxin. Franklin, assigned to the Agent Orange story while reporting for the Baltimore Evening Sun, eventually concluded that it was

a myth created by a group of Vietnam-era protesters, seized upon by Viet vets and disseminated by the press. That discovery and the more shaking discovery that my colleagues didn't care much about the truth of the matter and had never bothered to look into the substance very deeply, changed my life¹.

Scientists who have written books dealing with the dioxin controversy have also been critical. A. L. Young, who was involved in the controversy as a herbicide consultant to the Air Force, complained of the "intense and frequently inaccurate"

¹ Quoted in Richard Harwood, "Agent Orange Myth at War With Science," Detroit News, 17 Oct. 1990: 11.

coverage². The head of the personnel protection group of Materials Research Laboratories in Melbourne, Australia, Hugh D. Crone, made the dioxin controversy a centerpiece of his book on chemicals and society. He blamed the lack of "deep scientific background" among journalists, as well as what he perceived as the influence of media economics on news decisions.

The newspapers and television like issues that are sensational and alarm the public. They like elaborating on possible dangers, whereas a reasoned argument that puts matters in perspective is not seen as appealing to the public. . . . The only brake that controls the media is that of advertising revenue. I see plenty of advertisements in the newspapers for cigarettes, none for agricultural herbicides³.

Media's critics portray dioxin coverage as inaccurate, self-serving, dependent on manipulative, politically motivated sources, and in the long run detrimental to the public interest. The media are seen as a crucial link between reliable scientific knowledge about risks, on the one hand, and a public on the other that is all too ready to develop irrational health fears. By exaggerating dioxin's health risks and exploiting its emotional potential, these critics believe, media created unfounded fears about cancer and birth defects, as well as unrealistic expectations that society can be made to be risk-free. In turn,

² A. L. Young, "Social Assessment of the Agent Orange Controversy," Agent Orange and Its Associated Dioxin: Assessment of a Controversy ed. A. L. Young and G. M. Reggiani (Amsterdam: Elsevier 1988): 195-6.

³ Hugh D. Crone, Chemicals and Society: A Guide to the New Chemical Age, (Cambridge: Cambridge UP 1986): 181.

an ill-informed public exercising its power through democratic institutions made value judgments on a faulty factual basis and influenced the political system to reach misguided outcomes -- the removal of 2,4,5-T from the market being one example⁴.

This is a broad-gauged indictment. It is also one whose plausibility finds support in the scholarly literature of science/technology journalism. Studies have found that journalists do indeed tend to depend less on scientific specialists than on administrative sources and "big names" commenting on questions outside their field⁵. Research also strongly indicates that the public depends on the media for much of what it knows about health risk. The National Cancer Institute, for example, reported in 1984 that 58 to 63 percent of people got information about how to prevent cancer from the media, and only 13 to 15 percent from their physicians⁶.

⁴ This composite assessment is drawn from Young, "Social Assessment," 193-201, and Young and G. M. Reggiani, "Conclusions and Implications for the Future," 322, both in Agent Orange and Its Associated Dioxin, eds. Young and Reggiani; Michael Gough, Dioxin, Agent Orange: The Facts, (New York: Plenum 1986): 7-8; Edward J. Burger Jr., Health Risks: The Challenge of Informing the Public, (Washington: Media Institute 1984): 1-3; and Crone, Chemicals and Society 180-93.

⁵ Dorothy Nelkin, Selling Science: How the Press Covers Science and Technology (New York: Freeman 1987): 130; Sharon Dunwoody, "The Scientist as Source," Scientists and Journalists: Reporting Science as News (New York: Free P 1986): 7.

⁶ Nelkin, Selling Science 77.

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Numerous studies have found discrepancies between public perception and scientific assessment of risk⁷. Studies also have found that what people believe about risk correlates with what they are told in the media, regardless of the frequency of harm, and that the media often fail to provide much in the way of useful or balanced information. The media, concluded Eleanor Singer and Phyllis Endreny,

are superb at evoking the serious outcomes associated with a particular instance of a hazard -- a specific car crash, nuclear reactor accident, death from toxic shock. But they fail to put such risks in perspective -- not only the perspective of alternative hazards, which would be asking a good deal, but even the perspective of how likely such outcomes are: that is, the risk of their occurrence⁸.

Indeed, research has suggested that omission of what scientists consider to be relevant information is a major source of their complaints about inaccuracy in science coverage⁹.

An additional focus of criticism is the fact, established in numerous studies, that the amount of coverage given to a risk often bears minimal if any relation to the historical experience of harms. Communications researcher Vicki S. Freimuth and her colleagues, for example, found that colon-rectum cancer, the

⁷ A useful summary by key researchers of this topic is Paul Slovic, Baruch Fischhoff and Sarah Lichtenstein, "Rating the Risks," Environment 21(3) 1979: 14-39.

⁸ Eleanor Singer and Phyllis Endreny, "Reporting Hazards: Their Benefits and Costs," Journal of Communication 37(3) 1987: 10-26, quotation 25.

⁹ Nelkin, Selling Science 126.

second most prevalent cancer in the population in 1980, was the sixth most prevalently mentioned in news coverage¹⁰. In their study of coverage of a variety of risks, Singer and Endreny found that the number of news stories devoted to a hazard appeared to be "unrelated to the number of deaths it causes per year." That fact alone, they argued, "poses a serious obstacle to the accurate perception of risk."¹¹

Many of these findings about science journalism are echoed in criticism of dioxin coverage. Among principal conclusions of the Media Institute study of Times Beach was that coverage overemphasized health risks and relied excessively on government sources, while ignoring industry and independent sources¹².

Error per se and omission of relevant information were both noted in news about defoliation by medical professor Edward J. Burger Jr. In his 1984 case study, Burger labelled as inaccurate the characterization of dioxin as a "cancer causing by-product of the defoliant 2,4,5-T." And he took New Yorker writer Thomas Whiteside to task for giving his own interpretation of 2,4,5-T research while making

no reference to what biological mechanisms underlie developed abnormalities, or to the scientific issues one

¹⁰ Vicki S. Freimuth, Rachel H. Greenberg, Jean DeWitt and Rose Mary Romano, "Covering Cancer: Newspapers and the Public Interest," Journal of Communication 34 (1984): 62-73.

¹¹ Singer and Endreny, "Reporting Hazards," 14.

¹² Media Institute, Chemical Risks: Fears, Facts and the Media (Washington: Media Institute 1985): x-xi, 19-28.

should consider when moving from a series of animal results to human experience¹³.

The institute's Times Beach study complained that the "minute dioxin levels" found in the community were not put into perspective by comparison with much higher levels in the Missouri horse arenas, or qualified by reference to "a 1983 study of dioxin poisoning (which) shows that there were no ill health effects related to exposure."¹⁴ Similarly, Hugh Crone observed that a recent news item had reported 98 miners

dead in a mine disaster in Taiwan. Many more gone in one instant than dioxin has ever claimed. Compare, always compare. The public has to have a yardstick, something to give meaning to quantities and numbers¹⁵.

Dioxin risks were exaggerated not only through error and lack of context, in the view of critics of the coverage, but also by the amount and intensity of play. Less explicitly than complaints about error and context, concern that the volume and intensity of dioxin coverage is disproportionate to the risk runs as an undercurrent through the analyses. Prefacing its study of dioxin and other chemical controversies, Media Institute observed, for example, that

coverage of chemical health risks has become hot copy throughout the nation's newsrooms. . . . Our newspapers

¹³ Edward J. Burger Jr., Health Risks: The Challenge of Informing the Public (Washington: Media Institute 1984): 34.

¹⁴ Media Institute, Chemical Risks 25. It is unclear what the 1983 study might be. No citation is given.

¹⁵ Crone, Chemicals and Society 182.

devote to vinyl chloride the column inches once dedicated only to 'natural' disasters such as volcanic eruptions¹⁶.

Discovery of each new dioxin site "sets off a wave of headlines," noted Michael Gough, a government scientist and author of a book-length treatment of the dioxin controversy¹⁷. Young complained of inaccuracies in the coverage of environmental contamination, but also of its "intensity and duration." Media response to episodes of contamination, in his view,

is further characterized by articles in major newspapers or on the evening news, and these articles are usually followed by other articles containing 'sensational' stories in popular magazines (e. g., Time, Reader's Digest, Family Circle, Playboy and Penthouse). Culmination of the intense and frequently inaccurate campaign is marked by television documentaries usually prepared to highlight significant events or chemicals¹⁸.

Also criticized for the intensity they lent to coverage were what Media Institute called "speculative anecdotes" by ordinary citizens. While making up only 1.2 percent of coverage, such personal comments and narratives "seem to enhance the tone of dramatic urgency endemic to much of the media's reportage . . . On television, in particular, these . . . sometimes bizarre and unsubstantiated claims take on a prominence that cannot be conveyed adequately by merely listing their frequency."¹⁹ Clearly, from the perspective of media scholars and scientists

¹⁶ Media Institute, Chemical Risks ix.

¹⁷ Gough 7.

¹⁸ Young, "Social Assessment," 195-6.

¹⁹ Media Institute, Chemical Risks 25-28.

conversant with research into the health risks of dioxin, coverage erred not only through inaccuracy per se and through the omission of relevant context, but also through uncalled-for volume and intensity.

These assessments of how the media conveyed risk information about dioxin have their limitations. Gough, Young and Crone are scientists but not media scholars. None claims to have systematically gathered data on the coverage. As noted in the introductory chapter, the Burger case study examined a small sample of coverage without explaining why items were selected for analysis, while the more systematic Media Institute content study dealt with only one aspect -- Times Beach -- of a long, complex controversy. Nevertheless, my examination of coverage in the New York Times and selected magazines bears out their critique to some extent, although it also found significant evidence to the contrary.

II. Evaluating the Coverage: Error

Certainly there were instances of error per se. An article in the Nation by Edith Schloss, identified as an American art critic and painter living in Rome, contained numerous errors of fact²⁰. The article implied that the cloud which escaped from the Icmesa plant was "pure" dioxin, when in fact it was mostly

²⁰ Edith Schloss, "The Poisoning of Italy," Nation 16 Oct. 1976: 362-5.

trichlorophenol. The article stated that trichlorophenol was manufactured at Seveso "for defoliants," when in fact the end product was the germ-killer hexachlorophene. And it quoted a North Vietnamese "specialist on dioxin" as saying the chemical "causes total paralysis of the capacity for immunity in the body," a wild exaggeration²¹. A Newsweek article on Seveso demonstrated a lack of technical understanding when it reported that a recent animal study found dioxin to be "thousands of times more dangerous to fetuses than teratogen, the deforming agent in the now infamous thalidomide."²² Teratogen, of course, is not a specific "deforming agent," but a general term for agents, including substances or diseases, that cause malformation of a fetus²³.

Nevertheless, while there were unequivocal errors, much of the coverage looked at here contained statements about dioxin and its health risks that were not so much erroneous as contestable. For example, dioxin was often referred to as "toxic," a description that could only be disputed from an extreme position; its acute toxicity to laboratory animals and, as a cause of chloracne, to human beings is well established in the scientific literature. However, when it is called "one of the most toxic

²¹ See Alastair Hay, The Chemical Scythe: Lessons of 2,4,5-T and Dioxin (New York: Plenum 1982): 197-227.

²² Raymond Carroll with Loren Jenkins, "Our Own Hiroshima," Newsweek 16 Aug. 1976: 49.

²³ "Teratogen," Webster's New World Dictionary, 3d College Ed.

chemicals known" and equivalent phrases, more room for dispute appears. The characterization can be defended as accurate in the sense that dioxin kills some laboratory animals at doses similar to botulinum toxin. However, if the statement is taken to apply to human toxicity, there is less scientific data to support it, and if it is taken to refer to historical human harm from environmental exposures, the argument that it is inaccurate is quite strong. How the statement is taken depends in part on one's judgment about the relevance of animal studies to assessments of human health risk, a live issue. Lacking context to clarify just how it is to be taken, the statement could rightly be criticized as vague, but not as erroneous.

Similarly, references to dioxin as "carcinogenic" or "linked to birth defects" are also terrain for contest over meaning²⁴. Dioxin in very small doses causes cancer and birth defects in some laboratory animals. The implication that it is also carcinogenic or teratogenic to human beings is arguably accurate given certain assumptions about cancer causation and the extrapolation of animal tests to human experience, but arguably inaccurate given other assumptions, and not supported by the preponderance of scientific research on historical human

²⁴ On the idea that media are a site for struggle over meaning, see Stuart Hall, "The Rediscovery of 'Ideology'" Return of the Repressed in Media Studies," Culture, Society and Media, ed. Michael Gurevitch, Tony Bennett, James Curran and Janet Woollacott (London: Methuen 1982): 56-90.

experience with the chemical -- research which, it is important to remember, is riddled with inconclusiveness²⁵.

Statements that dioxin is "carcinogenic" or "one of the most toxic substances" might be criticized for seeking to maximize alarm by innuendo while hiding under the cover of technical accuracy. The same objection might be raised as well against statements tending to minimize alarm, such as the assertion by a chemical company official that there is "absolutely no evidence of dioxin doing any damage to humans, except something called chloracne. It's a rash."²⁶ In view of exposed workers' reported dizziness, nausea and loss of sex drive and the observed elevation in their heart disease risk factors, the statement is arguably misleading if not inaccurate. Yet if "damage to humans" is taken to mean clinical rather than subclinical manifestations of disease, the statement is just as arguably accurate.

III. Evaluating the Coverage: Context

The importance of how statements are "taken" in the discussion of accuracy is an index of the importance of context, the lack of which is another major criticism of dioxin coverage.

²⁵ A useful discussion of the debates over cancer biology and risk assessment is Frank B. Cross, Environmentally Induced Cancer and the Law: Risks, Regulation, and Victim Compensation (New York: Quorum 1989), especially chapters one and three.

²⁶ Dow Chemical Company's Paul F. Oreffice, quoted in "Dioxin Puts Dow on the Spot," Time 2 May 1983: 62.

One of the tasks of context is precisely to indicate how statements are to be read. And just as dioxin coverage did include some instances of outright error, there were indeed stories that contained little or no contextual information. At the extreme, two- to four-paragraph newspaper items about breaking news developments typically referred to dioxin only as "poisonous" or "toxic."²⁷ In addition, my study is biased toward finding accurate and contextualized coverage because it examined an elite newspaper and magazines, several of which, like Chemical & Engineering News, deal regularly with technical risk issues. Had I examined broadcast coverage or a different selection of newspapers and magazines, I might have found even more prominent and numerous examples of error and lack of context²⁸.

Nevertheless, in examining a large selection of dioxin coverage published over nearly two decades, one is struck not by the lack of technical detail but by the presence of it. In news item after news item, attempts are made to provide at least some technical information, if only a technical name for dioxin, an account of its origin as a contaminant in herbicide production, or a suggestion of the scientific uncertainties surrounding claims that it damages human health. Many items went beyond

²⁷ For example, "Forest Service Is Upheld in Plans to Use Herbicide," NYT 8 Aug. 1974: 31; "24 Italian Families Return to Contaminated Area," NYT 17 Oct. 1977: 5.

²⁸ Media Institute concluded in its Times Beach study that TV coverage made less use of scientific data and scientific sources than did newspapers. Media Institute, Chemical Risks 43-46.

that. For example, a 1975 New York Times story by Roy Reed, recounting a controversy over spraying of Arkansas hardwood forests with 2,4,5-T, included this technical context for the controversy:

- * The product in use is among the phenoxy herbicides;
- * Tests show phenoxy herbicides have caused birth defects and cancer in laboratory animals.
- * Disputed tests say herbicide spraying might have caused birth defects among Vietnamese.
- * 2,4,5-T is a selective herbicide, which works on broad-leaf plants by interfering with the growth process.
- * Dioxin is a contaminant of 2,4,5-T. It is toxic to test animals in small amounts and is persistent in the environment.
- * Dioxin's presence in 2,4,5-T has been reduced sharply by manufacturers. The total present annually in domestic 2,4,5-T is no more than eight ounces, and that is distributed over five million acres at 50 micrograms per acre.
- * An EPA advisory committee reported 2,4,5-T was not a likely health hazard as currently used. It discounted findings of the AAAS study reporting evidence of birth defects in Vietnam.
- * Some scientists say that even "purified" 2,4,5-T can produce additional dioxin when it is burned, and that

studies have found dioxin in the tissue of cows and other animals that grazed on sprayed land.

- * Mice living in an area "drenched" with 2,4,5-T showed no ill effects.²⁹ Like the characterizations of dioxin as "toxic" or "carcinogenic," the accuracy of many of these statements is also arguable and depends on further context. For example, to say that dioxin persists in the environment is to gloss over such questions as what one means by "environment" and by "persists." While such efforts at technical contextualization may be far from complete in and of themselves, however, they do serve notice that such technical concerns exist, and they offer at least minimal guidance in seeking technical information from other sources. Contrary to criticism that health-risk journalism has a "tendency to simplify factually complex issues and uncertainties into seemingly simple and unadorned constructs,"³⁰ such efforts also serve notice of the existence of scientific disagreement and scientific inconclusiveness.

In addition, numerous newspaper articles published during the dioxin controversy focused specifically on technical background. As part of a page-one series over three days in 1979, Richard

²⁹ Roy Reed, "Herbicide Use in Ozark Forests Challenged," NYT 14 July 1975: 40.

³⁰ Burger 49.

Severo of the New York Times recounted several major areas of expert disagreement over herbicides' human health effects. These included disputes over whether male exposure to teratogens could cause birth defects in offspring; over the safe level of exposure for humans; over the validity of animal tests as a basis for legislation; and on the likelihood of symptoms appearing years after exposure³¹. In 1982, science writer Philip M. Boffey reviewed the status of Agent Orange research, including the Air Force Ranch Hand study, the Centers for Disease Control investigation of birth defects, the Veterans Administration registry of industrial workers exposed to dioxin, and studies of Vietnam veterans as a whole and of those most likely to have been exposed to Agent Orange³². Additional attempts to summarize the state of research were made the next year, at the height of coverage of Times Beach and the EPA controversy, in the Times, the Washington Post and the Los Angeles Times³³.

To take the Los Angeles Times effort as an example of the scope of technical context offered, the 2,500-word article touched on dioxin's origin in herbicide and hexachlorophene

³¹ Richard Severo, "Herbicides Pose a Bitter Mystery in U.S. Decades After Discovery," NYT 29 May 1979: 1+.

³² Philip M. Boffey, "Agent Orange: Despite Spate of Studies, Slim Hope for Answers," NYT 30 Nov. 1982: C1.

³³ Wayne Biddle, "Dioxin's Peril to Humans: Proof Is Elusive," NYT 23 Jan. 1983: 1; Pete Earley, "Dioxin Is Still a Mystery," Washington Post 27 Feb. 1983: B5; William C. Rempel and Eleanor Randolph, "Lethal Dioxin: Monster Guest in Chemical Lab," Los Angeles Times 9 May 1983: 1+.

manufacturing, and its toxicity, carcinogenicity and teratogenicity in animal tests. Dioxin was identified by its full technical name and as one of 75 isomers of the "dioxin family." The "trace chemistries of fire" hypothesis was discussed by scientists on both sides of the issue. The contention that chloracne is the "only confirmed health effect on humans" was discussed and disputed, as was the topic of dioxin's carcinogenic and teratogenic effect on the cellular level. Nine sources were listed by name and affiliation or address. Eight were scientists or science administrators, including Matthew Meselson of Harvard; Dr. James Saunders, identified as Dow Chemical Company's director of biomedical research; Dow research scientist Warren Crummett; Vernon Houk, director of the Center for Environmental Health at the federal Centers for Disease Control; Howard Eisen of the National Institutes of Child Health; Michael Gross of the University of Nebraska; Alan Poland of the University of Wisconsin; and George Eadon, director of environmental science at the New York Department of Health laboratories. The ninth source named was Judy Piatt of Moscow Mills, Mo., the mother of two daughters who became seriously ill after the mother's horse arena was sprayed with waste oil contaminated with dioxin³⁴. As in the earlier example, the article identifies several technical areas as relevant, points to

³⁴ Rempel and Randolph 1, 8.

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the existence of expert disagreement, and provides useable guidance for seeking further information.

Readily accessible magazines provided popularized technical context for the controversy as well. One of the most extensive projects was a 37-page section published in Chemical & Engineering News in 1983. Titled "Dioxin Report" and written at college-level readability³⁵, it provided historical background and legal perspective on three aspects of the dioxin controversy -- Times Beach, Agent Orange and the contamination of the Tittabawassee River at Midland, Mich. -- and summarized research into dioxin's origins and human toxicity, as well as prospects for disposal and regulation³⁶.

Other general summaries of research included articles in Environment in 1973 and 1981, Bulletin of the Atomic Scientists in 1979, Science News and the non-refereed section of Science in

³⁵ Four randomly chosen paragraphs of the 41-paragraph article summarizing human toxicity research were used to calculate Flesch reading ease scores. The scores ranged from 6.341 ("very difficult," "college graduate") to 56.251 ("fairly difficult," "10th to 12th grade"). The average was 36.159, in the middle of the "difficult," "college" range. See Werner J. Severin with James W. Tankard, Jr., Communications Theories: Origins, Methods, Uses 2d ed. (New York: Longman 1988): 74-5.

³⁶ Janice R. Long and David J. Hanson, "Dioxin Issue Focuses on Three Major Controversies in U.S.," 23-36; Rebecca L. Rawls, "Dioxin's Human Toxicity Is Most Difficult Problem," 37-48; Ward Worthy, "Both Incidence, Control of Dioxin Are Highly Complex," 51-6; David Webber, "Dioxin Liability Is Huge Problem for Companies, Courts," 57-60, Chemical & Engineering News 6 June 1983.



1983, and Science News in 1985³⁷. Numerous magazine articles discussed individual research developments as they occurred, providing additional technical background. To take the "trace chemistries of fire" research as an example, it was reported and discussed in Chemical & Engineering News, Chemical Week, the news section of Science, the New Yorker, Science News and Chemistry³⁸. Chemical & Engineering News and Chemical Week are indexed in Business Periodicals Index, and the others are indexed in Reader's Guide to Periodical Literature. Thus the public had reasonable access to relatively popularized accounts of technical context for the dioxin controversy. If popular perceptions about dioxin were not adequately informed by technical context (a

³⁷ Janice Crosland and Kevin P. Shea, "The Hazards of Impurities," Environment June 1973: 35-8; W. A. Thomasson, "Deadly Legacy: Dioxin and the Vietnam Veteran," Bulletin of the Atomic Scientists 35 (May 1979): 15-19; David Kriebel, "Dioxins: Toxic and Still Troublesome," Environment Jan.-Feb. 1981: 6-13; Linda Garmon, "Dioxin Digest," Science News 3 Sept. 1983: 156-7; Marjorie Sun, "Dioxin's Uncertain Legacy," Science 219: 468-9; Jeffrey L. Fox, "Dioxin's Health Effects Remain Puzzling," Science 221 (1983): 1161-2; Janet Raloff, "Dioxin: Is Everyone Contaminated?" Science News 13 July 1985: 26-28.

³⁸ "Dioxins Formed by Normal Combustion," Chemical & Engineering News, 20 Nov. 1978: 7; "Dow Says Dioxins Occur Naturally From Combustion," Chemical Week 22 Nov. 1978: 36; R. Jeffrey Smith, "Dioxins Have Been Present Since the Advent of Fire, Says Dow," Science, 202 (1978): 1166-7; "Notes and Comment: TCDD Contamination," New Yorker 18 Dec. 1978: 27-8; "Dioxins, Dioxins Everywhere," Chemistry, 52 (Jan. 1979): 3; "EPA Sharply Criticizes Dow Dioxin Findings," Chemical Week 21 Feb. 1979: 25; "Burning Question: From Whence Dioxin," Science News, 22 Sept. 1979: 197; "Debate Continues Over Dow's Dioxin Theory," Chemical & Engineering News, 24 Sept. 1979: 27-8.

question not studied here), the fault does not appear to lie with media's failure to make such context available.

In sum, examination of a large and important segment of dioxin news lends some support to two major criticisms of the coverage -- that it contained inaccuracies and that it sometimes lacked technical context. At the same time, however, the evidence strongly suggests that these criticisms do not tell the whole story. Much of what was written about dioxin's health risks was not erroneous so much as it was contestable. And while some coverage did lack technical context, the coverage as a whole did not. For readers who wanted to make a not unreasonable effort, technical context was available.

IV. Evaluating the Coverage: Amount and Intensity

A third major criticism was that, regardless of what was said about dioxin, the amount and intensity of the coverage exaggerated its risks. My examination of the material leaves no question that dioxin coverage was both extensive and intense. The New York Times published more than 700 items on dioxin or closely related issues between 1965 and 1988. During the course of the controversy, there were several periods when coverage intensified markedly. In January and February 1983, for example, the newspaper published 39 items on Times Beach, five of them on

page one³⁹. There were short periods in each month, Jan. 22-25 and Feb. 23-25, of even more intense clustering of coverage, with five items in each period. Similar periods of intense coverage can be identified for the Seveso, Agent Orange, Newark and Midland incidents. Several of the most prominent treatments on the controversy began with personal narratives of damage or illness that implied dioxin was the cause -- as did this opening to Richard Severo's three-day, page-one series in the New York Times in 1979.

Julio Martinez is a former Marine Corps machine gunner in Vietnam; Bob Ralston is a former cattle rancher in the foothills of the Ozarks. The two men live 500 miles from each other. They have never met, never heard of each other, are a generation apart; they come from different backgrounds, different worlds. All they have in common, they say, is their poison⁴⁰.

Yet as critics of dioxin coverage have pointed out, no single death has ever been unequivocally traced to environmental exposure to dioxin. The quantity and intensity of coverage were

³⁹ Nathaniel Sheppard Jr., "In Dioxin-Tainted Town, No 'Welcome' Signs," NYT 10 Jan. 1983: 1+; Robert Reinhold, "Missouri Now Fears 100 Sites Could Be Tainted by Dioxin," NYT 18 Jan. 1983: 1+; Biddle, "Dioxin's Peril to Humans: Proof Is Elusive," NYT 23 Jan. 1983: 1+; Reinhold, "Missouri Dioxin Cleanup: A Decade of Little Action," NYT 20 Feb. 1983: 1+; Reinhold, "U.S. Offers to Buy All Homes in Town Tainted by Dioxin," NYT 23 Feb. 1983: 1+.

⁴⁰ Severo, "Two Crippled Lives Mirror Disputes on Herbicides," NYT 27 May 1979: 1+. For a similar treatment of the Seveso contamination, see Carroll and Jenkins, "Our Own Hiroshima," Newsweek 16 Aug. 1976: 49. An interesting reversal of the pattern is in "The River Rats Want to Stay," Time 10 Jan. 1983, where speculative anecdote is used to suggest the absence of harm at Times Beach.

striking, and critics of news about health risk can well argue that this could have resulted in public misperceptions.

However, examination of the coverage also makes clear that the dioxin controversy was not about health risk alone, but about a variety of contentious issues. Emerging out of a conflict between a dominant American ideology -- industrial capitalist democracy -- and a refocused and energized environmentalism, the dioxin story had to do as well with conflicts among such enduring American values as responsible capitalism, the authority of science, small-town pastoralism, individualism, and participatory democracy. These conflicts were reported by a press with wide-ranging, complex functions in American society, of which the accurate transmission of risk information is only one. If the amount and intensity of coverage indeed created differences between public perception and scientific assessment of risk -- an hypothesis not studied here -- that was a complicating but difficult-to-avoid side-effect of journalism doing its larger job, which was to facilitate the critical revision and preservation of values. This central argument of the dissertation will be discussed in detail in later chapters.

Before that is done, however, a normative objection will be considered. It may be the case, one could argue, that the dioxin controversy as constructed in the media had more to do with value conflicts than with risk; but shouldn't it have been carried out more tidily? Shouldn't the facts about risk have been dealt with

separately from the value issues, so that risk questions could have been settled by science while value issues were left to politics? This is the thesis of fact/value separation in science controversy, and since I am interested in my topic both normatively and descriptively, I have had to examine the thesis at some length. Fact/value separation is often offered uncritically as an appropriate model for settling risk controversies⁴¹. To avoid knocking down straw men, I examined the case offered by two science policy scholars, William Lowrance and Allan Mazur, who have argued for it critically and authoritatively.

⁴¹ See for example, Crone, Chemicals and Society 3.

PART III

Fact/Value Separation

CHAPTER FIVE: FACTS IN SCIENCE/TECHNOLOGY CONTROVERSY

I. Lowrance and Risk Assessment

William Lowrance, a Ph.D. chemist, wrote Of Acceptable Risk with the encouragement of the National Academy of Sciences and in consultation with an ad hoc panel of the academy's Committee on Science and Public Policy¹. That the book was written with one eye on improving media coverage is apparent from the foreword by the panel chairman, University of Illinois chemistry professor H. S. Gutowsky. Gutowsky wrote that the safety of the public has become

the subject of extensive reporting in the daily press and other media. It has been our observation that some of this reporting is not sufficiently informed, especially as concerns the scientific basis -- and limitations -- of the determination of safety and of the role of scientists in this process².

Hoping to clarify these issues, Lowrance argued for a fact/value distinction between the measurement of risk, which he characterized as an "empirical, scientific activity," and the judgment of safety, which he characterized as a "normative, political activity." The difference between risk and safety,

¹ William W. Lowrance, Of Acceptable Risk: Science and the Determination of Safety (Los Altos, CA: Kaufmann 1976).

² Lowrance vii-viii.

Lowrance wrote, is often forgotten, a failing that is "often the cause of the disputes that hit the front pages." However, Lowrance also stressed that both empirical and normative activities, fact questions and value questions, require careful attention from decision makers. In dealing with the risks of modern life, he wrote,

we continually have to seek a proper balance between the comprehensive, rigorous, rational approaches that seem so essential, and the subjective, less quantifiable but not necessarily less valid approaches characteristic of political and social confrontations with the unknown³.

Nonetheless, scientists, engineers and other technically trained people have an important, even decisive, role to play, Lowrance argued, not only in measuring risk but in some policy areas as well. Lowrance believed that scientific work not only provides factual knowledge but instills habits of systematic thinking that make technically trained people better fitted than others to apply scientific knowledge to value-laden decisions. Such decisions come up in what Lowrance described as the "any-man's land" of overall risk assessment, which connects the scientific determination of risk with the political determination of safety. Scientists who recommend exposure limits, doctors who prescribe medicine, and engineers who design dams and toasters are all making decisions that are "heavily, even if only implicitly, value-laden," according to Lowrance⁴.

³ Lowrance 10-11, 75-6.

⁴ Lowrance 79.

Noting the reluctance of some scientists to presume to make value-judgments on behalf of society, Lowrance nevertheless warned against defaulting "the appraisal of complex technological issues onto non-technically trained political leaders," lest the leaders make decisions with inadequate expertise or "fall prey to the influence of strongly biased special interest lobbies." In the "any-man's land" of judging safety, he wrote,

technical people are presumably as capable as others are, and in many cases more so, because of their breadth of experience, and their habit of systematic thought. Not only can they understand the technical details and appreciate the nature of the uncertainties, but from experience they can often provide historical perspective on the problem, anticipate the public's acceptance of the risks fairly accurately, and think of alternatives and consequences that nontechnical people would miss⁵.

Lowrance mapped out a procedure for settling risk and safety controversies. It could be described as a continuum along which the task of risk and safety determination should take place, moving more or less from one end to the other. First there are objective, value-neutral, scientific activities -- the measurement of risk -- carried out by technically trained people. In this part of the continuum there are three lines of inquiry: 1) defining conditions of exposure; 2) identifying adverse effects; and 3) relating exposure and effect. Although there are numerous sources of potential uncertainty in the first three lines of inquiry, Lowrance counseled researchers to rely on their experience, make the best estimate possible and hope for better

⁵ Lowrance 110.

data to be produced in the future. For example, he discussed the uncertainties of extrapolating from animal tests to humans, the problems of inferential adequacy involved in using small numbers of animals in laboratory tests, and the uncertainties of extrapolating effects into the low-dose range of a dose-response curve, where there are relatively few data points to guide the researcher in drawing the curve. "Until the curve can be defined better in the low range," Lowrance counseled, "the best we can do is apply experience from related extrapolations and sketch in an extension. . . ."⁶

A fourth line of inquiry for technically trained people is the overall assessment of risk. Located in the middle of the continuum, overall risk assessment takes place in "any-man's land" and "edges up to being political as well as scientific. . . ." The first four lines of inquiry "need not be sequential," according to Lowrance, although the fourth is the "pay-off stage, building upon all the preceding inquiries."⁷

On the other side of "any-man's land" are subjective, value-laden, political/social activities, carried out by lay people or their representatives. It is here that safety determinations, as opposed to risk determinations, are made. On the technical side of the continuum the question has been, How much risk is there? On this side it is, How much risk is acceptable. Determinations

⁶ Lowrance 18, 38-41, 61-7.

⁷ Lowrance 27.

of safety can involve such criteria as "reasonableness," custom of usage, and prevailing professional practice, and often involve balancing such considerations as the degree to which risk is voluntarily borne, the availability of alternatives, and whether or not the risk is encountered occupationally⁸.

To summarize: While allowing for uncertainties and estimates on the technical side, for the likelihood of a non-sequential research process, and for the existence of the "any-man's land" of technical participation in value-laden decisions, Lowrance's scheme in the main recommends that fact questions be separated from value questions, that fact questions be determined by technically trained people, and that value questions be settled through political processes. While he did not comment on the dioxin controversy in Of Acceptable Risk, ordinary citizens' speculative anecdotes of the kind which added to the intensity of dioxin coverage would be inconsistent with his scheme.

Lowrance focused his discussion specifically on risk and safety issues. A similar approach, expanded to include science and technology controversy in general, was taken by Allan Mazur, a leading proponent of the "science court" idea.

⁸ Lowrance 75-94.

II. Mazur and the "Science Court"

Mazur, a sociologist of science and technology with a background in engineering, presented the case for fact/value separation in journal articles and in The Dynamics of Technical Controversy. Unlike Lowrance, Mazur did not maintain that technically trained people are better equipped to make certain kinds of value-laden decisions by virtue of their "habit of systematic thought." Indeed, he explicitly rejected that view, asserting that scientists "are best able to deal with scientific issues, but they are no more qualified to render value judgments than any reasonable layman."⁹ But like Lowrance, Mazur proposed a procedure to simplify science and technology controversy, the key feature of which was separation of fact questions from value questions.

Total separation is not necessary, Mazur argued: Values shared by all sides or values too subtle to affect practical decisions may be left harmlessly intertwined with factual statements. However, when "blatant evaluative or normative statements" are intermixed with factual statements, the result is an unnecessarily complicated controversy. Mazur's purpose was to "explore the practicality of simplifying these arguments by

⁹ Allan Mazur, "Science Courts," Minerva, 15 (1977): 4.

treating contentious scientific issues apart from the non-scientific issues with which they are usually intermeshed."¹⁰

One benefit of doing so is that scientists can concentrate on doing what they are best qualified to do -- determine the facts -- while value issues would be reserved for the political process, whose participants presumably have both political skills and a public mandate. Additionally, untangling matters of fact from matters of value would permit the factual questions to be settled properly because it would permit them to be framed in a way which would allow "meaningful assessment through scientific methods." For Mazur, the danger is not that adversaries in a dispute will purposely distort facts to support their positions (although he said it would be "naive to believe that this never occurs). Rather the danger is that in the heat of controversy, "an adversary may find it rhetorically useful to state his factual hypotheses in terms which make them difficult to evaluate." Particularly, adversaries going up against a powerful, well financed establishment have a tendency to take a defensive posture and to state their technical position "in a manner that provides little opportunity for a clear refutation by the other side."¹¹ Mazur's concern here appears not to have been with clearly identified polemics but with rhetorical tactics

¹⁰ Allan Mazur, Dynamics of Technical Controversy (Washington: Communications 1981): 8.

¹¹ Mazur, Dynamics 36, Mazur's emphasis, 125.

hidden in ostensibly factual statements. While he did not specifically apply this analysis to the dioxin controversy, it is possible to do so. The vagueness of such characterizations of dioxin as "carcinogenic" or "one of the most toxic substances known" seems precisely an example of the value-entangled tendency to state a technical position "in a manner that provides little opportunity for a clear refutation. . . ."

Mazur's scheme for untangling facts and values was the "science court," similar to the "institution for scientific judgment" proposed in 1967 by Arthur Kantrowitz. As outlined by Mazur, a science court would work like this: Controversial technical issues would be referred to the court, perhaps by the legislature, by lawsuit in an ordinary court, or by referendum. Adversaries, or "case managers," would be selected for each side, and they would be asked to state and document the scientific facts they considered most important for their case. Statements and documentation would be exchanged and examined, and each case manager would specify points of agreement and disagreement. A referee acceptable to both sides would attempt to arbitrate the differences. Agreement might be reached on some points by changes in wording or removal of ambiguities. If both adversaries agreed on all points, the agreed-on statements of fact would be issued as the science court's report. In case of continued disagreement, an open, public hearing would be held in which the adversaries would present their cases before a panel of

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expert scientists acceptable to both sides. Debate would be restricted to matters of fact. At the conclusion of the hearing, the panel of experts would issue its report, "attempting to provide a relatively sophisticated and relatively unbiased statement of these facts as they appear at that moment." It is possible that the judges could decide that either or both of the adversaries were wrong, Mazur wrote, or, alternately, that the differences were legitimate and irreducible because of ambiguous or insufficient data. The judges might also suggest research to clarify disputed points. But Mazur emphasized that the judges

would not make a decision of policy, such as whether x cases of cancer for y amounts of electricity are acceptable. . . Judges' duties would be limited solely to clarifying the factual, strictly scientific issues and writing a report on the decisions on those points."¹²

Mazur tried to test a portion of the science court idea in a controversy in New York and Minnesota over construction of high-voltage transmission lines. This he did by offering to serve informally as a referee between two groups of experts on either side of a dispute over whether such transmission lines pose threats to human health not realized or acknowledged by the utility companies.

Mazur wrote to each of the experts involved, asking their help in putting together a list of disputed statements of fact. Only opponents of the transmission lines responded with lists, which asserted the following points:

¹² Mazur, "Science Courts" 4-9.

1. Extremely low frequency (ELF) electric (and magnetic) fields can cause biological effects in human beings exposed thereto.
2. It is likely that ELF electric (and magnetic) fields associated with high-voltage transmission lines will cause biological effects in human beings exposed thereto.
3. No biological effect that is likely to occur in human beings exposed to the fields of high-voltage transmission can be shown to be nonhazardous¹³.

Mazur sent the list to proponents, who criticized the allegations as vague and untestable. In the first statement, "biological effects" was criticized as too broad a term to be empirically meaningful. The statement that the fields can have biological effects and the statement that no biological effect could be shown to be nonhazardous were held to be irrefutable because of the impossibility of proving nonexistence. The second statement was criticized for not containing clear criteria for assessing whether an effect is likely. One misconception was cleared up when opponents discovered they had "attributed to a pro-line expert the view that it was impossible to produce biological effects from low-intensity fields" -- a view the expert denied having held. On other points, opponents of the line revised their statement of facts in line with the criticism, rephrasing their allegations "in the form of epidemiological hypotheses with a degree of specificity that is common in standard journals. . . ." The revised list now read as follows:

People exposed for a period as short as five years to the electromagnetic field created by a 765 kV transmission line (as specified, for example, in "Application to the

¹³ Mazur, Dynamics 38-39, Mazur's emphasis.

State of New York Public Service Commission for Certificate of Environmental Compatibility and Public Need," submitted by Rochester Light & Electric Corporation and Niagara Mohawk Power Corporation, January 1974) will be more likely to differ from a control population not so exposed in the following characteristics:

1. Growth, as measured by rates of change of physical parameters (e.g., height, weight).
2. Biological stress, as measured by physiological indicators (e.g., corticoids, serum proteins, circulating lymphocytes, blood pressure) and incidents of stress-related diseases (e.g., gastrointestinal and cardiovascular disorders).
3. Functioning of the central nervous and cardiovascular systems, as measured by neurohormone patterns, EEG, EKG, and the ability to adapt to blood volume changes.
4. Psychological behavior, as measured by decision-making capability, rates of acquisition of learned responses, gross activity level, reaction time, short-term memory, and motor coordination.¹⁴

One pro-line expert still objected, saying the revised statements remained untestable. Another did not comment, but two others found the revisions "sufficiently specific that they could disagree that the allegations were true for humans."¹⁵

As a result, Mazur felt that his effort to "separate the factual disputes of the transmission line controversy from its value disputes" had been "largely successful." However, he drew an additional, disquieting lesson from the experience. After the task of fact/value separation had been accomplished, the pro-line side refused to debate its position on the factual issues in a science court setting. One pro-line expert objected to the idea of an adversarial science court as "anti-science," while another objected to one of the anti-line experts on personal grounds.

¹⁴ Mazur, Dynamics 40.

¹⁵ Mazur, Dynamics 39-41.

Others refused to participate because they thought that to do so might undermine their cause. "Why, after all," Mazur acknowledged, "enter the debate if it is more likely to improve the relative position of the other side than of one's own side?"¹⁶

III. But Facts Don't Settle Controversies

After one has "the facts," what then? That is a question raised by several researchers, Mazur among them, who have examined science and technology controversies and found that facts are often less than compelling factors in the outcome. The response of the pro-line experts, Mazur wrote, "emphasizes that many technical controversies are primarily disputes over political goals and only secondarily concerned with the veracity of scientific issues which are related to these goals."¹⁷

Science and technology controversies, he wrote in an earlier article,

often arise because of strong moral and political convictions. . . . Controversies over nuclear power plants, the ABM, and recombinant DNA have a similar character, involving political and theological beliefs and anxieties about physical survival in which the resolution of a factual ambiguity one way or the other might be of little significance.

¹⁶ Mazur, Dynamics 41-42.

¹⁷ Mazur, Dynamics 42.

Nevertheless, Mazur argued, factual disputes should be settled, if for no other reason than just in case anyone is willing to be guided by the outcome. His point is normative: There are situations, he wrote, "in which scientific knowledge will have no influence on those who make policy, even though it should do so, but there are also situations in which the science court might have some impact on policy."¹⁸

This impact, Mazur wrote, is less likely to come about through any change of heart among partisans than because previously uncommitted people found their minds made up by the resolution of factual matters. A sophisticated, unbiased report on disputed factual matters, Mazur wrote,

could have an important impact on that portion of the public which has not yet taken a side in the controversy, but whose interests are at stake. . . . If the technical objections raised against transmission lines or nuclear power plants were found to lack any scientific basis, and this was reported by a credible source, then political power would most likely shift to the proponents of these technologies as electricity became scarcer and more expensive, and previously nonaligned citizens became involved. The resolution of factual disputes may not serve the interests of those directly involved in the debate, but it would be in the best interests of the public at large.¹⁹

For Mazur, political commitment limits one's openness to persuasion by the facts. Similarly, Nelkin suggested that disputants' commitments to one side or the other may override

¹⁸ Mazur, "Science Courts" 14, my emphasis.

¹⁹ Mazur, Dynamics 42.

their willingness to be influenced by facts. There is little evidence, she observed,

that technical arguments change anyone's mind. In the disputes over fetal research and even in . . . various siting controversies no amount of data could resolve value differences. Each side used technical information mainly to legitimate a position based on existing priorities."²⁰

Another line of research, based in psychology, suggests that human beings are limited in their ability to carry out difficult cognitive tasks -- in other words, they are subject to "bounded rationality" -- and that they employ a number of devices to simplify matters, some of which may lead to biased perception. In these researchers' view, facts in a dispute over risk, for example, might be disregarded or distorted by a variety of heuristic devices, including the tendency to "judge an event as likely or frequent if instances of it are easy to imagine or recall."²¹

In some case studies, scientific evidence seemed to have little impact on the outcome not only because of the bounded rationality and involvement of participants but also because the evidence was nonexistent or incomplete. In their study of the Michigan "bottle bill" controversy, for example, science historians Robert Snow and David Wright found that

²⁰ Dorothy Nelkin, "Science, Technology, and Political Conflict: Analyzing the Issues," Controversy: Politics of Technical Decisions, 2d ed., ed. Dorothy Nelkin (Beverly Hills, CA: Sage 1984): 20.

²¹ Paul Slovic, Baruch Fischhoff and Sarah Lichtenstein, "Rating the Risks," Environment, 21 (April 1979): 15.

such empirical evidence as existed was not crucial. Studies were used to buttress rather than to form or reshape opinion, partly because of an unavoidable inadequacy in the studies themselves. There were significant gaps in the relevant economic and environmental data. In addition, all the studies were based, of necessity, on challengeable assumptions about future technological developments, economic patterns, and consumer behavior."²²

It may also be the case that the evidence is less than compelling because it is ambiguous, arising out of research done in differing scientific specialties or occupational contexts²³. A biochemist, for example, might be expected to produce a completely different set of "facts" relative to a controversy than would an industrial hygienist. Indeed, the two might not be able to reach agreement on what constitutes a "fact." And although gaps in knowledge may be filled and ambiguities may be clarified in time, there are cases in which a decision to wait until factual matters are settled even provisionally is itself a policy decision.

For example, in the 1970s U.S. regulators decided as a policy decision to ban Aldrin/Dieldrin, while British regulators found the evidence that the pesticides were causing harm was insufficient to justify a ban. Sociologists studying the decision concluded that the British demand for evidence of

²² Robert E. Snow and David E. Wright, "Analysing Symbolic Dimensions of Technological Disputes: The Michigan Container Controversy," Science, Technology & Human Values (Fall 1979): 13.

²³ David Robbins and Ron Johnston, "The Role of Cognitive and Occupational Differentiation in Scientific Controversies," Social Studies of Science, 6 (1976): 362.

causality concealed "that the decision to wait for definite evidence of harm to accumulate is just as much an ethical and political choice as the decision to treat risk determination as a policy issue."²⁴ In the presence of "inconclusive scientific evidence that may be variously interpreted," communications scholar Leon Trachtman observed of science and technology controversies generally, "the economic, political, social and ethical dimensions of the problem are critical. . . ."²⁵

Finally, the facts adduced in a controversy may be less than compelling to some participants because they are wholly or partially beside the point in regard to issues important to those participants. Barry Casper and David Wellstone, in a study of the same Minnesota power-line controversy discussed by Mazur, found just such a displacement of the focus of the controversy. The dominant concern of protesting farmers, they found, was "the sacrifice of their land without their consent for an allegedly greater social need whose validity they question(ed). . . ."²⁶

While many farmers did "express a degree of concern about health and safety problems," such concerns were peripheral.

²⁴ Brendan Gillespie, Dave Eva and Ron Johnston, "Carcinogenic Risk Assessment in the USA and UK: The Case of Aldrin/Dieldrin," Science in Context: Readings in the Sociology of Science, eds. Barry Barnes and David Edge (Cambridge, MIT P 1982): 330.

²⁵ Leon A. Trachtman, "The Public Understanding of Science Effort: A Critique," Science, Technology & Human Values, (Summer 1981): 13.

²⁶ Barry Casper and Paul Wellstone, "Science Court on Trial in Minnesota," Science in Context 288.

Nevertheless, the protest movement itself paid "considerable attention" to the human health effects issue,

in part, because the institutions available to the protesters, such as environmental impact statements, . . . channeled them in this direction; and in part, because uncertain threats to health and safety (made) good organizing issues for a protest movement."²⁷

Thus the focus of the controversy was displaced from protesters' genuine concerns partly for tactical and partly for institutional reasons. For their part, the pro-line electric cooperatives also found a tactical advantage at certain points in the proceeding in trying to limit the focus to health and safety issues. Politicians also stood to gain. The science court idea, Casper and Wellstone concluded, "is a politician's dream -- it focuses public attention on peripheral technical issues and delegates the decision to the 'experts' "²⁸ It is an example of what philosopher Brian Fay called the "sublimation of politics," or the effort to overcome the limitations and uncertainties of politics by replacing it with positivist science. "Questions not accessible to a so-called technical analysis are thought to be irrational, and therefore essentially undiscussable."²⁹

²⁷ Casper and Wellstone 285.

²⁸ Casper and Wellstone 286, 288.

²⁹ Brian Fay, Social Theory and Political Practice (London: Allen 1975): 61.

Facts, then, can be less than compelling in science and technology controversies not only because participants' rationality is bounded or their passions are aroused, but also because the facts themselves are unavailable, incomplete or ambiguous, or because a fundamental question -- What are the issues? -- has been answered narrowly and the facts brought forward are irrelevant to many participants' concerns. Appeals to scientific authority in public disputes are often misplaced, philosopher Philip Shepard and historian of science Christopher Hamlin concluded, "because the question of relevance . . . is often contentious and loaded with moral and political implications."³⁰ And because questions of relevance are often begged, "the facts" function less as information and more as symbols in wide-ranging disputes over deeply held cultural values. The Michigan bottle battle, Snow and Wright found, was fought in two different but interpenetrating contexts. In the first, the environmental costs versus the economic benefits and convenience of the throwaways were debated -- the same kinds of issues that had already been confronted hundreds of times in the 1960s and 1970s in environmental legislation and litigation. But in a larger, symbolic context, the throwaway and its slogan, 'No Deposit, No Return,' had become the focus of a battle over opposing technological styles and the values supporting them."³¹

³⁰ Philip T. Shepard and Christopher Hamlin, manuscript draft of book tentatively entitled "Ideology and the Prospects for Consensus in U.S. Agriculture," (East Lansing, MI: 1988): Chapter 3, p. 12.

³¹ Snow and Wright 11.

Similarly, anthropologist Mary T. Douglas has argued that in the final analysis pollution is less a matter of hygiene than a matter of social order: A dirty pair of boots left on a clean dining room table may not pose a threat of disease, but would amount to a flouting of the values of order and appropriateness of the household. Do the boots "pollute" or not? It depends, in Douglas' analysis, on the moral commitment one has to the values of the household.³²

It seems things are more complicated than the fact/value separation model allows for. Having separated facts and values, we may find ourselves with facts that do little to help us. How does this state of affairs come about, and what are its implications? Does it mean that science and technology controversies are political through and through, with the victory to the side that can maneuver "the facts" most shrewdly? If so, what role is there for the journalist? To begin to answer these questions we must examine the philosophical foundations of the idea of fact/value separation in science and technology controversy.

³² Mary T. Douglas, Purity and Danger: An Analysis of the Concepts of Pollution and Taboo (London: ARK 1984): 35-36, and "Environments at Risk," Science in Context, 260-75.

CHAPTER SIX: WHY FACTS DON'T SETTLE CONTROVERSIES

I. Value Neutrality in Science

The possibility and desirability of separating facts from values in science has been widely debated among philosophers of science¹. As debate has refined the issue, it is generally accepted that many aspects of scientific work are value-laden -- the decision to "do science" in the first place, for example, as well as the choice of research problems and decisions about how to apply scientific knowledge. Scientists after all are human, and their values, preferences and biases influence their work in numerous ways. Nevertheless, logical positivists have argued that there remains a core aspect of science -- the "context of validation" as opposed to the value-laden "context of discovery" -- in which one can maintain that the correctness of scientific inferences can be and should be assessed without

¹ Classic arguments are presented by Thomas S. Kuhn, The Structure of Scientific Revolutions, 2nd ed., enlarged (Chicago: U of Chicago P 1970) and Israel Scheffler, Science and Subjectivity (Indianapolis: Bobbs 1967).

reference to scientists' attitudes, preferences, temperament or values². This is the thesis of value-neutrality in science.

The thesis of fact/value separation in science and technology controversy is related but different in important respects. The thesis is that questions of fact and questions of value can and should be separated in the process of trying to resolve controversy. Science court proponent Allan Mazur says this has been accomplished when questions of fact have been asked in such a way that "allows meaningful assessment through scientific methods."³ Such a separation also suggests a division of responsibility, with fact questions best settled by technically trained people and value questions best settled through political processes.

Clearly the thesis of fact/value separation depends on the value-neutrality thesis. If the latter cannot be maintained, neither can the former: If facts and values can't be separated at the core of science, they can't be separated in science and technology controversy, because separating them in the latter depends on the possibility of the existence of value-free facts. The value-neutrality thesis has been challenged, perhaps most substantially by the late philosopher Richard Rudner, who tried

² See Richard Rudner, "The Scientist Qua Scientist Makes Value Judgments," 540-6, and Isaac Levi, "Must the Scientist Make Value Judgments?" 559-569, both in Readings in the Philosophy of Science ed. Baruch Brody (Englewood Cliffs, NJ: Prentice 1970).

³ Allan Mazur, Dynamics of Technical Controversy (Washington: Communications 1981): 8.

to demonstrate that even within the context of validation, scientists as scientists necessarily make value judgments.

Rudner's argument was this: It is a part of science to accept or reject hypotheses; yet, as logical empiricists generally agree, no hypothesis is ever completely confirmed or disconfirmed by the evidence. Therefore, in accepting or rejecting a hypothesis, the scientist makes a decision that the evidence is sufficiently strong to warrant acceptance or rejection. Such a decision, Rudner argued, required a value judgment about the seriousness of the consequences if the decision is wrong. For example, a scientist should require a higher level of confidence for work involving toxicity of a drug used by humans than for work assessing the number of defects in a lot of belt buckles⁴.

To apply Rudner's argument to the fact/value separationist thesis, recall William Lowrance's discussion of the uncertainties involved in the empirical and scientific activities of measuring risk. For example, there is uncertainty involved in extrapolating effects into the low-dose range of a dose/response curve, where there are relatively few data points to guide the researcher in drawing the curve. "Until the curve can be defined better in the low range," Lowrance advised, "the best we can do is

⁴ Rudner 540-6.

apply experience from related extrapolations and sketch in an extension. . . ."⁵

To imagine this advice being applied, say a scientist has conducted an experiment in which a suspected carcinogen, a trace contaminant in a pesticide, is given to laboratory rats⁶. Rats given larger doses experience more cancers, but there are fewer cancers associated with lower doses. The scientist finds that the dose/response curve almost seems to "draw itself" in the high-dose area, because of the plenitude of data. But in the low-dose range, plotting the curve is less obvious because of the paucity of data points. Applying experience from related extrapolations -- a kind of tacit knowledge or "feel" for the situation that nevertheless is not based on this experiment's data -- the scientist makes an estimate of where the curve should be drawn. Has the estimate required a value judgment?

According to Rudner's argument, yes. The scientist might have sketched in a curve in such a way as to minimize or maximize the inferred response, or she might have sketched it in somewhere between the two. Indeed, she had innumerable choices, some preferable to others in terms of her tacit knowledge but all equally supported by the data. At the point of making her choice,

⁵ William W. Lowrance, Of Acceptable Risk: Science and the Determination of Safety (Los Altos, CA: Kaufmann 1976): 38-41.

⁶ This analysis is based on Philip T. Shepard, "Moral Conflict in Agriculture: Conquest or Moral Coevolution?" Agriculture and Human Values 1 (Fall 1984): 18.

she was required to either make or default on a value judgment about the seriousness of estimating wrongly.

If she minimized the inferred response, for example, her decision could have led to approval for use of the pesticide. The value judgment required of her was the acceptability of human cancer resulting from her estimate being in error. Alternately, she might have maximized the inferred response. In that case, the value judgment required was the acceptability of the consequences if her estimate had kept the pesticide off the market.

Fitting a curve to a set of data points is equivalent to accepting a hypothesis, that \underline{x} will be the response at dose \underline{y} , or $\underline{x} = f(\underline{y})$. Curve-fitting estimates are therefore an example of Rudner's problem, as is the extrapolation of animal-study results to humans⁷. One implication is a breakdown in Lowrance's and Mazur's division of responsibility in science and technology controversy. If value judgments are intrinsic to science, then value questions cannot so neatly be left to the political process, nor can scientists always stick to their empirical tasks and eschew policy questions.

Another implication is that scientists following Lowrance's advice on making estimates in areas of uncertainty would be making value judgments without consciously or critically doing

⁷ See Alvin M. Weinberg, "Science and Trans-Science," Minerva, 10 (1972): 209-22.

so. The pursuit of objectivity is one of science's most precious ideals, Rudner pointed out, and the "positive horror" which scientists have of intrusion of values into science is understandable. Still, he argued, for scientists to close their eyes to the fact that "scientific method intrinsically requires the making of value decisions" cannot bring them closer to the ideal⁸.

II. Doing Science vs. Doing Controversy

Rudner's challenge to the value-neutrality thesis was and remains controversial⁹. Even if it is not adopted, however, objections can be raised to the thesis of fact/value separation in science and technology controversy. The thesis seems reasonable, but as we have seen, case studies raise questions about its applicability. I turn now to an analysis of the thesis in light of these questions.

First, it can be objected that fact/value separation is useless because facts are weak compared to the power of interest and advocacy: Disputants' minds are made up, they are in the grip of their passions, and they won't be swayed by the facts; instead, they will use whatever facts suit their purpose as weapons to advance their cause. Mazur answered this objection

⁸ Rudner 545.

⁹ Levi.

normatively: It may often be the case that facts are drowned out by the clamor of interest and emotion, but it shouldn't be the case, and by separating facts and values one is at least keeping alive the possibility that some will attend to the facts -- particularly those who are as yet uncommitted.

Granting the validity of that response, what about those cases in which the scientific evidence is less than compelling not because of interest or involvement but because the evidence is non-existent, incomplete or ambiguous? Controversies don't unfold neatly, with all the evidence authoritatively determined before policy must be made or action taken. A defender of fact/value separation, however, might respond persuasively that the untidiness of the process of controversy is itself an argument for fact/value separation. It's true, she might argue, that fact questions can be settled only provisionally, and that action and inaction can sometimes be equally value-laden policy decisions; all the more reason to make one's decisions armed with the best factual data available at the time. All a scientist can do, after all, is her damndest.

What then about those cases in which the facts seem to be beside the point? After all, data about the human health effects of high-voltage transmission lines are at best peripheral to the concerns of farmers upset about land condemnation. A fact/value separationist might respond, again normatively, that valid issues may be ignored in particular cases, but that does not refute the

case for fact/value separation; deciding what the issues are is a matter best decided in the political arena. (Even when scientists get involved in such decisions, as they routinely do in trying to influence federal funding for research, for example, they are acting not as scientists, but as social and political beings). Once the issues are defined, the fact/value separationist might argue, the task of science is to try to ascertain facts that will aid in their resolution.

To this argument, a critic might object that issues, like facts, are often only provisionally determined. In her study of the Cayuga Lake nuclear plant controversy, for example, Dorothy Nelkin found that a controversy originally focused on thermal pollution of the lake shifted to concern with health risks after the Three Mile Island nuclear accident. Similarly, issues in a Toronto airport siting controversy were found to have changed in response to both technical and political developments¹⁰. In fluid situations like these, how do scientists know what to investigate, what questions to try to find factual answers to? Granted, the fact/value separationist might respond, the unfolding of science and technology controversy is messy and unpredictable. Still, a provisional formulation of the issues at

¹⁰ Dorothy Nelkin, "Nuclear Power and Its Critics: A Siting Dispute," 51-71, and Jerome Milch, "The Toronto Airport Controversy," 27-49, both in Controversy: Politics of Technical Decisions 2d ed. (Beverly Hills, CA: Sage 1984).

least allows the scientist to get to work. If the issues change, new research problems can be added to the old.

A critic might respond, however, that scientists do not investigate all issues, but only certain ones. Social scientist Mazur, for example, chose to concentrate his efforts in the power-line controversy on the human health effects issue, even though he acknowledged the presence of procedural and political issues in the dispute¹¹. A fact/value separationist might respond that scientists do indeed pick and choose their issues, and they do so for any number of reasons, ranging from theoretical interest to availability of funding to political predilection. After all, if society through the political process -- say the election of an extremist administration -- proposed a new generation of nuclear weapons as the nation's top scientific priority, scientists would hardly be expected to turn unreflectively to the task. They would, however, make their views known as citizens, not as scientists, and it is as citizens that they pick and choose their issues. What they do as scientists is to warrant the validity of their research.

However, what fact/value separationists have proposed, with fact/value separation as its centerpiece, is not an epistemology for assessing the correctness of scientific inferences, but a

¹¹ Mazur, Dynamics 37.

procedure for resolving science and technology controversies¹².

The two are different: In the assessment of scientific inferences (granting Rudner's critics their case for the sake of argument), value judgments are either irrelevant or agreed on. What is at stake is the validity of the work, which is assessed through rational reconstruction of empirical evidence and logic.

However, a procedure for conducting science and technology controversy differs significantly from a rational reconstruction of the evidence and logic supporting a scientific inference. It is a proposal for carrying out a social/political process aimed at resolving a controversy -- or as some have suggested, maintaining its creative tension¹³.

Issues are intrinsic to controversy, and the choice and definition of issues can have a substantial impact on the outcome, as the power-line dispute discussed by Mazur and Casper and Wellstone suggests. Who decides what the issues are, and on what basis? The two fact/value separationists whose work I have analyzed approach the question differently. For Lowrance, whose book is explicitly concerned with risk and safety controversies, the question of how risk and safety become issues lies outside

¹² T. Shepard, "Impartiality and Interpretive Intervention in Technical Controversy," Technological Transformation: Contextual and Conceptual Implications, eds. Edmund F. Byrne and Joseph C. Pitt, (The Netherlands: Kluwer 1989) 47-65.

¹³ Shepard and Christopher Hamlin, "How Not to Presume: Toward a Descriptive Theory of Ideology in Science and Technology Controversy," Science, Technology & Human Values, 12 (Spring 1987): 19-28.

his topic. Risk issues simply "arise" or "pop up."¹⁴ For Mazur, whose topic is the dynamics of technology controversy in general, particular technological issues like nuclear power arise out of general public concern over "larger issues" like the environment¹⁵. Thus they have their origins in the value-laden political and social realm. The proper procedure, Mazur suggests, is to disentangle matters of fact from the value context in which they arise so that the controversy can be simplified, scientists and politicians can do what they are competent to do, and factual matters can be framed so as to allow "meaningful assessment through scientific methods."¹⁶ In order to be consistent, a fact/value separationist would have to argue that the process of recasting questions so that they can be meaningfully assessed does not in itself require value judgments. i.e., that the process of fact/value disentanglement is value-neutral vis a vis any issues society cares to raise. But is it? Let's look again at the recasting of the anti-line experts' original statements of fact that resulted from Mazur's "neutral" intervention as referee. (The statements are on pages 123-124 above.)

The original statements are not capable of assessment by scientific means, as Mazur points out. Nevertheless, the recasting of them is not the only way they could be reformulated

¹⁴ Lowrance 102, 105.

¹⁵ Mazur, Dynamics 99.

¹⁶ Mazur, Dynamics 125.

so as to be capable of rational assessment¹⁷. For example, implied in the statement that no likely biological effect from the fields can be shown to be nonhazardous is a concern that technological change too often takes place incautiously. That is a value judgment, presumably the one Mazur sought to separate from the factual question with which it was entangled. However, the statement might also be recast this way: "Technological change in the past has often had unforeseen negative consequences, yet there has been a tendency to proceed as if this were not the case, and to disrupt established social arrangements in the process; the cooperatives urging construction of the power lines have proceeded similarly, and this is evidence in favor of reconsidering the project." This statement of alleged fact deals with an issue more central to the farmers' concerns, the sacrifice of their land for an alleged social benefit whose validity they questioned. Moreover, it is open, if not to scientific assessment, then nevertheless to rational assessment, on the grounds of logic and evidence.

The reformulation brought about by Mazur's intervention, it now appears, was not value-neutral. Framing the factual assertion in epidemiological terms required a value judgment that the health effects issue was more important than the issue of unforeseen consequences and social impacts of technological change. Moreover, the value judgment was made implicitly,

¹⁷ See Shepard, "Impartiality" 7-10.

without conscious, critical consideration. Far from simplifying and clarifying the power-line controversy, the separation of facts and values begged the important question of relevancy and contributed little to the resolution of the dispute¹⁸.

III. Implications for the Dioxin Controversy

When the dioxin controversy is viewed in the light of this analysis, a number of reasons appear for the failure of the scientific consensus to settle the dispute quickly and neatly. Certainly passions were aroused. Defoliation was but one element in the fierce conflict over the Vietnam War that engaged American society for nearly two decades. The chief engineer for ICMESA at the time of the Seveso explosion was assassinated, apparently by politically motivated terrorists, in 1980. At a hearing on the distribution of the Agent Orange settlement fund in 1985, a man was apparently overcome by news that a fellow Agent Orange veteran had killed himself and his family. The distraught man shouted in court, "Everyone has a book of matches. Burn everything down!"¹⁹ Nor were passions only on one side. A resolution by the House of Delegates of the American Medical Association in 1983 accused the news media of conducting a dioxin

¹⁸ See Shepard and Hamlin, "Ideology and the Prospects for Consensus," ch. 3 p. 12.

¹⁹ Ralph Blumenthal, "Vietnam Veterans Argue Over Agent Orange Fund," NYT 16 March 1985: 18.

"witch hunt" and the public of having succumbed to "hysteria." An AMA representative later acknowledged to a House subcommittee that the language was "imprudent."²⁰ As argued above, however, the fact that passions sometimes run hot in science and technology controversies is all the more reason for trying to bring facts to bear.

It was also often the case that facts about the health risks of dioxin were unavailable, incomplete or ambiguous. The difficulty of carrying out science during war stood in the way of assessing suspicions that birth defects in South Vietnam had increased as a result of herbicide spraying. Adequate information simply could not be gathered. The task of determining which veterans had been exposed to how much dioxin in Vietnam was blocked, among a host of reasons, because no one knew with any certainty how contaminated the early shipments of herbicide had been, and because blood serum tests of millions of Vietnam veterans would have been prohibitively expensive²¹. The complexity of the exposure situation at Seveso, plus the failure to establish strict research protocols and control groups early in the disaster, doomed later epidemiological studies to

²⁰ Philip J. Hilts, "AMA Votes to Fight Dioxin 'Witch Hunt,'" Washington Post 23 June 1983: A1; Robert Reinhold, "A.M.A. Disavows Jab at Dioxin Reports," NYT 1 July 1983: 6. See also "Dioxin Hysteria," Wall Street Journal, 31 May 1983: 26.

²¹ Janice R. Long and David J. Hanson, "Dioxin Issue Focuses on Three Major Controversies in U.S.," Chemical & Engineering News 6 June 1983: 29; Hanson, "Science Failing to Back Up Veteran Concerns About Agent Orange," Chemical & Engineering News 9 Nov. 1987: 11.

inconclusiveness on all but the broadest questions²².

Sociologist Bruno Latour has argued that the effectiveness of science in the world outside the laboratory depends on organizing the world so that meaningful collection of data is possible -- that is, it depends on turning the world into a laboratory.

Vietnam and Seveso were not laboratories²³.

Sources of ambiguity include the uncertainties involved in taking what is known about dioxin from animal studies and applying it to human beings. Humans and animals react differently to chemicals, for one thing. For another, animal studies often involve high doses, and the effects at small doses are estimated by extrapolation. Data also is available from the experience of industrial workers, but they constitute a small group for epidemiological purposes, their exposures are much higher than the general population is exposed to in the environment, and they are subject to a multitude of potentially confounding chemical exposures²⁴. Finally, there are ethical boundaries that sharply limit the extent to which studies can be done on human subjects. One of the many controversies of 1983

²² Paolo Bruzzi, "Health Impact of the Accidental Release of TCDD at Seveso," Accidental Exposure to Dioxins: Human Health Aspects, eds. Frederick Coulston and Francesco Pocchiari (New York: Academic 1983): 215-6.

²³ Bruno Latour, "Give Me a Laboratory and I Will Raise the World," Science Observed: Perspectives on the Social Study of Science (Beverly Hills: Sage 1983): 141-70.

²⁴ Gough, 21-4, 201-19.

involved a revelation that Pennsylvania prison inmates had had dioxin applied to their skin in the late 1960s, in an experiment to test human susceptibility to dioxin-induced chloracne²⁵.

Despite these ambiguities and uncertainties, however, one could plausibly argue that the preponderance of scientific evidence had long been on the side of the view that dioxin has relatively minor human health effects. The controversy was kept alive, this argument would continue, by interested parties -- scientists, government regulators, lawyers, the media -- who exploited the inevitable ambiguities and uncertainties of science while ignoring or downplaying its substantial findings²⁶. This argument is consistent with the view of fact/value separationists that scientifically determined facts should be the basis for decision in science/technology controversies. A simpler way of stating this view is to say that scientific knowledge may be imperfect, but it's the best we have, and we should use it as a basis for settling our disputes, rather than exploiting its imperfections as an excuse for extending them.

Yet the flaw we found in the fact/value separationist argument was that settling disputes on the basis of facts often begs the question of relevancy. So do imputations of insincerity and self-interest. Assuming reasonably honest motives on all

²⁵ Hay 134-6; William Robbins, "Dioxin Tests Conducted in 60's on 70 Philadelphia Inmates, Now Unknown," NYT 17 July 1983: 16.

²⁶ Various aspects of this composite view are expressed by Gough 254-5, Crone 180-93, and Young, "Social Assessment" 193-201.

sides, a pertinent question is, which facts are to be brought to bear, on what issues? Examination of dioxin coverage in the New York Times and selected magazines reveals that the controversy was not about health risk alone, but about a wide variety of issues, most of which the scientific consensus simply failed to address. Moreover, the process at the end of which the consensus emerged also represented a transformation of the controversy, so that the terms in which it was cast at the end were different -- narrower, less radical and seemingly less political -- than at the beginning²⁷.

As summarized by Michael Gough in his book on dioxin and Agent Orange, the consensus was that "harm has been limited to highly exposed industrial populations and that none has been shown from environmental exposures."²⁸ Examination of the coverage shows that human health effects of herbicides were always an issue in the pesticide and Vietnam defoliation controversies. Yet the issues out of which the dioxin controversy arose also included ethical and legal concerns about crop denial and chemical warfare, as well as those posed

²⁷ The importance of the terms in which controversies are cast is discussed by Stuart Hall, "The Rediscovery of 'Ideology': Return of the Repressed in Media Studies," Culture, Society and Media eds. Michael Gurevitch, Tony Bennett, James Curran and Janet Woollacott (London: Methuen 1982) 80-83.

²⁸ Gough 257.

by the emerging belief system of ecologism²⁹. As the controversy developed in the press, these obviously value-laden issues increasingly shared attention with whether dioxin exposure caused cancer or birth defects -- questions seemingly more readily assessable by the value-neutral processes of science. As the spotlight of news coverage shifted from Vietnam to Seveso, then to Agent Orange and to Times Beach, this refocusing of media attention on dioxin and long-term health risks continued and intensified. Eventually the health-risk issue came to predominate. "What did the media tell the public about dioxin?" turns out to be a less central question than "What did the media tell the public dioxin was about?"

Introduction of dioxin into the controversy as a technical detail in 1970 was a crucial development, marking the beginning of the end of the defoliation and pesticide controversies as ecologicistic challenges to fundamental American beliefs and behaviors. In its later stages, the controversy took place on less radical, more familiar terrain. Even here, however, the issue was not limited to long-term human health risk of environmental exposure to dioxin. Instead, the presence of dioxin in the environment exposed for journalist gatekeepers a number of conflicts in a mainstream, centrist ideology, or symbolic structure of beliefs about the way American society does

²⁹ On North Vietnamese claims of health effects, see William Beecher, "U.S. Will Step Up Defoliation Missions in Vietnam," 10 Sept. 1966: 2.

and should operate³⁰. Much of the coverage, examination shows, was concerned with exposing and resolving these conflicts in such a way that revision took place while the fundamental features of the ideology were maintained. Having argued that fact/value separation would not after all have been a helpful strategy, I turn now to an account of the emergence of the dioxin controversy out of disputes over domestic use of pesticides and the defoliation program in Vietnam.

³⁰ On ideologies as symbolic structures that help people deal with complex social realities, see Clifford Geertz, "Ideology as a Cultural System," Ideology and Discontent ed. David E. Apter (New York: Free 1973): 71-3; on journalists as gatekeepers who determine "what information is passed along (a) chain and how faithfully it is reproduced," see Werner J. Severin with James W. Tankard Jr., Communication Theories 2d ed. (New York: Longman 1988): 46.

PART IV

Emergence of the Dioxin Controversy

CHAPTER SEVEN: PESTICIDES AND THE NATURAL WORLD

I. Attitudes Toward Nature

The term dioxin began appearing in news coverage about 1970 as a technical detail in coverage of two ongoing environmental controversies. One involved the U.S. defoliation program in Vietnam, the other the domestic use of DDT and other pesticides. Both were shaped in important ways by American attitudes toward nature, attitudes which had developed over generations but took a new direction in the early 1960s. The emergence of dioxin as a focal point of controversy can be better understood by placing it in the context of these developments.

The place of human beings in nature is one of the fundamental relationships in a culture's cosmos or worldview, that culturally constructed myth which helps to impart order and unity to human experience¹. This was as true of the inhabitants of the American continent before European colonization as after. Native cultures apparently tended to view humans and the natural world as part of a common society, members of a family whose bonds were reinforced in religious ritual and ceremony. Early European immigrants had

¹ David Oates, Earth Rising: Ecological Belief in an Age of Science (Corvallis: U of Oregon P 1989): 1-3.

a sharply different view, coming as they did from a Judeo-Christian culture that saw nature as something to be subdued to human purposes. The native relationship to nature was transformed, in the worldview of the Europeans, into an aspect of "savagery," which it then became a goal of immigrant society to reform or eradicate. Similarly, what had been a settled continent was transformed into wilderness, which it became the duty of the Europeans to domesticate to gardens and farms. "Europeans did not find a wilderness" in America, writes historian Francis Jennings: "rather, however involuntarily, they made one. . . . The so-called settlement of America was a resettlement, a reoccupation of a land made waste by the diseases and demoralization introduced by the newcomers."²

The pastoral ideal -- America as the fruitful Garden of the World -- became one of the most powerful images of the culture. The driving impulse of the Puritans has been characterized as a wish to "carve a garden from the wilds; to make an island of spiritual light in the surrounding darkness."³ Pastoralism had a secular version as well, in the ideal of a simple, harmonious life lived close to nature, remote from both the perils of wild

² Francis Jennings, The Invasion of America: Indians, Colonialism and the Cant of Conquest (Chapel Hill: U of North Carolina P 1975): 75; Roderick Nash, Wilderness and the American Mind, 3d ed. (New Haven: Yale UP 1982): 13-20; Nash, The Rights of Nature: A History of Environmental Ethics (Madison: U of Wisconsin P 1989) 117-9; Howard P. Segal, Technological Utopianism in American Culture (Chicago: U of Chicago P 1985): 75.

³ Nash, Wilderness 35.

nature and the corruption of political power. Yet the appeal of industrialization was also strong. The figure of the ingenious Yankee inventor joined that of the frontiersman and the pioneer farmer as a symbol of what it meant to be an American. Common to all three was a restless, anthropocentric individualism that sought to impose its own purposes and order on nature⁴.

The transformation of nature took place with increasing rapidity and thoroughness in 19th century America. Wilderness gave way steadily to the plow, the plow to the streetcar. As the century opened, the frontier of agricultural cultivation was already moving west from the Alleghenies. By 1865 it had reach eastern Kansas and Nebraska, and after 1870 the edge of settlement pushed out onto the dry plains. In 1893, Frederick Jackson Turner delivered his famous paper, "The Significance of the Frontier in American History," at the Chicago World's Columbian Exposition. In it he formulated a thesis that the frontier was one of the dominant forces in American history, at the same time that he declared the frontier virtually closed⁵.

The nation's urban centers also developed rapidly. In 1800 only 6 percent of the nation's five million residents lived in

⁴ See Henry Nash Smith, Virgin Land: The American West as Symbol and Myth (Cambridge: Harvard UP 1950, reissued with a new preface 1970); Leo Marx, The Machine in the Garden: Technology and the Pastoral Ideal in America (London: Oxford UP 1964); and Frank W. Fox, "The Genesis of American Technology, 1790-1860," American Studies 17-2 (1976): 29-48.

⁵ Smith 3-4, 174, 250-60.

places of 2,500 population or more. But as early as 1820, argues historian Martin Melosi, industrialization and urbanization began to be "immutably linked" in a mutually complementary matrix of machinery, energy sources, transportation and labor. By mid-century, "factories were concentrating in milltowns and other urban areas at an increasingly rapid pace," with resulting severe degradation of the urban environment. Soon new industrial cities like Pittsburgh and Cleveland, as well as transformed mercantile cities like New York and Boston, became places of "overcrowded tenements, congested traffic, critical health problems, smoky skies, mounds of putrefying wastes, polluted waterways and unbearable noise"⁶

As agriculture, industrialization and urbanization changed the face of the continent with increasing rapidity, the cultural complex of attitudes about the relationship of humans and nature also evolved. As wild areas disappeared, their threatening aspect softened and they came to be perceived instead as resources to be prized and protected. The new view of wilderness received definitive political expression in the conservation movement of the Progressive era, which aimed to make efficient use of the nation's forests, waters and rangelands by managing them as resources. Meanwhile, the image of an agrarian America

⁶ Martin V. Melosi, "Environmental Crisis in the City: The Relationship Between Industrialization and Urban Pollution," Pollution and Reform in American Cities, 1870-1930, ed. Martin V. Melosi (Austin: U of Texas P 1980): 3-4.

of sturdy yeoman farmers came to be more and more out of touch with reality. As the country urbanized, agriculture was seen more as a resource for feeding the cities, and less (as Thomas Jefferson had put it) as God's "peculiar deposit for substantial and genuine virtue." American attitudes toward nature had taken on new manifestations, but one underlying idea remained unchanged. Whether as a howling wilderness to be tamed or a resource to be managed, nature was something apart from human

city populations grew, pesticide historian James Whorton has argued, farms were called upon to feed them, and the rapid development of transportation after 1820 aided the flow of food to the cities and the commercialization of farming. Labor continued to be scarce on the farms, however, so while urbanization provided the demand, industrialization provided the means to meet it. "From steel plows and seed drills, to steel-toothed cultivators and the Hussey and McCormick reapers, agricultural inventions by the thousands followed the call for labor-saving machinery."⁸

The result was monoculture, which created ideal feeding conditions for insects in "extensive, unbroken fields canopied by the foliage of a single plant." The clearing of forests for agriculture also frequently destroyed insect predators and forced the insects themselves to seek new food supplies. In addition, the development of a nationwide and then worldwide transportation system brought insects into areas where no natural predators existed. Free of natural checks, insects "were able to live and reproduce, and destroy, with virtual impunity."⁹ Two examples, the gypsy moth and the Colorado potato beetle, show the inter-relationship of commerce, transportation and farming practices in the development of infestations. The gypsy moth was introduced

⁸ James Whorton, Before Silent Spring: Pesticides and Public Health in Pre-DDT America (Princeton: Princeton UP 1974): 3-6.

⁹ Whorton 5-6.

to America from abroad in 1869 as part of an experiment in commercial silkworm breeding. Twenty years later the caterpillar devastated Medford, Massachusetts, stripping trees of leaves and covering sidewalks, tree trunks, fences and sides of houses. (It remains a problem in wide areas of the country today). Also in the 1860s, cultivation of the Irish potato in Colorado caused a beetle native to the region to forsake its diet of wild leaves for greener fields. Soon the infestation had spread eastward, devastating crops and setting off a frantic search for remedies. Other serious insect infestations of the time included those of the chinch bug, the codling moth, the cotton army worm and the Western grasshopper¹⁰.

The answer was arsenic. Apparently first used as a bug killer in 1867, perhaps apocryphally when a farmer threw leftover green paint on potatoes and noticed what it did to the beetles, arsenic-based insecticides such as Paris Green (and later lead arsenate) soon came into vogue. From the first, some farmers had opposed the use of the arsenicals as risky. The insecticides' popularity was pressed, however, by professional economic entomologists, a group whose rise to power and professional status was closely related to their research on chemical control of insects. The arsenicals did kill insects. They also were ingested by farmers occupationally and by consumers as residues on food. Thus they added to the body burden of a public already

¹⁰ Whorton 6, 17-8, 23.

exposed to arsenic from dyes, wallpaper and medical prescriptions. Medical use eventually declined, and arsenic in consumer products was prohibited. Arsenical pesticides continued in use, however, until they were replaced with synthetic pesticides shortly after World War II. Until then they were widely accepted as necessary for the American agricultural cornucopia to continue spilling its goods¹¹.

The story of research into risks of arsenical pesticides has a familiar ring. It was inconclusive for some of the same reasons dioxin research was inconclusive. Although there were numerous cases of acute arsenic poisoning on file, these were ignored or marginalized as anecdotal. Medical examination of exposed human beings in a Northwest fruit growing area in 1940, for example, failed to turn up much evidence of clinical damage to health, but the concerns about lead arsenate were not just for clinical but also for sub-clinical and chronic problems. "The only thing that could indicate sub-clinical damage," Wharton notes, "was extended experimentation with animals whose internal organs could be examined . . . (but) the agricultural industry refused to accept data obtained from rats and guinea pigs as applicable to people."¹² The response of industry and government was also something of a forecast of things to come. The battle over how much arsenic to allow on food, like the battle over

¹¹ Whorton 7, 20-2, 39-50, 69-70, 249.

¹² Whorton 245; 24-35, 102-12.

continued use of 2,4,5-T, lasted for years. Some government regulators were assertive. In general, however, government took the approach that restrictions on residues should be accomplished gradually, as permitted by economics and evolving technology. Risks to human health were to be balanced against benefits, and the benefits were seen as substantial. Chemical agriculture was lauded for improving the health and well-being of Americans by providing more and better food, and for improving the lot of farmers by eliminating drudgery and boosting efficiency¹³.

Thus there was established a characteristic pattern of pesticide use and justification. Part of the pattern was the short-term, sharply focused technical response to a problem that had arisen out of broad social, economic and cultural developments. If bugs were destroying the potato plants, in the words of one versifying pesticide booster, then "Spray, O spray."¹⁴ Another part of the pattern was the response to recurring worries over the health risks of arsenic. The concern was accommodated by pointing to inconclusive scientific research, the government's regulatory apparatus, and the apparent benefits of pesticide use. The argument was made that risks had been exaggerated, that further research would clarify the situation, and that the regulatory process stood ready to step in if clear-cut dangers were established. Meanwhile, the argument went, jobs

¹³ Whorton, 133-75, 244-5, 228-29; Bosso 21-33, 47-53.

¹⁴ E. G. Packard, quoted in Whorton 91.

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in the orchards and fields and plentiful, varied food on the nation's tables depended on spraying, and these benefits clearly outweighed the shadowy, unsubstantiated risks.¹⁵

Synthetic pesticides like DDT and 2,4,5-T were different in many respects from the arsenicals in use since 1867, but the pattern of use and justification that developed in the earlier time carried over. Wharton pointed out the continuity in a summary of a chapter from Rachel Carson's Silent Spring. The chapter noted that actual use of pesticides on the farm was difficult to monitor; that it was very difficult to evaluate the risks posed by small residues and to fix tolerances that were both effective and enforceable; that regulatory agencies lacked the tools to do their assigned job and were constantly opposed by industry. "(B)y simply changing the names of the new insecticides, wherever they occur," Wharton observed, "the chapter can be made to read like a summary of the years of arsenic and lead-residue regulation."¹⁶

¹⁵ Whorton 212-47.

¹⁶ Whorton 254.

III. Challenges to the Status Quo

The pesticide status quo was increasingly challenged in the 1960s, however, especially after the publication of Silent Spring. Often cited as a beginning point for widespread environmental consciousness in the United States, Carson's book had two lines of attack against what she saw as indiscriminate use of synthetic pesticides. One was to bring together and publish in popular form summaries of research about human health risks of pesticides. Persistent organochlorine pesticides known to cause cancer in laboratory animals concentrate as they move up the food chain, and human beings are near the top, Carson wrote¹⁷. Such warnings could be -- and were -- challenged within the terms of the pesticide status quo by charges of inaccuracy or, with more sophistication, charges that Carson lacked the specialized scientific background to properly interpret the research she drew on¹⁸. What made Carson's book so radical was not its compilation of human health risks from indiscriminate use of pesticides but its second challenge to the pesticide status quo. It refocused the topic in biocentric, ecologicistic terms.

¹⁷ Rachel Carson, Silent Spring (Boston: Houghton 1962): 21-3, 178-84,

¹⁸ Carson had a master's degree in biology. The counter-attack to Silent Spring is detailed in Frank Graham, Jr., Since Silent Spring (Boston: Houghton 1970): 55-68.

Pesticides, Carson wrote, endanger the web of natural inter-relationships of which humans are a part¹⁹.

The response to this aspect of her attack suggests that it was the more keenly felt threat. One state department of agriculture official placed her among the "vociferous, misinformed group of nature-balancing, organic-gardening, bird-loving, unreasonable citizenry that has not been convinced of the important place of agricultural chemicals in our economy." Time magazine accused her of a "mystical attachment to the balance of nature."²⁰

Carson, of course, was not the first ecologicistic writer. Proto-ecologicistic ideas in the United States have been traced back at least to Henry David Thoreau (1817-62) and George Perkins Marsh, whose principal work was published in 1864. In language presaging Carson's, Marsh wrote that the interrelatedness of nature was extremely complex, "and we never know how wide a circle of disturbance we produce in the harmonies of nature when we throw the smallest pebble into the ocean of organic life."²¹ Other important figures in American ecological thought included

¹⁹ Carson 246-8; Graham unequivocally interprets Silent Spring as an "ecological book," 53-5, his emphasis; for a similar but more qualified judgment, see Nash, Rights of Nature 80. I follow David Oates in distinguishing between the science of ecology and the worldview of ecologism. "The ecological worldview is not a science," according to Oates: "it is a belief system extrapolated from one." Oates 5.

²⁰ Quoted in Graham 56, 69.

²¹ Quoted in Nash, Rights of Nature 38.

John Muir and Aldo Leopold. Muir was a counterforce to the Progressive Conservation movement in the early 20th century, breaking with Theodore Roosevelt in an unsuccessful effort to prevent the Hetch Hetchy valley in Yosemite National Park from being dammed to provide water to San Francisco²². Leopold's 1947 essay, "The Land Ethic" was a particularly influential statement of ecologicistic principles in the pre-Carson years. "We abuse land," he wrote, "because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."²³

Ecologism has been a diverse intellectual movement. David Oates has summarized the major themes of the ecologicistic worldview as seen from the perspective of the late 1980s. These include holism, or the habit of seeing wholes rather than focusing analytically on parts; the inter-relatedness and oneness of nature, a unity to which human beings belong; and the concepts of balance, stability, diversity and cooperation. A common thread is the biocentrism of these themes, as contrasted with the anthropocentrism, or human-centeredness, of the dominant American view of the relationship between humans and nature. Ecologicistic thinking, according to Oates, "wishes to place the human being within the natural world, not above it."²⁴

²² Nash Wilderness 160-81.

²³ Quoted in Nash Rights of Nature 69.

²⁴ Oates 32-101; quotation 64.

Carson was not a complete or consistent biocentrist: As Nash has pointed out, much of Silent Spring was traditionally human-centered. Carson told her editor that in writing the book it had been her intention "to give principal emphasis to the menace to human health." Nevertheless, she continued, she increasingly came to believe that the threat of pesticides to "the basic ecology of all living things . . . outweighs by far . . . any other aspect of the problem."²⁵ Silent Spring and the controversy it occasioned have been widely credited both with enlarging public interest in the pesticide controversy and with vigorously injecting ecologicistic ideas into the debate²⁶.

Evidence of Carson's impact can be found in news of the controversy attending publication of Silent Spring itself. A convenient contrast can be made between coverage of Silent Spring and of the "cranberry scare" three years earlier. Shortly before Thanksgiving 1959, the government announced that residues of aminotriazole, a weed killer that produces tumors in laboratory animals, had been found on cranberries headed for the market. The resulting controversy was conducted in anthropocentric terms typical of other residue episodes, although it was more public. New York Times coverage, for example, dealt largely with human health and market economic issues surrounding the contamination. Ecological issues, such as wetlands degradation resulting from

²⁵ Quoted in Nash, Rights of Nature 80.

²⁶ Nash, Rights of Nature 55-82; Dunlap, 98-125.

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the creation of large-scale commercial cranberry bogs, were not explored²⁷.

Coverage of the Silent Spring controversy, however, included both human-centered and biocentric concepts. Within the biocentric framework, human health and welfare were still of concern but were placed in the context of overall damage to the environment, the "web of life," or the "balance of nature." However, while press coverage reflected these differing conceptual frameworks, it generally did not bring their differences to the surface for analysis or discussion.

Of a dozen New York Times items on the publication of Silent Spring which appeared from July through September 1962, four were dominated by biocentric concepts, treating both Silent Spring's warnings and its critics' responses in terms of "environment," the "balance of nature," or harm to wildlife²⁸. One of these, a "Critic at Large" column by Brooks Atkinson, expounded biocentrism concepts at length. "The basic fallacy," he wrote,

-- or perhaps the original sin -- is the assumption that man can control nature. Nature returns with a massive assault from an unexpected quarter. For nature has

²⁷ "Some of Cranberry Crop Tainted by Weed-Killer, U.S. Warns," NYT 10 Nov. 1959: 1; Clarence Dean, "Cranberry Sales Curbed; U.S. Widens Taint Check," NYT 11 Nov. 1959: 1; "Cranberries," NYT 11 Nov. 1959: 34; William M. Blair, "Pesticides Both Boon and Threat," NYT 22 Nov. 1959, D8.

²⁸ "Rachel Carson's Warning," NYT 2 July 1962: 28; John M. Lee, "Silent Spring Is Now Noisy Summer," NYT 22 July 1962: F1; Brooks Atkinson, "Rachel Carson's Articles on the Danger of Chemical Sprays Prove Effective," NYT 11 Sept. 1962: 30; "Bird Haven Spurs a Pesticide War," NYT 23 Sept. 1962: 71.

devoted millions of years to creating an order of life in which parasites and predators control one another.

Broadcast sprays to kill the gypsy moth and you kill birds that feed on the gypsy moth, as well as the pollinators -- chiefly bees -- that fertilize fruits and berries. Broadcast sprays to kill the fire ant and you kill wildlife that feeds on the fire ant. You also may kill domesticated animals such as horses, sheep and sows: And you will probably introduce poison into the milk that humans consume. The supreme irony is that you do not eliminate the gypsy moth or fire ant²⁹.

During the same period, three items were dominated by an anthropocentric outlook. Two were letters arguing whether dry cleaners' moth-proofing of clothing with DDT was a threat to human health. A third reported comments by the head of an industry-supported foundation attacking Silent Spring for failing to stress that the nation's food supply depended on chemicals³⁰. Other items appeared to mix biocentrism and anthropocentrism, but without bringing their differences to the surface. Coverage of a meeting of the American Chemical Society characterized Carson's message ambiguously as the threat of pesticides to "life on earth" and of "the extinction of mankind."³¹ The Times' major book review of Silent Spring, by Louis and Margery Milne, used ecologicistic terminology but strongly emphasized human health

²⁹ Atkinson, "Rachel Carson's Articles on the Danger of Chemical Sprays Prove Effective."

³⁰ Gerald Jonas, "DDT in Dry Cleaning," ltr NYT 26 July 1962: 26; Louis A. Kinum, "DDT's Use in Dry Cleaning," ltr NYT 6 Sept. 1962: 30; "Rachel Carson Book Is Called One-Sided," NYT 14 Sept. 1962: 37.

³¹ Walter Sullivan, "Chemists Debate Pesticides Book," NYT 13 Sept. 1962: 34.

effects. A comparison of the stress placed on human health by Atkinson and the Milnes illustrates a difference between the traditional human-centered and biocentric frameworks. "Poisoning people is wrong," the Milnes begin their review:

Yet for the sake of "controlling" all kinds of insects, fungi and weed plants, people today are being poisoned on a scale that the infamous Borgias never dreamed of. Cancer-inducing chemicals remain as residues in virtually everything we eat or drink."

If current policies are not changed, they continue, chemical contamination "will soon exterminate much of our wildlife and man as well."³²

Both Atkinson and the Milnes dealt with harm to humans and nature, but for the latter the human aspect was in the foreground -- and in the lead -- whereas for Atkinson the possibility of human harm was one detail in a complex whole. Coverage using both concepts was taking place simultaneously. The Times and other members of the media were of course providing information about environmental risk in covering the Silent Spring controversy. Even more importantly, however, they had become terrain on which a struggle was being carried out over the terms of the controversy. What did environmental pollution pose a risk to? Human beings directly, or human beings as a part of the "web of life?" The stakes were high. The status quo view of pesticides had worked out ways to accommodate direct threats to

³² Louis Milne and Margery Milne, "There's Poison All Around Us Now," NYT Magazine 23 Sept. 1962: 1.

human health, but a biocentric approach cut deeper, under more basic assumptions. The anthropocentric worldview had been a powerful source of legitimation for the American stress on material and economic growth. The ecologicistic perspective, because it called the wisdom of that emphasis into question, challenged "basic American priorities and behavior."³³

³³ Nash Rights of Nature 73; see also Robert Paehlke, Environmentalism and the Future of Progressive Politics (New Haven: Yale UP 1989).

CHAPTER EIGHT: DEFOLIATION IN VIETNAM

I. Operation Ranch Hand

A similar kind of struggle for definition took place with the other controversy out of which the dioxin dispute emerged, U.S. defoliation and crop destruction in Vietnam from 1961 to 1971. The goals of the program, called Ranch Hand, were to deny food and forest cover to the enemy. U.S. troops sprayed approximately 19 million gallons of herbicide on as much as 10 percent of the land area of South Vietnam in 20,000 missions. Peak years for Ranch Hand were 1967-69. A half-dozen different herbicide formulations were used, some directed toward rice crops, others toward forest trees. One of the most heavily used defoliant was a half-and-half mixture of 2,4,-D and 2,4,5-T, called Agent Orange.

Critics of the program accused Ranch Hand of using starvation as a weapon, inflicting suffering on civilians, violating the Geneva protocol on chemical weapons, and, most prominently, causing long-term, perhaps irreversible damage to the ecology of South Vietnam. Eventually health risks to the South Vietnamese and finally to American soldiers joined the list of issues, but

the initial concerns, raised by several American scientists, focused most strongly on ecology.

Ranch Hand apparently was first reported in the Times in accounts of U.S. military action in 1965, where it was described as risky for flight crew members but effective in depriving the enemy of cover and food¹. North Vietnamese claims of illness and death from the spraying were balanced by U.S. government reassurances that the herbicides were "non-toxic."² Beginning in 1968, coverage began to focus on threats to Vietnam's soil, forests and animal, bird and insect life. These concerns had been raised by members of the American Association for the Advancement of Science as early as 1966, and the government had commissioned Midwest Research Institute to assess the likelihood of long-term environmental harm in Vietnam by reviewing the literature on domestic uses of 2,4,5-T. In 1968 it was news that the institute reported no clear indications of long-term damage to the "balance of nature" in Vietnam³.

The report, however, failed to allay concerns within AAAS, whose board in July urged the United Nations to sponsor a new

¹ Jack Raymond, "Weed Killers Aid War on Vietcong," New York Times 28 March 1965: 2; Seth S. King, "Big U.S. Fire-Bomb Raid Hits Vietcong Near Saigon," NYT 1 April 1965: 1+; Charles Mohr, "Defoliation Unit Lives Perilously," NYT 20 Dec. 1965: 3.

² William Beecher, "U.S. Will Step Up Defoliation Missions in Vietnam," NYT 10 Sept. 1966: 2.

³ Walter Sullivan, "Use of Herbicides by U.S. in Vietnam Defended," NYT 4 Jan. 1968: 2; Sullivan, "War Defoliation Studied in Report," NYT 7 Jan. 1968: 3.

study⁴. In September a government scientist, Fred Tschirley, reported finding ecological damage in Vietnam but concluded it would not be permanent⁵. In December, the AAAS decided to carry out its own study of "potential risks and benefits" of using herbicides in war, although it would be another year before a study director was appointed⁶. Meanwhile, the Society for Social Responsibility in Science had sent its own observers to Vietnam. Their report combined a grim account of environmental devastation with the observation that they themselves likely would have been killed by enemy snipers were it not for Ranch Hand⁷.

Spot news coverage of these developments highlighted ecological concerns. References to "ecology," "the environment" or "the balance of nature" were common, sometimes in the lead. In addition, several less event-oriented items had a biocentric focus. One examined the impact of bombing, defoliation and other aspects of the war on Vietnamese animal life, noting that rhinoceroses had been driven out of the country and elephants

⁴ Jane E. Brody, "U.N. Study Urged on Defoliation," NYT 20 July 1968: 1+.

⁵ Douglas Robinson, "Study Finds Defoliants Change Vietnam Ecology," NYT 21 Sept. 1968: 10.

⁶ Robert Reinhold, "Scholars: Study of 'Risks and Benefits' of the Use of Herbicides in War Is Sought," NYT 31 Dec. 1968: 16; "Scientists Press Study of Defoliants in Vietnam," NYT 29 Dec. 1969: 25.

⁷ Sullivan, "Zoologist, Back From Vietnam, Notes Defoliants' Value and Toll," NYT 4 April 1969: 5.

were being shot indiscriminately, sometimes from the air⁸. Another explored an environmental issue raised in the Midwest Research Institute report, the possibility that increased erosion attendant on defoliation could lead to "laterization" or rock-like hardening of the soil⁹. Early in 1970 the World Council of Churches urged the United States to stop using weapons "which by long-term damage to the soil and vegetation further endanger the life of human beings." The Times editorialized for an end to "ecocide"¹⁰.

II. The Bionetics Report

What spurred the government to act, however, was not degradation of the ecology but direct risk to human health. In 1965 the U.S. Department of Health, Education and Welfare had commissioned Bionetics Research Laboratories of Litton Industries to study the carcinogenic, teratogenic and mutagenic activity of a variety of pesticides and industrial chemicals. One of the pesticides studied was 2,4,5-T. Bionetics found that it caused birth defects in laboratory mice and rats. In 1969 a critic of

⁸ Robinson, "Rhinceroses and Elephants Are Among the War Victims in South Vietnam," NYT 13 Sept. 1968: 16.

⁹ Sullivan, "Scientists Study Defoliated Areas," NYT 18 Feb. 1968: 5.

¹⁰ "World Church Body Issues Plea to 4 Sides in Vietnam," NYT 21 Feb. 1970: 9; ". . . And a Plea to Ban 'Ecocide,'" editorial, NYT 26 Feb. 1970: 38.

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U.S. herbicide spraying in Vietnam, Harvard microbiologist Mathew Meselson, called the study to the attention of the president's science adviser, Lee DuBridge, who soon after announced restrictions on use of the herbicide both domestically and in Vietnam¹¹.

After the Bionetics results became public, stories stressing human health risk began to appear more frequently. "Defoliants Used in Vietnam Linked to Birth Defects," read the headline on an account of scientists incorporating the Bionetics findings into a report to the World Health Organization on chemical and biological warfare¹². In the same December 1969 convention in which AAAS named a director for its study of the ecological impact of defoliation, the organization's council voted to urge an immediate halt to the use of Agent Orange in Vietnam. Harvard professor J. T. Edsall argued that the issue was too urgent to await the outcome of the ecological study. Use of the herbicides, he was quoted as saying, is "more seriously questionable than the use of cyclamates" (artificial sweeteners banned in 1969 as carcinogenic in laboratory animals)¹³.

¹¹ Robert M. Smith, "U.S. Curbs Use of Weed Killer That Produces Rat Deformities," NYT 30 Oct. 1969: 80.

¹² Sam Pope Brewer, "Defoliants Used in Vietnam Linked to Birth Defects," NYT 6 Dec. 1969: 3.

¹³ Reinhold, "Scientists Call for a Ban on 2 Vietnam Defoliants," NYT 31 Dec. 1969: 10. On cyclamates, see Philip F. Lawler, Sweet Talk: Media Coverage of Artificial Sweeteners (Washington: Media Institute 1986): 11.

A story three months later reported the U.S. government was taking with increasing seriousness South Vietnamese accounts of birth defects, miscarriages, fever, sneezing, weakness, dizziness and nausea¹⁴. When the U.S. military in Vietnam announced the suspension of defoliation in June 1970, the wire-service story cited possible "genetic dangers" to humans and "fetal deformities" in laboratory animals, giving no hint that ecological concerns figured in the controversy¹⁵. And in December 1970, when the AAAS ecological study committee reported back with a finding of "catastrophic effect" in Vietnam, the coverage cited deformities in laboratory animals and threats to human health along with threats to animals, birds, fish and plants¹⁶.

In sum, news about defoliation after October 1969 increasingly took on a bi-focal character, with some items emphasizing ecological concerns, some anthropocentric, and some mixed. As in the Carson controversy, coverage had become terrain for a struggle over the terms, ecological or anthropocentric, in which the controversy was to be waged.

¹⁴ Ralph Blumenthal, "U.S. Shows Signs of Concern Over Effect of 9-Year Defoliation Program in Vietnam," NYT 15 March 1970: 14.

¹⁵ "Weed Killer Curb Is Expanded by U.S.," NYT 2 May 1970: 33.

¹⁶ Sullivan, "Sprays in Vietnam Said to Level Fifth of Mangrove Area," NYT 30 Dec. 1970: 1.

III. Searchlight on 2,4,5-T

In addition to complicating the defoliation debate, the Bionetics findings shifted the news searchlight onto domestic use of 2,4,5-T. Here too the struggle over issue definition is apparent, with the difference that coverage of the domestic controversy was markedly more anthropocentric. This was true even when the expressed concerns of some participants were ecological.

Four months after the Bionetics results were publicized, a story reported that Arizonans exposed to 2,4,5-T sprayed in Tonto National Forest to clear mesquite and increase water runoff for irrigation complained of damage to animals, birds, plants -- and themselves. The opening paragraphs report a resident's fears about illness among his goats, and the story mentions possible damage to plants, wildlife and domestic animals. It does not explore ecological issues raised by irrigation and manipulation of rainwater runoff. Moreover, harm to animals and plants functions as foreshadowing for a catalog of human ailments suspected to have resulted from the spraying, including respiratory ailments, chest pains, swelling feet, miscarriages and hemorrhaging. "The evidence is not conclusive," the story reported, "but the women blame the spray." De-emphasized by its placement at story's end was the attempt by one source, a potter, to put health risks in a biocentric context. "The real danger,"

Robert McKusick was quoted as saying, "is not to us or our animals but to the environment. We can always move in or out, but the environment is here to stay."¹⁷.

Ironically, a brief story appearing on the same day, eight pages further back in the paper, signalled the start of the transformation of these issues into the dioxin controversy proper. In a four-paragraph wire-service article headlined "Contaminant in Pesticide Linked to Defects in Mice," the Agriculture Department was reported as blaming birth defects in the Bionetics experiments not on 2,4,5-T but on an unnamed contaminant, present in normal production runs at 1 part per million but at "27 times as much" in the sample used by Bionetics¹⁸. The contaminant was dioxin. In a further irony, 2,4,5-T manufacturers had called attention to dioxin in defense of their product. After discovering its presence and dangers, they said (in what was apparently the first Times story to specifically use the term "dioxin") that they had reduced contamination to levels their research led them to believe was safe¹⁹. If it was meant to put an end to the controversy, the

¹⁷ Steven V. Roberts, "Deformities and Hemorrhaging Laid to Forest Spray in Arizona," NYT 8 Feb. 1970: 60.

¹⁸ "Contaminant in Pesticide Linked to Defects in Mice," NYT 8 Feb. 1970: 68.

¹⁹ Jerry M. Flint, "Dow Aides Deny Herbicides Risk," NYT 18 March 1970: 72.

move was unsuccessful. Attention shifted rapidly toward human health effects as the risk and dioxin as the culprit.

In a crowded three-month period in 1970, in reaction to Senate testimony that laboratory experiments had associated even relatively "pure" 2,4,5-T with birth defects in animals, the government suspended the registration of some uses of 2,4,5-T, announced plans to cancel its use on food crops, suspended its use in Vietnam, where it had continued in use in what the military considered unpopulated areas, and banned its use on 500-million acres of federal land²⁰. In addition to chronicling these decisions, the newspaper reported on a petition by conservation and consumer groups for even stronger action, as well as criticism of the government's actions by the president of Dow Chemical Company²¹. In all these stories anthropocentric issues dominate. The government is portrayed as reacting to the risk of harm to human life, specifically birth defects and miscarriage, as indicated by "abnormal development" in laboratory offspring, while Dow President Herbert D. Doan is reported as offering assurances that there is no hazard to health, although there is "unnecessary public fear." The concerns about human health are not placed in an ecological context, as they would have been if the impact of herbicide use on plants, animals, other wildlife or

²⁰ "U.S. Curbs Sales of a Weed Killer," NYT 16 April 1970: 29.

²¹ "Federal Ban Now Is Urged on Controversial Herbicide," NYT 30 April 1970: 27; Agis Salpukas, "Dow Fights Pollution," NYT 7 May 1970: 69.

agriculture had been mentioned. Terms commonly found in Vietnam defoliation stories from the 1968-70 period, like "ecology" and "balance of nature," do not appear in the domestic stories. Even when the news is about actions by groups with an ecological orientation, such as Friends of the Earth, the focus is anthropocentricly on birth defects among laboratory mice and rats and "monstrosities . . . in plants."²²

Ranch Hand coverage began increasingly to raise direct human health concerns along with ecological issues. The lead of an account of unauthorized use of 2,4,5-T by the Americal Division said the defoliant had been "identified as a factor in animal birth defects."²³ A letter from a Philadelphia man claimed chemical weapons had caused "deaths of women and children by starvation . . . damaged the soil for an indefinite duration and . . . caused birth defects."²⁴ Sen. Gaylord Nelson, a Wisconsin Democrat whose efforts to ban herbicide spraying in Vietnam were primarily ecologicistic, raised human health issues indirectly by noting that the effect on humans and animals was an unknown²⁵.

²² E. W. Kenworthy, "5 Groups Ask Ban on Herbicide Use," NYT 19 July 1970: 34.

²³ Blumenthal, "U.S. Says Unit in Vietnam Used Banned Defoliant," NYT 24 Oct. 1970: 3.

²⁴ Mark Sacharoff, "Chemical Warfare as 'Humane Warfare,'" letter NYT 2 Nov. 1970: 46.

²⁵ Smith, "Senate, 62 to 22, Rejects Herbicide Ban for Vietnam," NYT 27 Aug. 1970: 1.

The controversy came to a crisis in December, with nearly simultaneous announcement of the AAAS study results and a White House decision to phase out Ranch Hand by spring. A story reporting study director Meselson's presentation to the annual meeting of AAAS emphasized damage to mangrove forests and the hardships imposed on civilians by crop destruction, but also dealt at length with direct human health effects. Coverage of the White House decision to phase out Ranch Hand noted the risk of 2,4,5-T to animals and humans²⁶. Domestic and Vietnam facets of the controversy came together in 1970, with the result that the emphasis of defoliation coverage shifted toward the anthropocentric concerns characteristic of the domestic controversy.

IV. The Focus of Controversy Shifts

The decision by the Nixon Administration to end Ranch Hand did not close the controversy, but rather shifted its focus to efforts to retrospectively evaluate damage, assess blame and decide how to dispose of surplus stocks of Agent Orange. One retrospective damage assessment also stands as something of a boundary marker in dioxin's emergence as an issue in its own right: It was the first item indexed by the New York Times under

²⁶ Richard D. Lyons, "Military to Curb Use of Herbicides," NYT 27 Dec. 1970: 5; Sullivan, "Sprays in Vietnam Said to Level Fifth of Mangrove Area," NYT 30 Dec. 1970: 1.

dioxin as a separate heading. The article appeared on the newspaper's "op ed" page. Its author, Dr. George Perera, M.D., was a Columbia University medical professor who had delivered medical supplies to Hanoi as part of an American Friends Service Committee mission.

Perera said a North Vietnamese surgeon had told him of a fivefold increase in cases of liver cancer treated in Hanoi in the six years after the beginning of Ranch Hand. Perera acknowledged that questions remained, but said the case implicating dioxin was "strong."²⁷ The article focused on human illness as a direct result of dioxin exposure. There was no suggestion that humans were interdependent with the natural world or that human welfare was related to the integrity of the system as a whole. Nothing in the article was inconsistent with such concepts, but reference to ecologic concepts was absent.

The Perera piece, however, was the exception. In other items on the aftermath of Ranch Hand in Vietnam, health effects were mentioned side by side with damage to the environment, and in others ecologic concerns predominated. A Herbert Mitgang column on the possibility that herbicide stocks might be turned over to South Vietnam listed the casualties of environmental warfare in Vietnam: "Uprooted trees uproot peasants, herbicide

²⁷ George Perera, "Vietnam: A Medical Consequence of War," NYT 19 Sept. 1972: 33.

assaults lead to possible sterility, bulldozing plants harvests fields of hunger."²⁸

Similarly, coverage of a National Academy of Sciences followup of Meselson's AAAS study, while concentrating on ecology, noted that the NAS report cited anecdotal evidence of children dying in areas where crops had been sprayed. "One theory . . . implicates dioxin" in the children's death, according to the story²⁹. Coverage of the Department of Defense response to the Meselson report portrayed the department as responding entirely to the ecological findings, albeit with arguments that were economically anthropocentric: DOD argued the permanence of damage to the mangroves could not be demonstrated, but that defoliation may have benefitted the South Vietnamese economy by facilitating logging³⁰.

Even more ecologically focused was a 1972 story disclosing that the United States had sprayed defoliants in 1966-67 as part of attempts to create fire storms in South Vietnamese forested areas. The disclosure, the Times reported, came at a time of "mounting concern" among scientists and government officials that years of defoliation, bombing and burning had wreaked

²⁸ Herbert Mitgang, "A Dying Land -- Casualty of War," NYT 10 Oct. 1971: E2; see also Mitgang, "The Spoor of Nam," NYT 3 Dec. 1974: 41.

²⁹ John W. Finney, "Vietnam Defoliation Scars Expected to Last a Century," NYT 22 Feb. 1974: 1+.

³⁰ Dana Adams Schmidt, "Pentagon Disputes Study of Spraying Devastation," NYT 9 Jan. 1971: 3.

irreversible damage on the Vietnamese environment³¹. In the same vein was wire-service coverage of Barry Commoner's proposal for American scientists to provide money and technical services to help establish a North Vietnamese agricultural botany research institute to help Indochina recover from the consequences of environmental warfare³². In sum, although dioxin and human health risks had become issues introduced frequently into the controversy over effects of Ranch Hand in Vietnam, they did not crowd out the broader ecologic concerns, nor did they dominate the discussion. The ecologic conceptual framework continued to be pertinent.

V. Domestic Coverage Was Anthropocentric

By contrast, accounts of the domestic 2,4,5-T controversy were dominated by discussion of its potential to cause birth defects or cancer in humans. Just as in coverage of the Vietnamese controversy, some stories mentioned 2,4,5-T's ecological effects alongside human health risks. When opposition by the Sierra Club and others forced the U.S. Forest Service to cancel plans to spray 2,4,5-T, opponents of the spraying were said to fear "human birth defects and miscarriages, destruction

³¹ Reinhold, "U.S. Attempted to Ignite Vietnam Forests in '66-67," NYT 21 July 1972: 1+.

³² "Scientists to Help Indochina Recover From Deforestation," NYT 11 Nov. 1973: 5.

of soil organisms and genetic mutations in animals."³³ In 1974, scientists at the Federal Center for Disease Control identified dioxin as the substance that had killed more than 50 horses and many other animals in Missouri in 1971, as well as making children ill³⁴.

Stories in which the ecologicistic dimension predominated were in the minority, however. More clearly anthropocentric was coverage when residents of the Tonto National Forest area sued the government in June 1971, claiming herbicide spraying in the forest in 1959 had drifted onto their ranches, damaging their "property and personal health." Harms mentioned included deformed animals, dead or damaged trees and shrubs, sterile ground, and human miscarriages, infertility and birth defects³⁵. In an earlier story, potter Robert McKusick's ecological concerns were de-emphasized by their placement at the end of a story whose headline emphasized animal deformities and human illness. A year later the lawsuit further de-emphasized ecology by treating the damaged animals, plants and land as human property, a shift in

³³ "Foes of Spraying Win Coast Round," NYT 11 July 1971: 20.

³⁴ "Deaths of Animals Laid to Chemical," NYT 28 Aug. 1974: 36.

³⁵ "Arizonans Sue U.S. for \$4-Million Loss in Forest Spraying," NYT 9 June 1971: 20.

focus perhaps influenced by the need to allege property or personal damage to gain legal standing³⁶.

Even the article from this period that most thoroughly explored ecologicistic issues characterized them as less important than human health risks. When a group of Arkansas residents and environmentalists obtained an injunction to stop the U.S. Forest Service from spraying herbicides in the Ozark and St. Francis National Forests to kill native hardwoods and encourage more marketable evergreens, the story highlighted twin concerns -- possible ecological damage from "changing the fundamental nature of a forest," and the fear of health effects from dioxin exposure. Both concerns were given roughly equal prominence, but the story reported, without offering specific support, that the residents themselves were "more concerned" about health threats than ecologicistic issues³⁷.

Health issues are unequivocally the focus in stories chronicling efforts by the Environmental Protection Agency to regulate 2,4,5-T. Soon after the April 1970 suspension by the Department of Agriculture of some uses of 2,4,5-T, responsibility for regulating the product shifted to the newly created

³⁶ On this point see Christopher Bosso, Pesticides and Politics: The Life cycle of a Public Issue (Pittsburgh: U of Pittsburgh P 1987): 41-42;, and Barry Casper and Paul Wellstone, "Science Court on Trial in Minnesota," Science in Context: Readings in the Sociology of Science ed. Barry Barnes and David Edge (Cambridge: MIT P 1982): 282-9.

³⁷ Roy Reed, "Herbicide Use in Ozark Forests Challenged," NYT 14 July 1975: 40.

Environmental Protection Agency. EPA announced in March 1971 that other uses of 2,4,5-T would not be suspended pending a one-year review of its safety. Administrator William Ruckelshaus held that the herbicide was not an "imminent" hazard to humans³⁸. Three years later the agency announced it was withdrawing legal motions seeking a ban of remaining uses of 2,4,5-T, on the grounds of insufficient scientific evidence. Coverage focused on whether use of the herbicide posed a threat to human health³⁹, as did a story about testimony by an EPA research leader, Dr. Dianne Courtney, that appears to have introduced into the controversy what would become a widely used soubriquet. Dioxin, she told a Senate Commerce subcommittee, is "by far the most toxic compound known to mankind."⁴⁰

By 1975, then, something that could be identified as a "dioxin controversy" focused on human health effects had developed out of a complex strand of issues involving the U.S. defoliation program in Vietnam and domestic use of herbicides. While ecologic concerns raised as part of these earlier issues did not disappear after dioxin came on the scene, they increasingly had to share the news searchlight with dioxin's

³⁸ Kenworthy, "Full DDT Ban Is Refused Pending Review of Safety," NYT 19 March 1971: 1+.

³⁹ Boyce Rensberger, "E.P.A. Ends Drive to Ban Defoliant," NYT 27 June 1974: 8.

⁴⁰ David Burnham, "Scientist Urges Congress to Bar Any Use of Pesticide 2,4,5-T," NYT 10 Aug. 1974: 13.

threat to human health, and they claimed nowhere near the spectacular media attention given to dioxin in the early 1980s, when the issues whose development is traced here were further transformed into such controversies as Agent Orange and Times Beach. Moreover, there was a distinct difference in the treatment of the Vietnam and domestic aspects of the controversy, with ecologicistic issues more frequently explored in regard to Vietnam than in regard to the United States.

VI. Significance of Dioxin's Emergence

What was the significance of the emergence of dioxin and human health effects as focal points of controversy?

A naive interpretation would be that research had uncovered the existence and risk of dioxin, and that the media simply reported events as they happened. There may be some truth in that, but the record suggests a more complex reality. The existence of a highly toxic impurity in 2,4,5-trichlorophenol, the manufacturing precursor of 2,4,5-T, had been known since at least 1950, and the impurity was identified as dioxin in the open scientific literature (although in German) in 1961⁴¹. The Bionetics research linking 2,4,5-T to birth defects came to public attention some time after the research was conducted, through a series of leaks initiated by a Ralph Nader associate.

⁴¹ R. W. Bovey and A. L. Young, The Science of 2,4,5-T and Associated Phenoxy Herbicides (New York: Wiley 1980): 5, 26 n. 3.

Virtually ignored in the coverage analyzed here was the record of illness resulting from industrial exposure to 2,4,5-T and related compounds, despite its presence in the open scientific literature. Among the very few references to worker exposure in the material analyzed in this chapter was reassurance from a government research administrator that herbicides in use in Vietnam had caused no known cases of death or serious injury, "even in factories where large amounts" are processed⁴². The emergence of the dioxin controversy represented something other than systematic journalistic coverage of events as they happened.

A contrasting interpretation, equally naive, is that the dioxin controversy emerged because it involved emotion-laden threats to human health that could be treated simplistically and exploited to sell newspapers. While there may be some truth here as well, the record again suggests a multi-dimensional reality. The Times covered the Silent Spring controversy in part in terms of broad ecologic concerns with less potential for exploitation than cancer and birth defects. The Brooks Atkinson column, in particular, was an attempt to clearly lay out the ecologic framework for a lay audience. Similarly, after the Bionetics report and the introduction of dioxin into the controversy, coverage did not immediately leap on the human health effects issues. Instead, the coverage oscillated between human-centered and ecologic frameworks.

⁴² Sullivan, "Use of Herbicides by U.S. in Vietnam Defended."

A more plausible interpretation is that the human health questions raised in the Bionetics study had tactical value in the ongoing controversies over the Vietnam war and pesticide use at home. For opponents of defoliation in Vietnam as well as domestic critics of spraying, bringing up human health concerns was consistent with the research and the observed facts, and not inconsistent with their biocentrism: Humans are, after all, a part of the biota. In addition, herbicide critics can hardly be blamed for having observed that the government was more responsive to claims of harm to human health than to the balance of nature, as evidenced by DuBridges' quick action to limit 2,4,5-T use after the Bionetics findings were brought to his attention.

For 2,4,5-T's manufacturers, the introduction of dioxin into the controversy was a move designed to defend the product. Historically less attuned to ecologism than to the human health issues dealt with in industrial hygiene research, industry argued that it had successfully identified and then taken steps to limit or eliminate the source of a problem. For government regulators, the new focus on herbicides represented by the emergence of the dioxin controversy was an extension of concerns about insecticides. Controversial gypsy moth and fire ant eradication programs and a Mississippi River fish kill traced to endrin had put the media searchlight initially on DDT and other

insecticides⁴³, but regardless of whether their targets were insects or plants, many of the postwar synthetic chemicals were chemically similar chlorinated hydrocarbons. Extending the investigation of health risks to include herbicides, as HEW did in commissioning the Bionetics study, seemed to make scientific and regulatory sense.

For the press, the emergence of human health effects and dioxin as the focus of controversy had several features that dovetailed with news imperatives: direct impact on people, as opposed to the animals, birds and insects of biocentric concern; origination in sources considered authoritative, in contrast with the North Vietnamese and National Liberation Front claims of human harm; and, in the leakage of the Bionetics results, the unauthorized use of herbicides by the Americal Division, and the disclosure of attempts to create huge firestorms in the Vietnamese forests, elements of watchdog and investigative journalism⁴⁴.

As suggested earlier, institutions played a role in structuring the terms in which the controversies were covered. Much of the news about Ranch Hand concerned the AAAS and NAS studies, the missions of which were to evaluate the environmental

⁴³ Bosso, 79-108.

⁴⁴ See Dorothy Nelkin, Selling Science: How the Press Covers Science and Technology (New York: Freeman 1987): 109-31; and Sharon M. Friedman, "The Journalist's World," Scientists and Journalists: Reporting Science as News eds. Friedman, Sharon Dunwoody and Carol L. Rogers (New York: Free P 1986).

impact of defoliation. By contrast, EPA's dual mission is to protect human health and the environment, and the law under which pesticides are regulated requires a finding of imminent harm to humans before a registration can be suspended⁴⁵. Individual participants in the controversies may have been anthropocentric or ecological in their concerns, but the institutions through which these disputes reached the press and the public exerted their own biases.

The emergence of the dioxin controversy, with its bias toward anthropocentrism, had ideological significance as well. It is in this sense that the coverage served as a site for struggle over issue definition, or what British media scholar Stuart Hall terms "the power to signify events."⁴⁶ In its stress on human dominance over nature for human ends, anthropocentrism has been and remains a powerful legitimator of the American ideology of industrial capitalist democracy, with its emphasis on material and economic growth. The ecologicistic perspective calls the wisdom of that emphasis into question. The pesticide controversy, which had taken place largely within anthropocentrism until the 1960s, took a turn with Silent Spring toward issues that challenged basic American priorities and

⁴⁵ Kenworthy, "Full DDT Ban Is Refused Pending Review."

⁴⁶ Stuart Hall, "The Rediscovery of 'Ideology': Return of the Repressed in Media Studies," Culture, Society and Media eds. Michael Gurevitch, Tony Bennett, James Curran and Janet Woollacott (London: Methuen 1982): 56-90.

behaviors. Introduction of dioxin into the controversy, while providing those with ecologic concerns with ammunition, also offered others an opportunity to turn the pesticide controversy back the other way.

While the domestic/2,4,5-T dispute was predominantly anthropocentric, the Ranch Hand controversy was not. There, the emergence of dioxin added a complicating dimension but did not significantly recast the controversy in anthropocentric terms. Differences in the context in which 2,4,5-T was used in the two situations may help to explain why. Domestically, the threat could be met with a time-honored solution, the same one offered earlier in the century for arsenicals: Pesticides could be made safe by ensuring they were carefully applied in accordance with manufacturers' directions. Since these were based on laboratory experiments aimed at determining safe levels of human exposure, the argument could be made that human health was protected and criticism resulted from emotionalism and hysteria. Thus the controversy could take place on the same familiar terrain of hard-to-prove illness causation and inconclusive scientific studies that had been the site of pesticide controversy since the late nineteenth century. What anthropocentric framing of the controversy suppressed, however, was what biocentrists saw as entrenched patterns of ecological damage resulting from the American way of life.

Because of the exigencies of combat in Vietnam, it was more difficult to argue -- although the military tried -- that Agent Orange was applied discriminately and with due care for human health and life. Moreover, Vietnam was an agricultural nation with an environment relatively untransformed by industrialization. To fight defoliation there was to attempt to prevent further damage, rather than to point to Humpty-Dumpty's pieces at the base of the wall. The ecological perspective also offered a way to oppose the war on grounds different from those of the North Vietnamese, who had long claimed people were poisoned by U.S. spraying. Most significantly perhaps, in its Vietnamese context, ecological framing was consistent with solutions which, if difficult and controversial, were still short of fundamental social and economic change: The United States could end Ranch Hand, and it could end the war, and did, without fundamental social and economic change at home. What ecological framing of the defoliation controversy tended to suppress was (as in the domestic controversy) the connection between ecological damage and fundamental aspects of the American way of life.

That issue was raised but rarely in the Times' defoliation coverage. A story on the 1972 United Nations Conference on Human Environment in Stockholm detailed Swedish Premier Olaf Palme's criticism of U.S. "ecological warfare" in Vietnam, and then reported questions raised by a rival, unofficial group called Dai Dong about the "fundamental conflict between traditional concepts

of economic growth and the preservation of the environment." The group called for "a technology review and surveillance system to assure that any new technology is ecologically compatible and will be used for human survival and fulfillment."⁴⁷

A story the next day reported the U.S. rebuke of Palme for "politicizing . . . our environmental discussion" and its dismissal of Dai Dong's criticism with the argument that technological advance was the key to cleaning up the environment. The clash between the two perspectives was dealt with summarily and not pursued⁴⁸. As in the domestic 2,4,5-T controversy, the way the issue was framed in news coverage raised important questions while suppressing even more difficult ones.

⁴⁷ Gladwin Hill, "Draft Calls for Ecological Responsibility," NYT 7 June 1972: 3.

⁴⁸ Hill, "U.S., at U.N. Parley on Environment, Rebukes Sweden for 'Politicizing' Talks," NYT 8 June 1972: 13.

PART V

The Mature Controversy

CHAPTER NINE: SEVESO AND JOURNALISM'S 'ENDURING VALUES'

I. Ecologicistic Perspectives

The controversy had taken a decisive turn in Vietnam. It had become the "dioxin controversy," and its terms had become somewhat less ecologicistic, somewhat more centered on long-term human health effects, particularly cancer and birth defects. This transformation continued in news coverage of the Seveso disaster of 1976 and its aftermath. News coverage of Seveso created a richly textured controversy, by no means restricted to the issues of cancer and birth defects, but it was also one in which ecologicistic perspectives were marginalized.

They were not entirely absent, to be sure. In his reports in the New Yorker, for example, Thomas Whiteside emphasized that Seveso was a community in an ecological sense -- a place where people lived in complex and close association not only with each other but with dogs, breeder rabbits and vegetable gardens. Whiteside's articles, later turned into a book, portrayed the release of trichlorophenol not solely as a threat to human health, but as a threat to a community inclusive of humans and of much else besides.

Although much of the seven hundred acres on which the visible part of the cloud seemed to have settled consisted of market-gardening plots and fields on which crops such as grain were raised and on which cows were grazed, the area was inhabited by about five thousand people, most of them artisans from southern Italy (particularly from Sicily) and their families, generally large¹.

"Bird life appeared to have been devastated," he wrote in a memorable image of the catastrophe. "(F)ields, gardens, and orchards were littered with the carcasses of swallows, martins, warblers and goldfinches, also with those of thousands of rats, mice, and moles."²

Other writers raised ecologism's challenge to industrial capitalism in political terms. A long article in the New York Times Magazine by Melton S. Davis said Seveso had raised "profound questions about modern technology and scientifically induced progress."³ The article noted that Seveso had stimulated interest in environmentalism in Italy, a point also made a year later by a U.S. News & World Report story on the continuing "physical, economic and emotional aftermath of Italy's worst environmental disaster." Italian communities are "resisting industrial projects they fear could become contaminating," the article said, quoting the Milan newspaper, Corriera della Serra:

Seveso has shaken public opinion much more than a hundred speeches about ecology Although (factory) chimneys

¹ Thomas Whiteside, The Pendulum and the Toxic Cloud: The Course of Dioxin Contamination (New Haven: Yale UP 1979): 32.

² Whiteside, Pendulum 38.

³ Melton S. Davis, "Under the Poison Cloud," New York Times Magazine 10 Oct. 1976: 20+.

smell like jobs, if the stink is dioxin we now know that no increase in employment can make up for the harm it does."⁴

The liberal weekly Nation published perhaps the most wide-ranging ecologicistic indictment of industrialization to come out of the Seveso disaster. Drawing on two of the most powerful of ecologicistic images, American painter Edith Schloss wrote that Italy was once the garden of Europe but had become the continent's garbage dump. A number of environmental depredations, intertwined with political and cultural problems, are listed. Among them are chemical factories polluting the Po river, high mortality rates in a town where a factory emits toxic substances, and vineyards and orchards destroyed near rice plantations treated with herbicides. Schloss quotes an Italian Communist environmentalist writing in Corriere della Serra:

The problems are not solved by promises of decontamination, as the present government seems to believe . . . but by a profound political change (after which) the structure of an industry based on petroleum by-products, created with public funds, exporting to other countries, operating with maximum expenditure of energy, minimum employment and a high rate of pollution, must be radically re-evaluated. And the concept of 'progress' must then be re-examined by institutions able to work for the benefit of all."⁵

⁴ D. B. Richardson, "Seveso -- One Year Later," U.S. News & World Report 1 Aug. 1977: 44-5.

⁵ Edith Schloss, "The Poisoning of Italy," Nation 16 Oct. 1976: 362-5.

II. The Enduring Values of the News

For the most part, however, news about Seveso portrayed a different kind of world, one in which responsible leaders, with science and technology at their disposal, worked more or less effectively to clean up and limit the damage from an admittedly severe pollution problem, despite difficulties posed by an unruly and sometimes even irrational public. In such a world the themes of technological threat to ecological community, of dioxin as a symptom of fundamental societal disarray, were virtually irrelevant. What was relevant was the job at hand -- to clean up the contamination, monitor the health of residents and improve procedures so nothing similar would happen in the future. News about Seveso was dominated, in brief, by coverage fitting the reformist pattern of what sociologist Herbert Gans has called the "enduring values" of the news⁶.

Gans carried out participant-observer research in professional newsrooms in the 1960s and 1970s, contemporaneously with much of the dioxin controversy. He identified a number of values that comprise journalism's underlying "picture of nation and society as it ought to be," and found these values entering into decisions about what becomes news and how it is reported.

⁶ Herbert J. Gans, Deciding What's News: A Study of CBS Evening News, NBC Nightly News, Newsweek, and Time (New York: Pantheon 1979): 41.

The most important, setting aside such universal norms as peace and prosperity, were

- * **Moral and social order:** The news reflects respect for authority and for other enduring values, and concern for social cohesion.
- * **Leadership:** It values moral, competent leadership as the way to maintain moral and social order.
- * **Ethnocentrism:** American journalism values its own country above others.
- * **Altruistic democracy:** It believes politics should be based on the public interest and public service, and that citizens should participate at the grass-roots level.
- * **Responsible capitalism:** The news believes business should compete, without exploiting workers or customers, to create more prosperity for all.
- * **Small-town pastoralism:** It values nature, smallness, and old-fashioned technologies; these values, however, may be surrogates for a more general value, respect for tradition.
- * **Individualism:** The news values the preservation of individualism against the encroachments of government and society.

- * Moderatism: While it values individualism, however, it discourages excess or extremism, both by individuals and groups⁷.

These values, according to Gans, are in turn part of a "paraideology" that is "neither entirely consistent nor well integrated . . . but is ideology nonetheless." The somewhat old-fashioned, centrist ideology of the news, he concludes, is Progressive and reformist. Its resemblance to the Progressive movement of the early twentieth century

is often uncanny, as in the common advocacy of honest, meritocratic, and anti-bureaucratic government, and in the shared antipathy to political machines and demagogues, particularly of populist bent. Altruistic democracy is, in other words, close to the Progressive ideal of government. The notion of responsible capitalism is also to be found in Progressivism, as is the dislike of bigness, the preference for craftsmanship over technology, the defense of nature, and the celebration of anti-urban pastoral society. Journalistic paraideology and Progressivism are further akin in their mutual support of individualism, their uneasiness about collective solutions, other than at the grassroots level, and their opposition to socialism. Moreover, the preservation of an upper-class and upper-middle-class social order, like the need for morally and otherwise competent national leadership, has its equivalents in Progressive thought⁸.

⁷ Gans Deciding What's News: 39-69; see also Werner J. Severin with James W. Tankard Jr., Communication Theories: Origins, Methods, Uses, 2d ed. (New York: Longman 1988): 228-31.

⁸ Gans Deciding What's News 68-9.

III. Why Seveso Was News

Analysed in the light of Gans' enduring values, Seveso was news because the release of trichlorophenol represented a disturbance of social order by modern technology, necessitating evacuation, harming human health and posing the danger of even more serious health threats. That it happened in a community that could be represented as small and pastoral leant added news value, as did the plight of individuals whose lives were disrupted. It was news of moral disorder in that the accident might have resulted from negligence and that industry had covered up or reacted slowly. In other words, the norm of responsible capitalism had been violated.

Leadership -- scientific, business, governmental -- was necessary to restore order. The authority of science as a basis for leadership was particularly important. When leadership seemed to be lacking, as in the apparent confusion of Italian authorities, the lack represented a threat to the norm; when leadership was forthcoming the threat was averted. Responses of the stereotypically portrayed Italians also allowed ethnocentric comparisons with Americans, whose offers of help and scientific data became news. Meanwhile, it was also necessary to report on extremist reactions to the disaster, as well as on a populace whose behavior was sometimes unruly -- representing, even in Italy, a threat to the American value of altruistic democracy.

From a journalistic perspective, there was much more to be done than simply to convey accurate information about risk -- and unless one lived in the vicinity of a similar chemical plant, risk information had little direct relevance for American readers anyway.

IV. Social Disorder

Social disorder in the face of technological threat is a major theme of reformist accounts of Seveso. These accounts share some common ground with ecologicistic treatments: Modern technology is perceived as a problem in both, and both emphasize the concept of community. In reformist accounts, however, community is conceived in anthropocentric terms, de-emphasizing the participation of animals and plants. Reformist accounts likewise generally lack an explicit analysis in which the technological problem is tied to structural features of modern industrial capitalism. They instead portray the technological threat as descending suddenly, as if from the outside, on traditionally and even stereotypically conceived pastoral communities.

This approach is often embodied in narrative techniques that tell the story through the eyes of ordinary people. In its first account of the disaster, for example, Newsweek emphasized the suddenness with which dioxin intruded on a scene of traditional domesticity.

In the little town of Seveso, Giuseppina Senno could recall the precise moment on July 10 when it all began. "Suddenly I saw a white cloud, like steam, shoot up from the Icmesa factory, and then I smelled a nauseating odor . . . I called the children into the house and closed the doors, but the smoke and smell were already in the house."⁹

Time began its account with a post-explosion scene of social disruption, villagers loading possessions into automobiles or hand-drawn carts and fleeing the area, leaving behind a wasteland of dead animals, barbed wire and soldiers on guard. The account flashes back to the explosion, then moves forward chronologically, again through the eyes of ordinary people.

Already accustomed to smoke from the factories that have sprung up in the region in the last decade, nearby townspeople at first paid little attention to the white chemical cloud. But they could not ignore it for long. "The wind carried it here," recalls Vinicio Lazzaretti of the small town of San Pietro. "I couldn't breathe. It made my eyes water. The next day all the leaves and plants and flowers were riddled with small holes, as if they had been struck with tiny hailstones."¹⁰

Telling the Seveso story in this way emphasizes the contrast between the "natural" characteristics of small-town, pastoral existence on the one hand, and the suddenly appearing chemical threat, which "riddles" the natural world of leaves and flowers, on the other. A similar effect is achieved by contrasting technical terminology with the ordinariness of the consumer products that eventually resulted, in a sentence that also associates the world of chemicals and technology with "Seveso's

⁹ Raymond Carroll, with Loren Jenkins, "Our Own Hiroshima," Newsweek 16 Aug. 1976: 49.

¹⁰ "The Deadly Cloud," Time 16 Aug. 1976: 39.

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nightmare." The nightmare "originated at Icmesa, a chemical plant that makes trichlorophenol, which is used in manufacturing disinfectant soaps and deodorants." The world of the familiar is even more starkly juxtaposed with a symbol of science-as-threat in the comment of a regional health minister that dioxin contamination at Seveso had become "our own little Hiroshima."¹¹

V. The Public Threat

These accounts draw on the enduring values of social order and small-town pastoralism for their power as news. In other stories the threat to social order came from another quarter -- a mistaken or even irrational public. Though the public in this case was European and not American, the coverage serves to warn of a flaw in the ideology of democratic government -- the possibility that ordinary people may be too uninformed or irrational to govern themselves intelligently.

In an article on parent company Hoffmann-La Roche's liabilities in the wake of the accident, for example, Business Week reported that Swiss and West German customers were refusing to take shipments of goods from the area, "even when they originate in parts of the region that were unaffected by the gas." In addition, the disaster has touched off a xenophobic attitude toward multinationals in Italy. Lurid wall posters are showing

¹¹ Carroll, Jenkins, "Our Own Hiroshima."

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up throughout the country, denouncing multinationals for poisoning not only Seveso, but the world's environment¹².

The article presents dioxin as a fairly serious health threat, "known to cause extensive kidney, liver and lung damage." Yet the text devalues the threat by contextualizing it within a theme of public over-reaction to the chemical.

Chemical Week offers a similar illustration. Reporting on additional cases of chloracne that turned up among children seven months after the explosion, the magazine suggested two possible causes, exposure from the original fallout or "people breaking through the flimsy fence barricading Zone A" (the evacuated zone closest to the plant). As in the Business Week article, dioxin was portrayed as a serious health threat -- but here a threat worsened by the public's tendency to ignore facts and disobey authorities. Zone A was a wasteland, according to the text, yet "its residents, still unimpressed by the dangers of dioxin, have persisted in returning to their contaminated homes in recent months."¹³

¹² "The Costly Aftermath of a Poison Cloud," Business Week 11 Oct. 1976: 32-3.

¹³ "Toxic Effects Persist," Chemical Week 23 Feb. 1977: 22.

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VI. Ethnocentrism

Victims of the disaster were not the only ones portrayed as unruly. In a story dovetailing with ethnocentric journalistic values, the New York Times highlighted jurisdictional conflicts between local and regional authorities, headlining the story "Italians Wrangle Over Poison Issue."¹⁴ Several other stories portrayed the Italians as not handling the disaster well, often suggesting that they needed help from the United States. The New York Times' second story on Seveso drew on a U.S. authority for information that dioxin was the focus of concern, and reported that a decontamination expert from the U.S. Department of Agriculture was being dispatched¹⁵.

A month and a half after the explosion, Chemical & Engineering News reported that Italians were unsure of what had happened and had fallen prey to rumors and confusion. Among the rumors: That flamethrowers would "destroy everything within the contaminated zone;" that the plant was making chemical warfare agents for the United States or NATO; that the new Italian government was floundering. "Some clarity on what happened" was provided by two U.S. scientists who went to Italy to assess the

¹⁴ "Italians Wrangle Over Poison Issue," NYT 4 Aug. 1976: 9.

¹⁵ "20 More Evacuated From Area in Italy Hit by Poison," NYT 29 July 1976: 3.

incident, offer suggestions on decontamination and help set up a medical program¹⁶.

The same article contrasted the Italian plant with an "automated," "fail-safe" U.S. operation, quoting Dow Chemical Co. official Etcyl H. Blair as saying a shut-down of trichlorophenol manufacture because of Seveso "never even crossed our minds." Both Science News and Chemical & Engineering News reported that two U.S. scientists, Barry Commoner and Robert E. Scott, had sent the Italians data generated in the United States on dioxin's toxicity, solubility and decomposition in soil. "U.S. Data on Dioxin May Aid Italian Town," headlined the latter¹⁷.

VII. Leadership

American scientists represented one kind of leadership that could restore order to the chaotic situation, but there were others as well. Reflecting daily journalism's event-orientation and its standard procedure of gathering news from government sources, the story as told in a number of New York Times articles in 1976 and 1977 emphasized a theme of government leaders -- and in one instance, business leaders -- taking action. The

¹⁶ Rebecca L. Rawls and Dermot A. O'Sullivan, "Italy Seeks Answers Following Toxic Release," Chemical & Engineering News 23 Aug. 1976: 27-8+.

¹⁷ "U.S. Data on Dioxin May Aid Italian Town," Chemical & Engineering News 29 Nov. 1976: 4; "Dioxin Toxicity Data Sent to Aid Italy," Science News 4 Dec. 1976: 359.

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newspaper's first story on the incident, a three-paragraph brief, carried the headline "179 Italians to Be Moved from Poison Gas Area."¹⁸ Subsequent stories with this theme reported

* A meeting of the Italian prime minister and cabinet to discuss the problem¹⁹;

* Government approval of a \$48 million emergency fund for decontamination and health measures²⁰;

* Announcement by the justice minister that pregnant women in the area could take advantage of exceptions in the law to obtain abortions²¹;

* Announcement by officials that six women have obtained abortions and nine more are seeking them, along with the announcement that warrants were issued for the arrest of three company officials²².

* A decision by regional and trade union officials to close the factory²³;

¹⁸ "179 Italians to Be Moved From Poison Gas Area," NYT 25 July 1976: 15, my emphasis.

¹⁹ Christina Lord, "Italian Leaders Take Up Poison Chemical Problem," NYT 31 July 1976: 3.

²⁰ "Italy Allocates Funds for Gassed Region," NYT 11 Aug. 1976: 2.

²¹ "Comment on Abortion," NYT 22 Aug. 1976: 2.

²² "Six More Italians Undergo Abortion," NYT 20 Aug. 1976: D17.

²³ "Polluting Factory in Italy Will Close," NYT 21 Aug. 1976: 6.

* A request that the government send in troops to prevent people from returning to their homes in the evacuated area²⁴;

* Announcement by authorities that 19 factories would be temporarily closed for tests after new dioxin contamination was found²⁵;

* Announcement that 24 families were "allowed" to return home after 14 months²⁶.

* Announcement that Givaudan, a Hoffmann-La Roche subsidiary that owned ICMESA, had set up a center in Milan to settle damage claims, and that the parent company had already paid more than \$2 million in damages²⁷.

Dioxin thus was portrayed as a health threat that called on government and business leaders, including those at the highest levels, to enforce the law, take preventive action, provide funds and compensation and, perhaps most prominently, manage the populace by evacuating them, giving them limited approval to obtain abortions, preventing them from returning home, and finally allowing them to return.

²⁴ "Italy Asked to Use Troops to Seal Polluted Region," NYT 13 Feb. 1977: 7.

²⁵ "New Pollution Reported in Italy," NYT 21 April 1977: 4.

²⁶ "24 Italian Families Return to Contaminated Area," NYT 17 Oct. 1977: 5.

²⁷ "Toxic Effects Persist."

VIII. Scientific and Technical Knowledge

The most important tool available to leaders trying to cope with the situation, judging from news coverage, was scientific and technical knowledge. A common theme was that the dioxin situation was a technical problem that could best be understood and dealt with through the authority of science. The theme was introduced early in daily newspaper coverage. In August 1976 the New York Times reported, episodically, that doctors had found no traces of dioxin in the blood of seven children evacuated from the area, and that the company had announced it would soon test an "antidote" that would "accelerate the disintegration of the dioxin."²⁸

Early coverage in Chemical & Engineering News, which acknowledged the severity of the incident, also emphasized the opportunities provided for research. Among decontamination plans, the magazine reported, was one to fence the most severely affected area permanently, turning it into a "scientific observation area to study the long-term effects of TCDD exposure on the land and on living things."²⁹ As in those stories in which U.S. scientists and data were sent to Italy to bring clarity to a confused situation, science provided the

²⁸ "Blood Tests Favorable in Gassed Area in Italy," NYT 17 Aug. 1976: 6; "Antidote to Be Tested Near Italian Factory," NYT 18 Aug. 1976: 12.

²⁹ Rawls and O'Sullivan, "Italy Seeks Answers Following Toxic Release."

authoritative account in the New York Times report of Hoffmann-La Roche's June 1978 announcement that "scientific findings now permit the 'confident assumption' that no serious and permanent damage to health occurred.'"³⁰

The authority of science likewise was appealed to in fixing blame for the incident. Scientists appointed to conduct a judicial inquiry, said Chemical Week, confirmed earlier findings by an investigative commission that blamed Icmesa and Givaudan³¹. The charge that the plant's owners were lax also appeared with a corollary implication -- that similar incidents could be prevented elsewhere and in the future by running a tighter ship in accordance with appropriate scientific, technical and management standards. The company's production method at Seveso was riskier than that used by others, Chemical Week reported in August 1978; necessary permits were not obtained for the production of toxic substances; the owners deviated from the patent process, didn't properly train workers, and didn't take appropriate security measures to guard against the explosion³².

Similarly, the solution to the existing problem at Seveso was portrayed as a technical one -- cleanup. Here, too, the

³⁰ Paul Hofmann, "Company Says '76 Blast in Italy Caused Little Injury," NYT 25 June 1978: 4.

³¹ "Study Blames Icmesa for Dioxin Disaster," Chemical Week 14 Feb. 1979: 13.

³² "Probers Detail Dioxin Damage," Chemical Week 9 Aug. 1978: 20.

company's shortcomings became the subject for a story, which reported charges by a decontamination worker that cleaning water had been poured down drains and paper bags holding debris broke frequently, spreading dioxin-laden dust. Hoffmann-LaRoche denied the charges, saying it had verification from experts and scientific institutes that cleanup was carried out thoroughly and successfully³³. Whether the charges were true or not, the underlying implication was that dioxin was a problem that could be solved by cleaning it up after it had been spilled. Nearly two years later, however, Chemical Week returned to the topic, reporting that "the solution still has not been found for cleaning up the area. . . ." Nevertheless, the magazine reported,

progress was made last week when the government-appointed Cimmino Commission responsible for directing cleanup efforts recommended that the contaminated soil in the 0.5-sq. km. barricaded area be scraped up, and that some of it be used in experiments to help determine ultimate disposal³⁴.

IX. "The Questions Persist . . ."

Several of these themes were brought together in a long article in Science, headlined "The Questions Persist Where Dioxin

³³ "Toxic Effects Persist."

³⁴ "Seveso Cleanup Still Not Solved," Chemical Week 18 July 1979: 23.

Created a Wasteland."³⁵ The persistent questions, according to this article, revolved around technical issues relating to clean-up of the area and to long-term health effects of residents. The article mentioned the confusion and bitterness felt by some residents, positive company reactions to the situation, and the involvement of foreign scientists, particularly Americans. The impact of the disaster on the lives of residents whose homes closest to the plant might have to be razed was noted as a "poignant problem," but it was de-emphasized as a less serious concern than the "implications for the health of those exposed to the chemical cloud. . . ." Another serious concern was the failure to use the disaster effectively to extend scientific knowledge about dioxin. An American government scientist is quoted as stating that "the world missed a golden opportunity to get a handle on dioxin exposure and what it means to humans" because provisions were not made early for systematic data gathering. Scientists disappointed at the missed opportunity recognize that emergency conditions prevailed after the accident and that the people of Seveso made a point of not wanting to be 'treated like guinea pigs.' But while the incident has focused attention in Italy on the impact of industry on the environment and human life, and internationally, Seveso has come to stand for the threat of a 'chemical epidemic,' it seems agreed that, unfortunately, the scientific lessons which Seveso offered have been, to a large degree, lost."³⁶

³⁵ John Walsh, "Seveso: The Questions Persist Where Dioxin Created a Wasteland," Science 9 Sept. 1977: 1064-7.

³⁶ Walsh 1064-7.

The example illustrates the way in which the reformist version incorporates but subordinates aspects of Seveso that posed challenges to fundamental assumptions about progress, technological change and industrialization. The headline, "The Questions Persist Where Dioxin Created a Wasteland," draws on the same imagery of uncertainty and devastation incorporated in more ecologicistic accounts. The questions that persist, however, are not ecologicistic but technical. To be sure, the more radical ecologicistic questions are mentioned briefly -- "the incident has focused attention in Italy on the impact of industry on the environment and human life" -- but they are mentioned in the context of missed scientific opportunity, not potential political or cultural change. Direct impact on the everyday lives of human beings also is mentioned in passing -- as a "poignant problem" -- but is accorded less significance than the question of whether dioxin would cause significant health effects in humans over the long term.

Hoffmann-La Roche announced in June 1978 that "scientific findings now permit the 'confident assumption' that no serious and permanent damage to health occurred."³⁷ That the Seveso story had narrowed to a concern with long-term human health effects is illustrated by the subsequent tailing off of news interest. Event-oriented coverage ceased in the New York Times,

³⁷ Hofmann, "Company Says '76 Blast in Italy Caused Little Injury."

which had run more than two dozen items on Seveso in three years. The newspaper's coverage in 1979 focused not on events in Italy but on the publication of Thomas Whiteside's book on the disaster, The Pendulum and the Toxic Cloud. Based on interviews with Seveso-area residents as well as government officials and technical experts, the book portrayed Seveso as a cultural disaster with potentially serious human health implications. A review of the book by Times science writer Philip Boffey attacked Whiteside's case on the health effects issue as "weakened by the ambiguity of the evidence."³⁸ The newspaper published letters criticizing Boffey's review on scientific grounds and then, the next year, a news story on Hoffmann-LaRoche's agreement to pay nearly \$80 million in compensation to individuals, companies and the government³⁹. With financial closure having been achieved to accompany the tentative scientific closure, the Seveso story, for all intents and purposes, was over.

X. Two Conflicting Versions

There were two conflicting versions of Seveso. In one, the events raised ecologically-framed questions about modern technology-based industrial capitalism. Is technology out of

³⁸ Philip M. Boffey, "A Dirty Business," NYT 15 April 1979: G12.

³⁹ "Toxic," NYT 10 June 1979: G53; "Owners of Chemical Plant in Italy Paying \$80 Million in '76 Mishap," NYT 21 May 1980: 10.

control? Must communities, in the widest sense, be disrupted and people's health put at risk for the sake of jobs and technology-based consumer products? What fundamental social, political or cultural changes are needed to prevent such disruptions from happening in the future? These questions guided coverage by Schloss in the Nation, Davis in the New York Times Magazine and Whiteside in the New Yorker and his book on Seveso. In the preponderance of news about Seveso, however, they were either missing or incorporated at the margins.

Questions raised in the other, reformist version were of a different sort, offering less fundamental challenges. The threat to small, pastoral communities by modern technology, in its reformist version, is less radical than romantic. Seveso in fact was both highly industrialized and highly polluted, a fact fully noted by Schloss, Davis and Whiteside but marginalized in Time and Newsweek. A thornier question was this: How can the values of capitalism, social order and democracy be reconciled when social order seems threatened from two directions, negligent capitalism and irrational democracy? Seveso remained news until plausible answers were worked out.

These were provided largely by science and technology: The admittedly disruptive damage could be cleaned up technically and compensated through the law. Technical improvements could be made to insure against a recurrence. Long-term health consequences could be monitored. And science could learn from

the experience, if only how to lay the groundwork for better epidemiology in the future. News about Seveso had little to do with transmitting risk information and much to do with seeing that cracks in the structure of enduring values were repaired.

Indeed, the number of points at which Seveso touched on the enduring values of the news suggests a possible dynamic for this and other, similar controversies: They stay in the news at least in part because they expose incoherence in the Progressive, reformist ideology whose values they hold up for perusal -- stresses, strains and contradictions in the dominant picture of society which it is an important business of the news to see reaccommodated within a revised but essentially intact structure. This interpretation suggests a way of understanding the fact that health risks appear in the news disproportionately to their scientifically assessed degree of threat. Natural cancer threats like aflatoxins and radon, for example, may receive less coverage than synthetic carcinogens if they are judged by journalist gatekeepers to raise fewer, or less important, threats to the ideology's coherence and hence credibility⁴⁰.

Where the faultlines appear depends to some extent on the facts of the controversy. Agent Orange, like Seveso, was about social order disrupted both by capitalism and a seemingly

⁴⁰ On aflatoxins, see Hugh Crone, Chemicals and Society: A Guide to the New Chemical Age (Cambridge: Cambridge UP 1986): 94-5; on radon, see Frank B. Cross, Environmentally Induced Cancer and the Law: Risks, Regulation and Victim Compensation (New York: Quorum 1989): 31.

irrational public. In the Agent Orange controversy, however, no geographically defined pastoral community was threatened -- Vietnam veterans were scattered across the nation, in big city and small. Rather the threat was posed to individualism, to such individual rights as that of soldiers to be warned of and protected from risk, to complain of wrongs, and sue, and have their cases heard by a jury. As at Seveso, the authority of science was crucial. Perhaps the most intractable question was how to deal fairly with individuals in disputes in which science of necessity spoke the language of statistics.

At Times Beach, in contrast, a community was once more at risk, this time with the possibilities of ethnocentrism removed because the community was quintessentially American. Unlike Seveso, however, Times Beach could not be saved. Order was restored there, not by reinhabiting the town but by eliminating it. As a result Times Beach news became in part a requiem for a vanishing small-town pastoral way of life.

CHAPTER TEN: TIMES BEACH: REQUIEM FOR A WAY OF LIFE

I. Laying Blame

Times Beach, like Seveso, was presented in the news as a small, pastoral community disrupted by chemical pollution. Everywhere in the town, according to an early wire service account in the New York Times, were "signs that the community's life was crumbling."¹ Among these signs were the closing of a voluntary flood relief center and the activities of repair workers clad in plastic hooded suits, rubber gloves and insulated boots. Literal signs of damage to community were posted at the town limits, the newspaper reported in a page-one feature article:

Where travelers enter most cities past a "Welcome to . . . " sign, they enter Times Beach past a barricade with a "Keep Out" sign and pictures of a skull and crossbones².

There were, however, important differences in the coverage of Seveso and Times Beach. Most importantly, nothing in the material examined here placed the Times Beach disaster in context as symptomatic of systemic social and cultural problems in regard

¹ "County Pulls Police Out of Poisoned Missouri Town," NYT 1 Jan. 1983: 5.

² Nathaniel Sheppard, Jr., "In Dioxin-Tainted Town, No 'Welcome' Signs," NYT 10 Jan 1983: 1.

to the human relationship to nature. While ecologicistic issues were marginalized in the journalism about Seveso, they were missing altogether at Times Beach. As in the early days of the controversy, when biocentric issues were more readily raised about dioxin in Vietnam than domestically, ecologicistic perspectives seemed to vanish the closer the controversy got to home.

Instead, the Times Beach disaster was occasionally presented as a natural catastrophe, but more frequently as a matter of careless past industrial practice. The root of the dioxin problem was located in a failure to adequately dispose of waste, rather than in its production in an environmentally unsound social and economic system. Much of the blame was laid on a specific individual, waste hauler Russell Bliss. Any systemic problems were considered to have been already solved by passage of legislation in the late 1970s and early 1980s. Paradoxically, however, much of the blame for the ordeal at Times Beach was laid at the door of the federal government, which was portrayed as remote, faceless, slow to react and manipulative.

Thus compared to Seveso, Times Beach brought to the surface different weaknesses than did Seveso in the Progressive, reformist ideology of the news. Instead of stereotypically emotional and irrational Italians, news about Times Beach presented stereotypically laconic and skeptical Missourians. Although reporters found fear and uncertainty over dioxin's

health effects, they also found residents reluctant to believe in its risks and suspicious of federal government action. One major problem at Times Beach, in the eyes of the news, was not irrational democracy but ineffective and unresponsive government leadership, particularly in the Environmental Protection Agency headed by Anne Gorsuch Burford.

As at Seveso, science and technology were important sources of leadership and authority. Cleaning up the contamination was presented as an important solution and as a scientific and technical problem. Science also was called upon to determine definitively what had happened, and to calm residents' uncertainties and fears with data. When research eventually indicated no ascertainable clinical illnesses among exposed residents, one aspect of the Times Beach story had reached closure.

Another reached closure as the remaining residents of the community sold their homes, leaving Times Beach uninhabited. An important concern of Times Beach news was to expose, examine and resolve stresses among important parts of journalism's reformist ideology -- modern, technology-based industrial capitalism and romanticized small-town pastoralism and individualism. Unlike Seveso, which was reinhabited after a time, the Times Beach conflict was resolved only with the elimination of the community and the dispersal of its residents. This process was followed

closely in news that became, in effect, the story of the passing of an outmoded way of life.

II. Ecologicistic Issues Unexplored

Journalistic efforts to provide context for the events at Times Beach often presented them as the "tip of the iceberg" of a potential nationwide threat to health. Some accounts reported a growing list of sites thought to be contaminated³. Others cited growing concern on the part of government officials and scientists about the health risk of low-level, environmental exposure.⁴ But Times Beach did not have its Thomas Whiteside, Edith Schloss or Melton Davis. Treated from the beginning as the response to a human health threat, the community's ordeal was not put in a context that drew attention to it as a symptom of fundamental problems in American society's relationship with nature. It was not treated as an ecologicistic story.

Several characteristics of Times Beach coverage worked to distance it from an ecologicistic perspective. One was the frequent juxtaposition of dioxin contamination, which had taken

³ Robert Reinhold, "Missouri Now Fears 100 Sites Could Be Tainted by Dioxin," NYT 18 Jan. 1983: 1+; "Seven More Dioxin Sites Are Found in Missouri," NYT 10 Feb. 1983: 18; "Dioxin Found at Day-Care Center," NYT 11 Feb. 1983: B5; "Dioxin Found at Illinois Sites," NYT 15 Feb. 1983: 21.

⁴ Wayne Biddle, "Dioxin's Peril to Humans: Proof Is Elusive," NYT 23 Jan. 1983: 1+; Philip Shabecoff, "Threat Posed by Dioxin Subject of Growing Fear," NYT 12 Feb. 1983: 10.

place years earlier, with the coincidental flooding of the Meramec River, the event that originally led officials to evacuate the town in the final days of 1982. Although the flood was coincidental, flood damage and dioxin contamination were often mixed together in a single catastrophic image in the news.

"It has been a month since the rain-swollen Meramec River overflowed its banks and swept through this St. Louis suburb," began a New York Times feature on Times Beach, "leaving residents in fear that what little remained of their possessions might be contaminated with highly toxic dioxin."⁵ "Dioxin in Missouri," read the headline in a Science News article, but the damage described in the lead paragraph resulted from flooding, not dioxin.

This town had been Yolanda Bohrer's home for 17 years until it was swallowed and spit back out by a twisting branch of the muddy Mississippi River. Now, weeks after the floodwaters receded, Times Beach, Mo., still does not resemble the place she and about 2,200 other residents were forced to evacuate on Dec. 5. "You see there where only one wall is standing," she says; "that used to be a church . . . And parts of this building," she says, pointing to some semblance of an enclosed structure, "were carried a block and a half down toward the tavern."⁶

The pairing of flood and dioxin could be naively defended within the conventions of journalistic objectivity as a report of "what happened": The river did flood. Dioxin was found. These were unusual events, and unusual events make news, presumably

⁵ Sheppard, "In Dioxin-Tainted Town, No 'Welcome' Signs."

⁶ Linda Garmon, "Dioxin in Missouri: Troubled Times," Science News 22 Jan. 1983: 60-2. Ellipsis in original.

because they attract readers' attention. More interesting is the way in which the juxtaposition puts dioxin contamination on a par with flooding as a "natural" phenomenon, an act of God rather than an outcome of human cultural, social and economic choices. At Seveso dioxin descended on the community from a visible industrial stack. At Times Beach it was sometimes portrayed as having arrived with the flood.

This is not to suggest that dioxin's origins in industrial production and waste disposal were ignored in news coverage. Far from it'. Times Beach was, however, portrayed as an industrial waste disposal problem whose systemic origins had already been remedied, in the "Superfund" law of 1980 and the federal Resource Conservation and Recovery Act of 1976. "The Missouri situation," the New York Times reported, "underscores the casual way in which extremely hazardous wastes were disposed of before waste control laws were enacted."⁸ The statutes "unfortunately . . . were not enacted in time to prevent these problems," a Missouri Department of Natural Resources official was quoted as saying⁹. Except for

⁷ See for example, Michael A. Lerner with Marjorie Mandel and John McCormick, "The Trouble at Times Beach," Newsweek 10 Jan. 1983: 24; Sheppard "In Dioxin-Tainted Town, No 'Welcome' Signs"; Biddle, "Dioxin's Peril to Humans: Proof Is Elusive"; Marjorie Sun, "Missouri's Costly Dioxin Lesson," Science 28 Jan. 1983: 367-9; Janice R. Long and David J. Hanson, "Dioxin Issue Focuses on Three Major Controversies in U.S.," Chemical & Engineering News 6 June 1983: 23-36.

⁸ Reinhold, "Missouri Now Fears 100 Sites Could Be Tainted by Dioxin."

⁹ Sun, "Missouri's Costly Dioxin Lesson."

cleaning up the contamination and monitoring the health of exposed residents, dioxin in Missouri was treated as a problem of past practice.

The news also distanced itself from ecologicistic issues by focusing blame on the misdeeds of a single individual, Russell Bliss. In the view of the news, dioxin was not brought to Times Beach by deep-seated cultural and social disarray but by the actions of a single ignorant, histrionic and devious man. If someone had told Bliss dioxin was jelly, he was paraphrased as having said, "he would have spread it on toast." Dioxin-laden oil was dumped on the road to his own property, according to the article, which was illustrated with a photograph of Bliss weeping during testimony at a hearing on his waste hauler's license¹⁰. Subsequently the Times covered testimony that Bliss had been warned of dioxin's dangers but instructed his drivers to ignore the problem¹¹. To the extent Bliss was to blame, his remorse and punishment were required to bring the narrative to completion, and later news items reported his apology to his neighbors for

¹⁰ "Business Sideline Puts Oil Dealer in the Spotlight in Missouri's Dioxin Case," NYT 24 Jan. 1983: 8.

¹¹ Reinhold, "Witness Says Hauler Knew of Toxic Material," NYT 25 Jan. 1983: 19; "Witness Says Driver Lied About Spraying Dioxin," NYT 27 Jan. 1983: 9.

spraying local roads with dioxin-laden oil, as well as his conviction of income tax violations¹².

III. Why Times Beach Was News

Whatever ecologicistic issues may have been latent in the Times Beach controversy were not brought to the surface in the material examined here. Times Beach did, however, intersect with and expose conflicts among a number of Herbert Gans' "enduring values." Examined in their light, the story was news fundamentally because it was about the disturbance of social order by modern capitalist industry, and the apparent failure of government leadership to deal with the problem. The news places high value on social order, industry and government leadership. When one disturbs the other and the third fails in its responsibility, the news pays attention -- exposing the conflict and following the story through to some plausible resolution. As in Seveso, the intersection of events with other enduring values -- small-town pastoralism is most important here -- increased the news interest of the story and called for resolutions of their own. On the other hand, ethnocentrism played little if any role, since Times Beach -- situated near Six Flags amusement park, the "eager little town of Eureka" and

¹² "1970's Dioxin Sprayer Apologizes at Hearing," NYT 26 June 1983: 37; "Salvage Oil Dealer Convicted in Tax Trial," NYT 24 July 1983: 16.

billboards for the Black Madonna shrine and Meramec Caverns¹³ -- was quintessentially American.

The lead paragraph of Newsweek's initial article illustrates how the contamination of Times Beach with dioxin intersected with such enduring values as social order, small-town pastoralism and rugged individualism to make news.

Even at its best, the small Missouri town of Times Beach is not a particularly pretty place. Dilapidated houses, mobile homes and old cottages resting atop cement-block foundations shelter a population of 2,500, many of whom call themselves "river rats" -- an affectionate reference to the nearby Meramec River. But early last month the river lashed out at Times Beach, swirling 22 feet above flood level and damaging virtually every one of the town's 800 dwellings. Then, just two days before Christmas, federal agencies confirmed that hazardous levels of the chemical dioxin had been uncovered in soil samples from the town, and residents just moving back after the flood were urged to evacuate once again. "This is phenomenal," says Fred A. Lafser, director of the Missouri Department of Natural Resources. "Very few people in the world have dioxin problems, and very few people in the world have flood problems. We have both."¹⁴

IV. Failure of Leadership

One of the ways in which Times Beach coverage was distanced from ecologicistic issues was by treating the episode as a problem whose systemic features had essentially been solved with passage of the Resource Recovery and Conservation Act and the "Superfund" legislation. Systemic solutions still had to be applied to

¹³ Kurt Andersen, "Times Beach, Mo: Overgrown and Ghostly," Time 14 Oct. 1985: 86-7.

¹⁴ Lerner, Mandel and McCormick, "The Trouble at Times Beach."

specific instances, however, and the apparent problems of the government in dealing adequately with the specific situation at Times Beach required news attention.

Some coverage showed government actions in a positive light, to be sure. Science News, for example, characterized the buyout as an action Times Beach residents had "fought, hoped and prayed for. . . ." ¹⁵ State officials were shown exercising leadership, as when Missouri Gov. Christopher S. Bond asked the legislature for "new measures to cope with the growing problem of dioxin contamination in the state." ¹⁶ To a much greater extent than at Seveso, however, government was identified as the problem at Times Beach. "They should have known more before they came to us and disrupted our lives," one resident said of the government's handling of the evacuation. ¹⁷

Government was portrayed as remote from ordinary citizens. Reporters described cleanup workers wearing protective plastic, hooded suits and rubber gloves while Times Beach residents nearby wore street clothes ¹⁸. "There's a painful gulf in Missouri between governors and governed," the New York Times editorialized. Authorities knew of the presence of dioxin in the

¹⁵ Linda Garmon, "The Buying of Times Beach: A Town Unfit for Human Beings," Science News 26 Feb. 1983: 132-3.

¹⁶ Reinhold, "Missouri Governor Proposes Steps to Fight Dioxin Crisis," NYT 12 Jan. 1983: 12.

¹⁷ "The River Rats Want to Stay," Time 10 Jan. 1983: 21.

¹⁸ "County Pulls Police Out of Poisoned Missouri Town."

town for years but did little, and even after the flood were slow to respond, the editorial charged¹⁹. Slow government response was also the theme of news accounts pointing out that a Missouri citizen had compiled a list of dioxin sites 11 years earlier -- a list that had "disappeared into a black hole in the bureaucracy" after she turned it over to the government.

For Judy Piatt, the recent news that Times Beach is contaminated with dioxin -- perhaps the most toxic chemical known -- came as no surprise. That the contamination has been traced to a waste hauler came as no surprise to her either. Eleven years ago, Piatt sent state and federal officials a long list of sites where she had seen the company spray waste oil to control dust. Times Beach was on that list.²⁰

Similarly, the Times reported official confusion over what should be done, and said residents were upset that the government had provided them with "little or no information with which they could make decisions about their lives." Instead, government response was symbolized by the

"faceless forms behind protective white garments that look like space suits (who) move in and out of a few of the houses, collecting samples that they carefully place in protective containers and load into trucks²¹."

The residents of Times Beach were portrayed in the news in striking contrast to the excitable Italians of Seveso. Compared to Guiseppina Senno, who snatched her children inside as the trichlorophenol cloud approached, Missourians were represented as

¹⁹ "Deadly Miasma Over Missouri," editorial NYT 3 Jan. 1983: 18.

²⁰ Sun, "Missouri's Costly Dioxin Lesson."

²¹ Sheppard, "In Dioxin-Tainted Town, No 'Welcome' Signs."

laconic and skeptical in the face of risk. Time's first article on Times Beach opens with a 60-year-old construction worker, Ira Bennett, puttering in his yard. "I don't know what to think about dioxin," he says.

"I've lived here for 13 years. The birds are still flying, dogs are still running around." Then he bent over to turn up a strip of plywood, revealing a colony of worms in the dirt. "See there. If something was wrong, do you think they'd still be living?"²²

At Times Beach the problem was not with unruly and irrational citizens but with remote authorities who not only failed to protect ordinary people from risk and uncertainty but would not help them protect themselves. "It's awful down here," said resident Marian Hagen,

and I wish we would hear something -- that the government will buy us out or clean up this mess. We never know where we will spend the night. I heard the emergency sirens a couple of days ago and thought they were going to evacuate us again. Some nights I dream about those skulls on the barricade²³.

Yet when the government did act, its buyout decision was represented as destroying the placidity of a middle-American community even as it responded to the problem of dioxin's health risks. Time reported the buyout announcement as a hit-and-run tactic by a remote, embattled EPA, with Anne Gorsuch Burford stopping in Missouri only long enough to leave "the barest outlines of the first federal purchase of a polluted city in U.S. history." Townspeople who came to hear her

²² "The River Rats Want to Stay," Time 10 Jan. 1983: 21.

²³ Sheppard, "In Dioxin-Tainted Town, No 'Welcome' Signs."

pressed against the locked glass door of a large meeting room, their intense faces showing the strain of waiting in vain for years for state and federal officials to decide what to do about the potentially lethal dioxin that had poisoned their town²⁴.

Chemical & Engineering News used parallel sentence structure to suggest the buyout as a third disruptive blow to the community. "First came road spraying with dioxin-laced oil. Then, years later, came the floods. Now the federal government has come to relocate the residents. . . ." ²⁵.

The New York Times editorialized in favor of the buyout plan, giving EPA credit "for moving to end the misery" of residents by offering to "buy their now worthless homes." But the editorial went on to suggest that action in Times Beach did not necessarily mean the EPA would be "more assertive about public health."²⁶ Times Beach, in fact, became an important symbol in a rising tide of criticism of the EPA under Burford. "When flood waters of the Meramec River swept over this working-class hamlet in December," wrote Robert Reinhold in a Times commentary article datelined Times Beach,

few residents would have predicted the wave of political crisis that now engulfs the Environmental Protection Agency and laps at the steps of the White House. Yet the anguish here resonates clearly with concern in Washington

²⁴ "Found: A Buyer," Time 7 March 1983: 39.

²⁵ "Dioxin-Tainted Town," Chemical & Engineering News, 28 Feb. 1983: 6.

²⁶ "One E.P.A. Buy-Out Is Not a Policy," editorial NYT 25 Feb. 1983: 30.

over whether enough is being done to safeguard the nation from environmental hazards²⁷.

Within two weeks, Burford had resigned as head of EPA, surrounded by charges that her agency had politically manipulated cleanup funds, maintained "hit lists" of political opponents and showed favoritism toward some toxic waste dumpers²⁸. Burford's resignation moved toward a resolution of the leadership issue, at the same time that the buyout decision went some way toward resolving residents' uncertainty and confusion -- and hence the social disorder brought to Times Beach by dioxin.

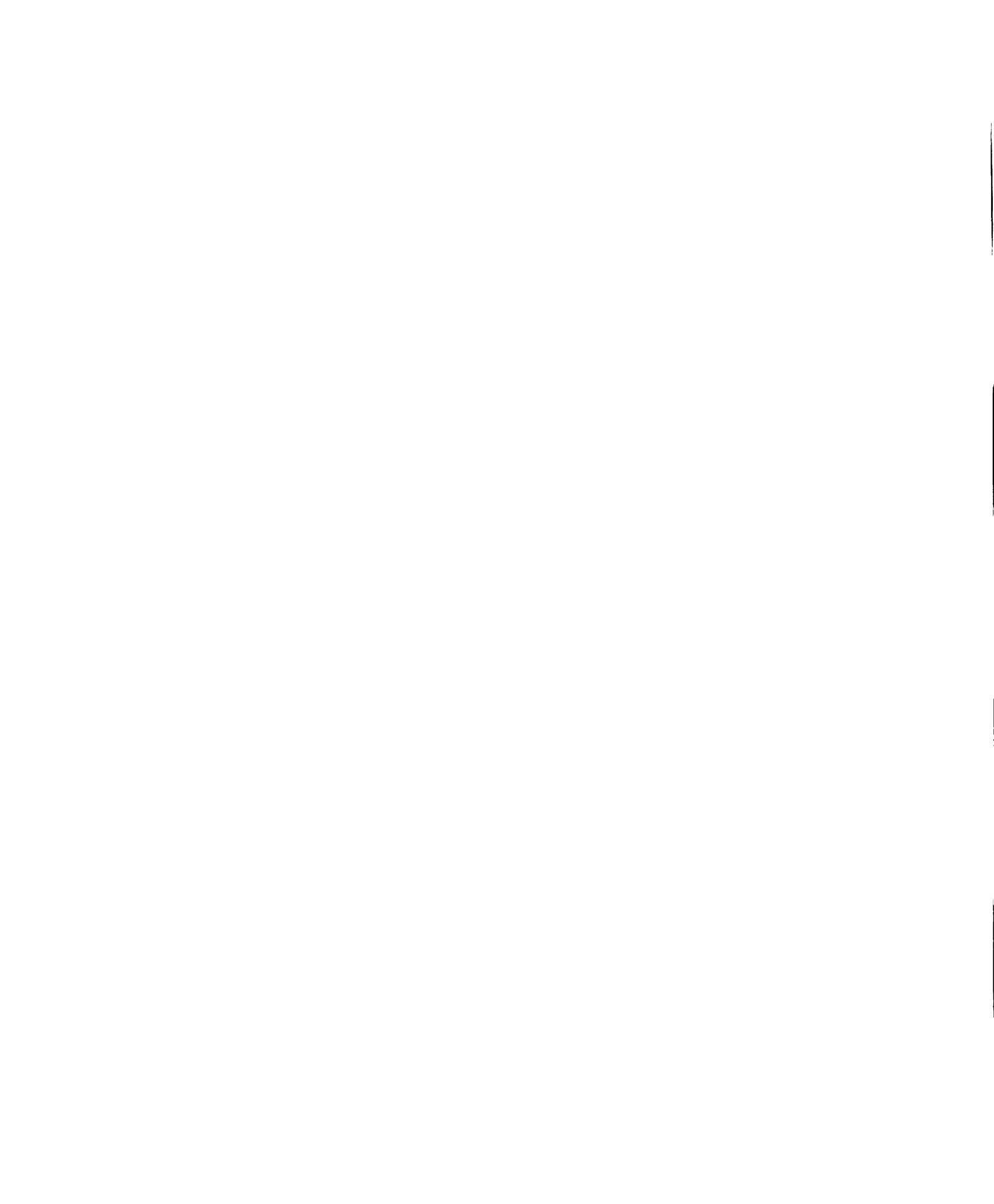
V. The Authority of Science and Technology

As at Seveso, however, much of the authority for restoring the sense of social order was provided by science and technology. Scientific and technical knowledge figured in the news as the keys to cleaning up the contamination, determining definitively what had happened, and assessing any long-range health problems of inhabitants. Times Beach even had its silver lining as a site for scientific research using dioxin-contaminated soil.

As at Seveso, cleaning up the contamination was an important topic for the news. Covered in more than a half-dozen brief

²⁷ Robert Reinhold, "Dangerous Ground: Uproar at E.P.A. Blends Politics, Pollution and Public Health," NYT 27 Feb. 1983: 1E.

²⁸ Stuart Taylor Jr., "E.P.A. Inquires Center on Four Issues," NYT 13 March 1983: 36.



items, for example, was a dispute over where to dispose of flood debris. The dispute was resolved by court order after EPA tests failed to find dioxin contamination in the debris above 1 part per billion²⁹. Missouri's governor made news when he sought the creation of a state "Superfund" to supplement federal cleanup money for future problem sites³⁰. The extent of cleanup necessary was put at 150,000 tons of contaminated soil statewide, at a cost of \$100 million. "What we are looking for," according to a Missouri environmental official, "is the most cost-effective technology."³¹

Just as cleanup was a technical problem, so science was appealed to as the authority for determining definitively what had happened at Times Beach. Early in the controversy, residents were portrayed as bewildered and frustrated by the lack of solid, scientific data on the risks they faced. A Science article on the paucity of data begins with a vignette of a "weary-looking Douglas King," who sits near a space heater in the office of Easy

²⁹ "Flooded Town Is Checked for Toxic Chemicals," photo caption NYT 6 Jan. 1983: 12; "Dioxin Debris to Remain in Times Beach, Mo.," NYT 7 Jan. 1983: 10; "Judge Blocks Removal of Missouri Flood Debris," NYT 8 Jan. 1983: 8; "Court Hearing Set Today," NYT 10 Jan. 1983: 14; "Tests Hint Debris Is Safe," NYT 12 Jan. 1983: 12; "Court Approves Disposal Plan," NYT 12 Jan. 1983: 12; "Trucks Move Debris Floods Left in Town With Dioxin Trouble," NYT 14 Jan. 1983: 9.

³⁰ Reinhold, "Missouri Governor Proposes Steps to Fight Dioxin Crisis."

³¹ "First Attempts to Cope With Times Beach Dioxin," Chemical Week 5 Dec. 1984: 26+.

Living Mobile Manor and notes the mysterious deaths of four of his dogs in 10 years.

"They looked like they starved to death," King says. "But I ain't blamin' dioxin." Then he adds that he is concerned about the future health of his two teen-age daughters. "But what can you do?" he asks in bewilderment and frustration³².

By the autumn, however, news accounts reported that the accumulation of research data was beginning to clarify the situation -- and was associated as well with the restoration of social order to the community. One article in September, for example, began with an account of Times Beach residents celebrating a Christmas they had been unable to observe in the crisis of the previous December. The residents "gathered just outside of their onetime Meramec River town for a summer yule party -- complete with a Santa Claus, Christmas tree and presents."³³ The article went on to report that the buyout of the community was under way, and that dioxin contamination had been found in other communities. Then it summarized recent research findings on dioxin. The accumulation of scientific knowledge and the symbolic healing at Times Beach were associated, if not explicitly then at least by their juxtaposition in the same article.

Times Beach had its silver lining -- the research opportunities it provided. Scientific chances were lost at

³² Sun, "Dioxin's Uncertain Legacy."

³³ Garmon, "Dioxin Digest," Science News 3 Sept. 1983: 156-7.

Seveso but not in Missouri. "When one thinks of desirable real estate," reported Chemical & Engineering News,

Times Beach, Mo., isn't the first place that comes to mind. Nevertheless, the Missouri Department of Natural Resources has managed to rent out some of that dioxin-tainted territory along the Meramec. In fact, it was the dioxins that made the land attractive. Three companies, PPM Inc., Agro-K, and Monsanto -- have leased plots in the area, paying good money to the state for the privilege of using the contaminated land to carry out research³⁴.

Meanwhile, the news reported scientific assurances that, as at Seveso, nothing very serious had happened at Times Beach after all. News accounts reported in October that persons exposed to dioxin in eastern Missouri showed no "meaningful" ill-health effects. Three years later it was reported that followup studies had found liver and immune-system abnormalities but no more clinical illness than normal³⁵. News audiences were reassured that neither at Times Beach nor at Seveso had people died like flies.

VI. Small-Town Pastoralism

What had died at Times Beach, symbolically, was an old-fashioned way of life associated with small-town, pastoral America. Coverage often noted the smallness of the town, its

³⁴ "Times Beach Used for Research on Dioxins," Chemical & Engineering News 20 Aug. 1984: 8.

³⁵ "No Illness Found in Dioxin Testing," NYT 18 Oct. 1983: 16; Philip M. Boffey, "Dioxin Link Cited in Abnormalities," NYT 18 April 1986: 13.

"800 dwellings," its "population of 2,500."³⁶ The New York Times called it a "hamlet" and described the flood damage at a "once tranquil" address on "River Road."³⁷ A resident's description of the damaged town for Science News included two stereotypical aspects of village life: "You see there where only one wall is standing," Yolanda Bohrer told the magazine, "that used to be a church . . . And parts of this building . . . were carried a block and a half down toward the tavern."³⁸

The social relations and closeness to nature possible in the American small town of the past were recalled nostalgically. A Times Beach resident for nearly 35 years told a newspaper reporter of

earlier years when she owned eight lots and grew flowers on each, when the ladies' club met down by the beach and when there were dances every Saturday night. . . . "Times Beach was a community in which people really cared for each other and I am not sure we could create this type community somewhere else. I sure hope so. I'm too old to go out and make new friends"³⁹.

Nostalgia for the past was accompanied by expressions of relief, realism and renewal, however. The chairman of the town board, reacting to the buyout decision, said it would allow people to "put their lives together and start over. The question

³⁶ Lerner, Mandel and McCormick, "The Trouble at Times Beach."

³⁷ "One E.P.A. Buy-Out Is Not a Policy"; Sheppard, "Times Beach Is Mixed on Buyout," NYT 24 Feb. 1983: 14B; Reinhold, "Dangerous Ground."

³⁸ Garmon, "Dioxin in Missouri: Troubled Times."

³⁹ Sheppard, "Times Beach Is Mixed on Buyout."

now is how much they will get for their property."⁴⁰ Coverage also suggested that however pleasant life might have been, the town was a relic of the past. "Even at its best," began a Newsweek story,

the small Missouri town of Times Beach is not a particularly pretty place. Dilapidated houses, mobile homes and old cottages resting atop cement-block foundations shelter a population of 2,500⁴¹

Apparently the town was on its way downhill, even before the flood and dioxin arrived. These only hastened a social disintegration already under way, a process in which the news took an interest. Times Beach became a story of the passing of a slice of small-town American life.

Over the next three years the disintegration of the community was covered in detail. Officials made news by barricading the town from tourists and looters in April 1983. Times Beach was hit by new flooding the next month⁴². The town was disincorporated in 1985, in a decision Missouri Gov. John Ashcroft described as a "sad but necessary step in allowing local citizens, the state and the Federal Government to complete the job in that area." Coverage eulogized the town as a once close-knit community destroyed by chemical pollution, a blank spot on

⁴⁰ Sheppard, "Times Beach Is Mixed on Buyout."

⁴¹ Lerner 24; see also "The River Rats Want to Stay" 21.

⁴² "Times Beach, Mo., Board Moves to Seal Off Town," NYT 27 April 1983: 18; "Children Stack Sandbags by Flooding Mississippi," NYT 5 May 1983.

the map obscured by "weeds and tall grass."⁴³ That year only two of the original 2,400 residents were holding out against the buyout. An elderly couple, they were still there in April 1986, seeking a higher price for their property. Times Beach, the news reported, was a "ghost town."⁴⁴

⁴³ Andersen, "Times Beach, Mo.: Overgrown and Ghostly."

⁴⁴ "Times Beach, Mo., Votes Itself Out of Existence," NYT 3 April 1985: 16; "Contaminated Town Is Relegated to History," NYT 14 April 1985: 26; Richard Haitch, "Dioxin Holdouts," NYT 5 May 1985: 58.

CHAPTER ELEVEN: AGENT ORANGE AND THE MARGINALIZED INDIVIDUAL

I. Differences and Similarities

Early criticism of U.S. use of Agent Orange in Vietnam was strongly ecologicistic and was covered in the press in ecologicistic terms. Defoliation was opposed, in large part, because of what it did to the Vietnamese mangrove and upland hardwood forests, to animals, birds, fish and soil -- to the biota within which humans lived. Early North Vietnamese claims of human illness or death from the spraying rated only occasional mention in the news. When dioxin was introduced into the controversy in 1970, human health concerns were taken somewhat more seriously. They were taken quite seriously -- and virtually removed from an ecologicistic context -- in the controversy over domestic use of 2,4,5-T. Apparently ecologicistic concerns were news when dealing with a foreign situation, but when American lives -- and/or deep-seated American ideological commitments -- were at stake, a different set of gatekeeping criteria seemed to emerge. This same variety of ethnocentrism is evident in the later Agent Orange controversy, beginning in the late 1970s, over the health effects of dioxin on U.S. troops who served in Vietnam.

Like news about Times Beach, news about Agent Orange virtually lacked ecologicistic contextualization. Some writers did mention the controversy's historical connection to the earlier dispute. Environmentalist Barry Commoner described veterans' health fears as a "new chapter" in the "tragic story" of defoliation¹. Another writer identified the very transformation of the controversy that is one of the themes of this dissertation -- its initial focus on ecological damage and its refocusing after the Bionetics study on human health effects, especially birth defects and cancer². More typical, however, was the blunt anthropocentrism of the writer who warned that Vietnam veterans "are now being alerted to the fact that a chemical time bomb, posing immense danger to themselves and to their children, may be ticking away inside their bodies."³

While sharing this anthropocentrism with coverage of Seveso and Times Beach, news about Agent Orange differed in several respects. One was the greater prominence given to business activity as moral disorder. There was no Russell Bliss to blame for the exposure of U.S. soldiers to Agent Orange in Vietnam. Instead, Agent Orange's manufacturers came under scrutiny for

¹ Barry Commoner, "Dioxin: The Vietnam Connection," Science Digest Oct. 1978: 58-61.

² W. A. Thomasson, "Deadly Legacy: Dioxin and the Vietnam Veteran," Bulletin of the Atomic Scientists, May 1979: 15-19.

³ Alan S. Miller, "2,4,5-T: Chemical Time Bomb," Environment June 1979: 2-4.

failing to be more forthcoming about the health risks of dioxin. To the extent that there was a Bliss-like scapegoat created by coverage of the controversy, it was the Dow Chemical Company -- ironically the manufacturer who apparently had acted most in line with the media's own standards of responsible capitalism.

Agent Orange coverage also differed from Times Beach -- but was similar to Seveso -- in that the exposed population was itself seen as a significant source of moral disorder. The veterans' litigation, interpreted in some coverage from the start as being of doubtful validity, was portrayed as a threat to the chemical industry because of the billions of dollars in potential damages. In addition, the case's huge stakes and uncharted legal issues were interpreted as putting strains on major sources of authority in American society -- on the legal system and even on science itself. Veterans were frequently characterized in coverage as emotional, eccentric and even deranged.

Another difference was that Agent Orange did not pose a threat to a geographically defined community, but rather to a loosely defined and loosely organized class of individuals. This difference had important consequences for the overall shape of the controversy in the news. Concern about the conflict between modern industrial capitalism and the ways of life associated with small, pastoral communities, for example, was virtually non-existent. Taking its place, however, were a host of issues revolving around the place of the individual in modern society.

In reporting the Agent Orange controversy, the news presented individual veterans as having been swallowed up in the mass-produced chaos of war, then treated callously by government bureaucracy, then marginalized -- unfortunately but perhaps necessarily -- by a legal system that denied them an opportunity to have their case decided by a jury. The news cares about individualism and about the social order represented by government bureaucracies and courts. When such values are in conflict, journalism pays attention until a plausible resolution is worked out. That, not the transmission of risk information, was the larger business of the press in covering Agent Orange.

One way in which the media portrayed the working out of these conflicts was through the leadership of Judge Jack B. Weinstein, the presiding judge in the Agent Orange litigation. If Russell Bliss was the individual villain of Times Beach, Weinstein was the individual hero of Agent Orange, portrayed as a liberal, innovative judge who worked out a solution that was at once compassionate to the veterans, not unduly burdensome to the manufacturers and -- perhaps most importantly, in accordance with science.

For as in other dioxin controversies, the principle authority in terms of which these conflicts were resolved was science. The press devoted substantial coverage to the progress of research on the health effects of dioxin. Despite occasional warnings that central issues in the controversy were in fact trans-scientific,

the news portrayed science as the authority in the dispute, the basis for responsible, rational government decision. Although veterans' bitter complaints about the legal outcome of their case were given an occasional forum, the court's decision was justified as being essentially in line with what the science of dioxin had determined.

The irony that the veterans had themselves been marginalized by an epidemiological science that did not -- because it could not -- determine the merits of their individual cases was itself marginalized to the vanishing point in news coverage. The controversy was declared closed, and coverage entered a post-mortem period in which the press itself began to figure as a villain for having disseminated "a myth created by a group of Vietnam-era protesters (and) seized upon by Viet vets."⁴ This did not occur, however, until after the press had seen the controversy through to a closure in which the centrist values of social order, responsible capitalism, altruistic democracy, leadership and individualism had adjusted to the conflicts posed by the presence of dioxin in the environment and found a new equilibrium.

⁴ Pulitzer-Prize-winning science writer Jon Franklin, quoted by Richard Harwood, "Agent Orange Myth at War With Science," Detroit News 17 Oct. 1990: 11.

II. Moral Disorder in Government and Business

In journalism's Progressive, reformist ideology, government is supposed to act disinterestedly on behalf of the public, while business is supposed to compete without crossing the line into exploitation. Indications that both standards may have been violated in the use of Agent Orange in Vietnam compelled attention in the news. One pervasive theme of coverage was that moral disorder had infected both government and business.

In the case of government, the news was a forum for charges that the military had used Agent Orange carelessly in Vietnam and failed to inform troops of the risks. In 1980, a writer in the liberal Progressive focused on a government study contradicting claims of careful use of Agent Orange. Despite military assurances that troops were kept away from recently sprayed areas, the Government Accounting Office found nearly 6,000 Marines who had been within a third of a mile of spraying operations during or shortly after spraying, the article reported⁵. "I thought the enemy was throwing gas at us," one veteran told a newspaper reporter after the 1984 litigation settlement, only to find on his return home that "it was the U.S."⁶

⁵ William Steif, "Agent Orange Disaster," Progressive Feb. 1980: 8; see also Lewis M. Milford, "Justice Is Not a G. I. Benefit," Progressive Aug. 1981: 32-5.

⁶ Ralph Blumenthal, "Veterans Speak Out on Agent Orange," New York Times 9 Aug. 1984: 1B.

The government also was accused of being slow to take veterans' complaints seriously. "How many people must be buried before the nation discovers what Agent Orange really does to the human organism?" asked a writer in one liberal magazine in urging independent research⁷. A writer in the same journal later contrasted federal sluggishness with the responsiveness of state government in Texas⁸. Science News gatekeepers decided to publish a story when Veterans Administration physical examinations were criticized as inadequate by the General Accounting Office⁹. The most serious problem, a National Veterans Law Center official told the New York Times, was the "failure of the Veterans Administration to conduct any outreach. All they are really doing is waiting for people to present themselves at V.A. hospitals."¹⁰

Other news of possible moral disorder in government included allegations that evidence of Agent Orange's health risks had been ignored, minimized or covered up. Government decision makers, concluded one chemical industry trade publication in 1983, "didn't want to hear" what government scientists and mid-level

⁷ Steif, "The Agent Orange Scandal," Progressive 11 Dec. 1979: 11-12.

⁸ Rod Davis, "Cheering Vets," Progressive Sept. 1981: 18.

⁹ "Agent Orange Exams Criticized," Science News 6 Nov. 1982: 301.

¹⁰ Richard Severo, "U.S., Despite Claims of Veterans, Says None Are Herbicide Victims," NYT 28 May 1979: 1+.

managers knew in the 1960s about dioxin's dangers¹¹. In the 1980s the Veterans Administration, which had taken the position that no evidence linked Agent Orange exposure to human cancer, came under fire for failing to frankly and promptly acknowledge contrary research findings¹². The Air Force was criticized for dismissing as "minor or undetermined" the ailments suffered by members of the Ranch Hand crew, which included liver complications and a high infant death rate¹³.

Criticism of government was also a major theme of Times Beach coverage. One major difference between Times Beach and Agent Orange was the extent to which moral disorder was attributed to business -- not just to one errant businessman, Russell Bliss, but to the corporations that had supplied Agent Orange to the government. At issue was the 1965 meeting at which Dow Chemical Company shared technical information with its competitors about how to reduce dioxin contamination. In 1983, memoranda relating to the meeting turned up in court documents which described Dow's fear that government knowledge of dioxin's dangers would lead to increased government regulation of the industry. The memoranda

¹¹ "The Government Knew Plenty," Chemical Week 20 July 1983: 3.

¹² "Defoliant, Cancer: Studies Show Link," Science News 12 April 1980: 230; "Study Links Cancer Risk to Vietnam War Service," Chemical & Engineering News 14 Sept. 1987: 6; "Agencies' Handling of Agent Orange Studies Hit," Chemical & Engineering News 21 Sept. 1987: 8.

¹³ "Agent Orange: Still the Fog," Progressive April 1984: 11.

made front-page news in the New York Times¹⁴ and were the topic of two articles in Time.

To the extent that there was a Russell Bliss-type scapegoat in the Agent Orange controversy, it was the Dow Chemical Company. Time covered the memos as an embarrassment to Dow ("Dioxin Puts Dow on the Spot,"¹⁵) and later, more harshly, as evidence that the company failed to act on its own knowledge of dioxin's risks. Dow continued to "sell herbicides containing dioxin," the magazine reported, even though it knew "even before the mid 1960s that exposure to dioxin might cause people to become seriously ill."¹⁶ Actually the magazine begged the question. Dow did indeed know that "exposure to dioxin" (at high enough levels) "might cause people to become seriously ill." And the company did indeed continue to "sell herbicides containing dioxin." The company did not, however, fail to act on its knowledge. It reduced dioxin contamination in its products to levels it was convinced were safe.

More genuinely at issue were the responses of other chemical companies, principally Monsanto and Diamond Alkali (later to

¹⁴ David Burnham, "1965 Memos Show Dow's Anxiety on Dioxin," NYT 19 April 1983: 1+; Ralph Blumenthal, "Files Show Dioxin Makers Knew of Hazards," NYT 6 July 1983: 1+; see also Burnham, "Dow Says U.S. Knew Dioxin Peril of Agent Orange," NYT 5 May 1983: 18; Michael Winerip, "U.S. Judge Clears Way for Trial on Agent Orange," NYT 13 May 1983: 12.

¹⁵ "Dioxin Puts Dow on the Spot," Time 2 May 1983: 62.

¹⁶ "No Longer So Secret an Agent," Time 18 July 1983: 17.

become Diamond Shamrock). These continued to produce 2,4,5-T with higher dioxin levels. Also at issue was the fact that Dow did not act as a whistle blower within its own industry by exposing the other companies' lax response to the data. Notably these topics were explored in most detail not in liberal periodicals but in the industry trade journal, Chemical Week.

Like Time, Chemical Week's initial coverage of the memoranda directed attention to the failure of 2,4,5-T producers to act on data indicating dioxin contamination of the product¹⁷. Based on examination of court documents, however, the magazine developed the story in greater detail. After finding dioxin in its commercial 2,4,5-T, Chemical Week reported, Dow initially planned to share information with the U.S. Public Health Service and the U.S. Department of Agriculture. Instead, however, the company called the March 1965 meeting with competitors, a move the magazine described as an "experiment in industry self-regulation." The meeting, it said, was intended both to protect the domestic herbicide market from increased regulation and to put "producers on notice that if they failed to reduce dioxin levels, that fact would be industry-wide knowledge."¹⁸

¹⁷ "A New Blister Bursts in the Agent Orange Case," Chemical Week 27 April 1983: 13-15; "Agent Orange Finally Gets Its Day in Court," Chemical Week 18 May 1983: 44-5.

¹⁸ "Agent Orange Papers: What Companies Knew," Chemical Week 13 July 1983: 24+.

In fact, the magazine reported, Monsanto and Diamond Alkali did fail to reduce dioxin levels, while Dow cut dioxin contamination of its product to undetectable levels. Dow's share of Agent Orange sold to the government was 31 percent, but its share of dioxin sold to the government was only 1.3 percent, according to Chemical Week. Monsanto, whose share of Agent Orange sales was 27.7 percent, contributed almost 75 percent of the dioxin total, and Diamond Shamrock, at 5.4 percent of Agent Orange sales, contributed 22 percent of the dioxin¹⁹. Thus Dow, which some coverage made to appear something of a villain, actually behaved the most consistently with journalism's own standards for responsible capitalism, acting competitively while seeking to avoid exploitation. The company did not, however, blow the whistle on its colleagues in the industry, described by Chemical Week as "at odds with itself and at war with would-be government regulators."²⁰ Since Dow "remained mum for five years while its competitors continued to market 2,4,5-T high in dioxin," the magazine concluded in an editorial, "we have to wonder whether loyalty to the industry somehow seemed more important than public safety."²¹

¹⁹ "Dow and Toxicology Meet Again," Chemical Week 14 Dec. 1983: 13-14.

²⁰ "Agent Orange Papers."

²¹ "Dioxin: To Tell or Not to Tell," Chemical Week 13 July 1983: 3.

III. The Threat From the Veterans

News about Agent Orange also differed from Times Beach coverage in that the exposed population -- in this case veterans who were part of the litigation -- were portrayed as a threat to social order. In this, Agent Orange coverage more nearly resembled that of Seveso.

For some trade publications, the real story from the beginning was the threat posed to manufacturers by Agent Orange litigation. Like Agent Orange itself, the Agent Orange litigation was reported using the terminology of war and disease. "The number of Agent Orange-related lawsuits is mushrooming," began an account in Chemical Week early in the controversy. "The rash of lawsuits is part of a nationwide campaign" ²² Some post-settlement coverage focused on the companies' struggle to apportion costs, hold the government accountable for costs and deal with the complex aftermath of the settlement -- and not, to make the point explicit, on any struggles veterans or their families may have had in waiting for settlement money to be paid ²³.

²² "More Agent Orange Suits Filed in Chicago; Still Others Will Follow," Chemical Week 28 Feb. 1979: 18.

²³ "Agent Orange Pact Hits Monsanto Hardest," Chemical & Engineering News 21 May 1984: 5-6; "Justice's Brief on Agent Orange," Chemical Week 19 Sept. 1984: 26+; "Bendectin Case Revived; Agent Orange Pact Hit," Chemical & Engineering News 11 Feb. 1985: 6; "Government Relieved of Agent Orange Payments," Chemical & Engineering News 20 May 1985: 6. The first payments from the settlement were not made until 1989.

Paralleling the portrayal of Sevesans as excitable and irrational, the supposed emotionalism of the veterans was juxtaposed against the supposed objectivity of the manufacturers.

"Although the veterans failed to present medical evidence that would prove a link between Agent Orange and their present ill health," one magazine reported in covering House subcommittee hearings in 1979, "they presented dramatic circumstantial evidence."²⁴ The dispute, another reported eight years later,

still evokes considerable emotion almost a decade after it was first raised. It is these emotions, and the politics, that so confuse the issue. The science so far indicates that few veterans were exposed to much Agent Orange and that fewer still are suffering because of it²⁵.

The veterans' emotionalism made them vulnerable to manipulation by lawyers, charged a 1984 New York Times editorial which portrayed both veterans and companies as attorneys' victims. "How on earth could so tenuous a case have ended in a \$180 million settlement?" the editorial asked.

Don't blame the veterans too much. They feel rejected, with reason, and their illnesses are genuine, even if not yet provably different from other people's. Their fears and grievances have been stoked by an avid legion of lawyers . . . (who) shaped their suit on a shadow that grows fainter in the light of each new health study²⁶.

²⁴ "Congressional Panel Hears Vietnam Vets on Agent Orange Effects," Chemical Week 4 July 1979: 18.

²⁵ David J. Hanson, "Science Failing to Back Up Veterans' Concerns About Agent Orange," Chemical & Engineering News 9 Nov. 1987: 7-11+.

²⁶ "The Truth About Agent Orange," editorial NYT 13 Aug. 1984: 22.

The supposed emotionalism of the veterans sometimes shaded over into mental illness, it was suggested. One writer in 1979 noted the "increasing agitation" among veterans on the Agent Orange issue, which was characterized in the headline as a "furor."²⁷ Another described the "lingering controversy" as being "fanned by suspicions" about damaged health²⁸. An EPA official was quoted as saying, "It's hard to tell if we have health problems, but mental anguish is a clear effect of dioxin."²⁹ More explicitly, the Wall Street Journal editorialized that the "notion that dioxin is a doomsday menace is based less on medical evidence than on some kind of psychological phenomenon."³⁰

This theme received extended treatment in a 1980 Business Week article³¹. The article explicitly poses an emotionalism/objectivity contrast between veterans and manufacturers while also implying it through the article's structure. Structurally, the account begins with epigraphs quoting veterans activist Frank McCarthy and Alsea's Bonnie Hill.

²⁷ Constance Holden, "Agent Orange: Furor Continues to Build," Science 24 Aug. 1979: 770-2.

²⁸ "AMA Study Requests More Data on TCDD," Chemical Week 20 Jan. 1982: 18.

²⁹ Donald Barnes, quoted in Susan Begley, "Dioxin: How Great a Threat?" Newsweek 11 July 1983: 65-6.

³⁰ "Dioxin Hysteria," editorial Wall Street Journal 31 May 1983: 26.

³¹ "Fallout From Agent Orange Dogs a Herbicide," Business Week 24 March 1980: 114+.

The McCarthy quotation stresses veterans' "outrage," while Hill's statement presents her as relying on a seemingly simplistic, lay-observed linkage between sprayings and miscarriages. The body of the article, in contrast, uses technical terms for 2,4,5-T and frequent quantification to bolster the credibility of the manufacturers' position.

The manufacturers' case was argued explicitly, as well.

"There is no question that TCDD is extremely dangerous in concentrations," says John E. Donalds, general manager of Dow's Agricultural Products Dept. "But the concentrations of TCDD in 2,4,5-T are so darn low, they can't hurt anybody." The company has reduced the TCDD levels in 2,4,5-T to 0.2 part per million from the 10 to 12 parts per million that contaminated Agent Orange.

The issue in seeking to defend 2,4,5-T isn't money, a Dow attorney continued, but rather scientific principle. "We can't let the EPA simply ban a product in the face of science."

Meanwhile, opponents of the herbicide are portrayed as emotional, and even as abnormal in some unspecified way. An unnamed rancher commented:

"The bureaucrats in Washington don't even know what the benefits (of 2,4,5-T) are. Mostly what they listen to are some of these emotional other-kind-of-people who don't have all their data and get a scare thing going."

Similarly, Dow chairman Earle B. Barnes is reported as blaming 2,4,5-T's problems on northern California marijuana growers and extremists. "These activists," he is quoted as saying, "have learned the trick of the Hitler-type propaganda in Germany; that is, if you tell a lie often enough, people will begin to believe it." The account then ends with a return to veterans' activist

McCarthy, who is quoted as saying, "We're already exposed; we've already got deformed children . . . We want to stop the suffering in the rest of the country." The veterans' threat to the chemical companies thus shaded over into a larger threat -- to science and even to democracy itself.

IV. The Individual at War and After

News about Agent Orange also differed from coverage of Seveso and Times Beach in that there was no disrupted community in a geographical sense. Instead, a loosely defined, loosely organized group of individuals sought redress. This difference shaped the controversy by bringing a different conflict to the fore. Instead of small-town pastoralism at odds with a modern industrial capitalist society, Agent Orange coverage examined a range of issues having to do with the place of the individual in that society.

The focus on the individual is suggested by the frequency with which Agent Orange news used the device of personalization³². The first Agent Orange story published in the New York Times was an account of Paul Reutershan's funeral, beginning with a vignette of the helicopter crew chief flying

³² Seveso and Times Beach news also was personalized to some extent, but physical descriptions of the towns were also available and used frequently to help symbolize the story for readers.

through a "fog" of Agent Orange in Vietnam³³. The Times began a three-day, page-one series in 1979 by introducing former Marine Corps machine gunner Julio Martinez. Martinez as a boy, readers learn, wanted to play baseball with the Chicago Cubs, but found himself at age 26, after Vietnam service, with enlarged breasts, fatty tumors, a lack of sex drive and children born dead, deformed or emotionally disturbed³⁴. Four years later, Time introduced an update on the status of the litigation with the story of Navy gunner Robert Sutton. Sutton inhaled fumes of burned, sprayed vegetation in Vietnam and later found himself stricken with ailments including "brain lesions and degenerative joint disease."³⁵

Reutershan, the founder of Agent Orange Victims International, was something of a celebrity. The story of his funeral could be said to be about him as an individual, although it also included discussion of more general Agent Orange issues. Martinez, Sutton and others were more clearly present in their

³³ Severo, "Vietnam Veteran's Family Vows to Continue His Fight," NYT 19 Dec. 1978: 2B. Among stories on Times microfilm is an earlier wire service item reporting that about 500 veterans had filed disability claims. It did not appear in the Times, however, which was on strike. See Mike Shanahan, "About 500 Vietnam War veterans have filed", NYT strike supplement, 12 Oct. 1978: 57.

³⁴ Severo, "Two Crippled Lives Mirror Disputes on Herbicides," NYT 27 May 1979: 1+.

³⁵ "No Longer So Secret an Agent."

stories as examples of larger themes. Having served their journalistic purpose, they disappeared from the news.

The theme they embodied however briefly was of the individual poisoned by his own side in the chaos of war, then swallowed up in an unfeeling bureaucracy, and finally marginalized by a legal system too unwieldy to deal with him as an individual. The opening paragraphs of an early Rolling Stone feature illustrate aspects of the theme.

Wendy Vogt's husband and two brothers spent the late Sixties tramping through Vietnamese jungle. Michael Vogt, a Navy Seabee (construction brigade), backpacked a metal spray machine, clearing underbrush from roadsides and camp perimeters with a chemical spray. Sometimes he could taste the herbicide and feel it itching on his skin days later. His brothers-in-law, army veterans Edward and John Miller, remember trailblazing helicopters showering them with the same acrid spray.

All three men, who have since returned to homes near Seattle, have spent a large part of the last few years in doctors' offices³⁶.

Similarly, Marine Lance Cpl. Kenneth Pullen is disabled by a persistent illness variously diagnosed as "possible jungle rot, possible trench foot, possible gangrene, possible vasculitis of the lower extremities, possible vein thrombosis" He blames his illness on Agent Orange, but his claim is not accepted because "officially Agent Orange poisoning doesn't exist."

Veterans like Pullen, continued Richard Severo of the Times,

are the children of the 60's who did not stay behind to protest the war but who went out to fight it. Now they have become protesters, and they are central to a massive

³⁶ Howard Kohn, "Poison Harvest: Agent Orange: A Vietnam Legacy," Rolling Stone 24 Aug. 1978: 31-2; similarly, see J. V. Lamar Jr., "Winning Peace With Honor," Time 21 May 1984: 39-40.

struggle for recognition. They contend that they are the victims of an uncaring bureaucracy that has violated the very tenet of the V.A., the words of Abraham Lincoln: "To care for him who shall have borne the battle, and for his widow and his orphan."³⁷

"I thought the Marines would take care of me" (Martinez told Severo), but I guess they are not interested. If I had only known this would happen, I would have been a draft-dodger. I would have gone to Canada with the rest of them."³⁸

For a time the litigation became a vehicle through which veterans carried out their struggle for recognition. They were portrayed in the news as underdogs, individuals banding together against a strong, organized adversary. "I feel like Goliath has just been told he's got to go down into the valley and meet David," one veteran responded after Judge George Pratt ruled veterans could sue manufacturers in federal court³⁹.

Ironically, the massive federal class-action suit itself turned into a Leviathan in which the veterans, as individuals, were lost. The settlement, arrived at by lawyers in closed meetings with representatives of Judge Jack B. Weinstein, was greeted bitterly by some veterans. "I have no feeling for this country anymore," a Yonkers veterans was quoted as saying. "They have total disregard for us when they can plea-bargain behind a

³⁷ Severo, "U.S., Despite Claims of Veterans, Says None Are Herbicide Victims."

³⁸ Severo, "Two Crippled Lives Mirror Disputes on Herbicides."

³⁹ Donald G. McNeil Jr., "Judge Allows Ill Veterans to Sue Defoliant Makers," NYT 21 Nov. 1979: 16.

closed door without notice to us."⁴⁰ After the settlement, holdouts began to appear in the New York Times not as individualists but as what the veterans had always appeared to be in portions of the trade press -- extremists, and even dangerous crackpots. Veterans opposed to the settlement don't ask for money, said one,

"but for the truth, for someone to admit what has been done, and to try to stop what shall prove to be the beginning of a nation of mutations.

"Our sons and daughters shall join their mutated and damaged chromosomes with those perfect and pretty little offspring of you who went to law school or into corporate employ instead of to Da Nang, An Khe and Quang Tri . . . and we shall then be vindicated when our daily existence becomes your greatest nightmare"⁴¹.

"Everyone has a book of matches," shouted another at a March 1985 hearing on the settlement distribution. "Burn everything down!"⁴²

V. Working Out the Conflicts

Agent Orange coverage had begun in the late 1970s with portrayals of individuals banding together to battle a system that had sprayed them with dioxin in Vietnam and rebuffed or ignored their complaints at home. By the mid 1980s, it was portraying individuals as extremist holdouts against the \$180

⁴⁰ Blumenthal, "Veterans Accept \$180 Million Pact on Agent Orange," NYT 8 May 1984: 1+.

⁴¹ Blumenthal, "Veterans Speak Out on Agent Orange."

⁴² Blumenthal, "Vietnam Veterans Argue Over Agent Orange Fund," NYT 6 March 1985: 18.

million settlement, which the New York Times urged veterans to accept "before too much more truth accumulates."⁴³ A major portion of Agent Orange news in the intervening years was concerned with seeing that society in some way meted out justice to individual veterans exposed to Agent Orange.

News in those years focused on the workings of the court system, and eventually on the leadership of Judge Jack B. Weinstein. It also paid enormous attention to research, portraying science as the ultimate authority with which justice had to square. When a settlement was reached that could plausibly be presented as consistent with science, the controversy had reached an important point of closure for the news. At that point, individualism took the turn toward extremism in the New York Times.

Reflecting daily journalism's event- and official-source orientation, the Times covered pretrial maneuvering, the settlement and its legal aftermath in detail. Items reported on the filing of suits in federal or state courts and on such pretrial procedural issues as whether the government could be sued or whether a class action would be allowed⁴⁴. When

⁴³ "The Truth About Agent Orange," editorial NYT 13 Aug. 1984: 22.

⁴⁴ Among items on these matters in the pre-trial period, see for example "Makers of Defoliant Are Sued on Behalf of Vietnam Veterans," NYT 3 Feb. 1979: 17; Donald G. McNeil Jr., "Judge Allows Ill Veterans to Sue Defoliant Makers," NYT 21 Nov. 1979: 16; Lee A. Daniels, "5 Makers of Agent Orange Charge U.S. Misused Chemical in Vietnam," NYT 7 Jan. 1980: 14; Arnold H. Lubasch, "Appeals Court

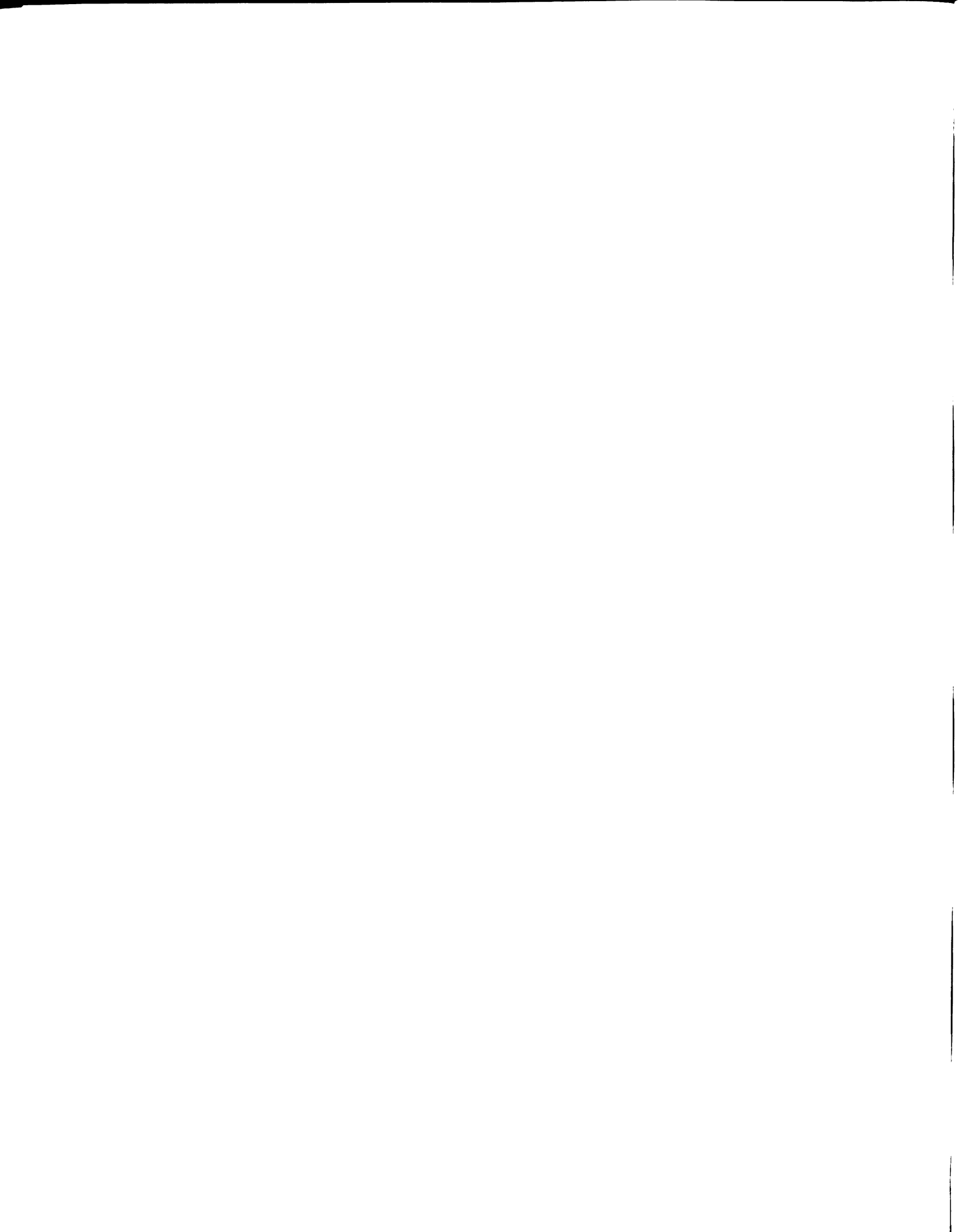
Weinstein took over the case from Pratt in October 1983, Chemical Week examined the impact on the case of the new judge's approach, including his redirection of emphasis "from policy issues to science" and his insistence that the government play a major role⁴⁵.

The May 1984 out-of-court settlement, reached at Weinstein's urging on the eve of trial, was covered as the decisive event of the Agent Orange controversy. The New York Times, for example, published 10 items directly related to the settlement in the six days beginning May 8, including page-one coverage of the settlement itself, sidebar reports on implications for the government and manufacturers' earnings, a chronology of key events, a question-and-answer summary of key issues, an editorial supporting the agreement, and reports on veterans' reactions and the key role played by Weinstein in encouraging a settlement⁴⁶.

Upsets a Ruling for Veterans in Suit Over Defoliant,' NYT 25 Nov. 1980: 11; James Barron, "U.S. Judge Allows Class Suit Against Defoliant Makers," NYT 30 Dec. 1980: 6; Blumenthal, "U.S. Kept as Defendant in Agent Orange Suit," NYT 20 Dec. 1983: 23.

⁴⁵ "Shaking Up the Agent Orange Case," Chemical Week 2 Nov. 1983: 22-3.

⁴⁶ See Blumenthal, "Veterans Accept \$180 Million Pact on Agent Orange," NYT 8 May 1984: 1+; Robert Pear, "U.S. Liability Not Resolved by Veterans Suit Settlement," NYT 8 May 1984: B4; "Litigation Continued for Years," NYT 8 May 1984: B4; Daniel F. Cuff, "Companies Comment on Pact," NYT 8 May 1984: B4; Blumenthal, "Agent Orange: How Fund Will Work," NYT 9 May 1984: B2; "Justice, Mercy and Agent Orange," editorial NYT 9 May 1984: 26; David Bird, "Veterans Divided on Damages Pact," NYT 10 May 1984: 24; Blumenthal, "How Judge Helped Shape Agent Orange Pact," NYT 11 May 1984: 1+; "Limited Health Risks From Dioxin Reported," NYT 12 May 1984: 29; Stuart Taylor Jr., "Why the Army Has an Edge in Court," NYT 13 May



Editorially, the Times called the settlement "the best feasible solution to an intractable problem."⁴⁷.

The settlement was reported as a dramatic turning point in the controversy. Two trade journals stressed the drama by noting its arrival in the "eleventh hour" before the trial⁴⁸. Newsweek led its story on the agreement with a vignette of Weinstein presiding over the signing of the agreement by weary lawyers at a 3:30 a.m. meeting. The agreement, the magazine said, "settled the largest tort case in the nation's history. . . ."⁴⁹

Additional coverage stressing the pivotal nature of the settlement included the hammering out of a plan for distribution of the funds⁵⁰ and veterans' efforts to obtain compensation from the federal government, which did not participate in the 1984

1984: E6.

⁴⁷ "Justice, Mercy and Agent Orange," editorial NYT 9 May 1984: 26.

⁴⁸ "Agent Orange Suit: Firms Agree to Pay, Deny Liability," Chemical & Engineering News 14 May 1984: 6-7; "The Agent Orange Surprise," Chemical Week 16 May 1984: 24.

⁴⁹ Ari Press with Ann McDaniel and Barbara Burgower, "A Fast Deal on Agent Orange," Newsweek 21 May 1984: 56.

⁵⁰ See for example Blumenthal, "Agent Orange Payments Plan Limits the Number of Awards," NYT 28 Feb. 1985: B1; Blumenthal, "Vietnam Veterans Argue Over Agent Orange Fund," NYT 6 March 1985: 18; Joseph P. Fried, "Judge Rules on Allocation of the Agent Orange Fund," NYT 29 May 1985: B3; Blumenthal, "U.S. Court Blocks Plan to Use Agent Orange Fund," NYT 28 Aug. 1986: 1+; Blumenthal, "Both Sides Act to Strengthen Positions on Stalled Agent Orange Plan," NYT 29 Aug. 1986: B3; Lubasch, "200-Million (sic) Agent Orange Award Is Upheld by U.S. Appeals Court," NYT 22 April 1987: B3; "Agent Orange Fund Is Backed," NYT 1 July 1988: B7; Leonard Buder, "Judge Schedules Start of Agent Orange Payments," NYT 6 July 1988: 24.

settlement⁵¹. Some lawyers acting for the veterans tried to scuttle the plan a year later because it failed to distribute money on the basis of problems most closely associated with Agent Orange exposure. Lawyer Victor Yannacone commented that most veterans "do not want a welfare giveaway where chump change is distributed to shut them up."⁵² Nevertheless, the focus on the working out of the agreement in the courts emphasized the theme that democracy was working, even in the face of the difficulties posed by the Agent Orange case.

VI. The Authority of Science

If the news portrayed the courts as the forum where individual justice could be done, however, it looked to science as the basis of authority for that justice. Repeatedly, scientific research was presented as the key to answering the questions raised by Agent Orange. The New York Times alone published more than 35 items principally focused on research between May 1979 and May 1984, when the settlement agreement was reached. Many items announced that new studies would be undertaken or were getting under way⁵³. Research results

⁵¹ See for example Fried, "Judge Says U.S. Need Not Aid Agent Orange Fund," NYT 10 May 1985: 1+.

⁵² Blumenthal, "U.S. Court Blocks Plan to Use Agent Orange Fund," NYT 28 Aug. 1986: 1+.

⁵³ David Binder, "Administration Widening Investigation of Herbicide Effects on Veterans," NYT 29 May 1979: 18; Martin

continued to be heavily covered even after the May 1984 agreement, with at least nine articles focusing on research through 1988⁵⁴. At times, research techniques upstaged results, as when scientists were described as using "tools of breathtaking sensitivity" to find persistent traces of dioxin in human tissue⁵⁵.

Similarly, the theme of numerous magazine articles was the advance of scientific knowledge about Agent Orange and Vietnam veterans. Some coverage had what might be called a "science marches on" motif, often embodied in the characterization of science as the gradual accretion of small bits of knowledge. Reporting on a re-evaluation of the cause of death of a West

Tolchin, "Carter Vows to Focus on Vietnam Veterans Rights," NYT 31 May 1979: 16; "Coalition to Study Effect of Agent Orange on G.I.'s," NYT 17 July 1979: 10; "U.S. Is Opening Registry on Herbicide Exposure," NYT 3 Aug. 1979: 10; "Australia to Study Effects of Chemical on Its Veterans," NYT 8 Jan. 1980: 5; "U.C.L.A. Researchers Given Pact for V.A. Study of Agent Orange," NYT 6 May 1981: 26; "Australia to Study Effects of Agent Orange," NYT 15 May 1983: 5; "Jersey to Conduct Study of Dioxin," NYT 11 Feb. 1984: 30; "VA to Study 30,000 Veterans Who Are Twins," NYT 12 Feb. 1984: 23.

⁵⁴ Richard D. Lyons, "Study of Vietnam Veterans Finds No Increased Risk of Birth Defects," NYT 17 Aug. 1984: 1+; "No Death Rate Impact Found in U.S. Study of Agent Orange," NYT 12 Feb. 1985: B10; "Researchers Report Finding Telltale Sign of Agent Orange," NYT 18 Sept. 1986: 28; "Dioxin Levels Found in Vietnam Veterans Termed Not Unusual," NYT 25 July 1987: 8; "Air Force Study Finds No Unusual Health Problems Among Agent Orange Handlers," NYT 10 Oct. 1987: 12; Warren E. Leary, "Vietnam Veterans' Health: No Worse Than Others," NYT 13 May 1988: 13; "Tests Say Dioxin Level High Among Sprayers in Vietnam," NYT 27 May 1988: D19; Ben A. Franklin, "Study Finds Vietnam Combat Affecting Veterans' Health," NYT 12 Nov. 1988: 7.

⁵⁵ Erik Eckholm, "Highly Sensitive Test Can Detect Dioxin Years After Exposure," NYT 14 Oct. 1986: C1.

German chemical worker and on the first Ranch Hand study results, one account concluded that although "neither development is particularly enlightening or unexpected, each adds to the accumulating data that may help determine what danger, if any, is present."⁵⁶

News did point out the limitations and difficulties of science in dealing with Agent Orange issues. Stories on the difficulties of doing dioxin science included reported suggestions about which institutions should carry out research and what should be studied⁵⁷, or complaints or suspicions about the way it was carried out⁵⁸. It was news that a scientific panel concluded that the Ranch Hand study would be inconclusive in answering questions about the health of Vietnam veterans exposed to Agent Orange. The study as designed was not statistically sensitive enough to "identify the adverse health effects due to exposure" among veterans in general, National Academy of Science President Philip Handler was quoted as telling

⁵⁶ "Agent Orange: More Data Help Define Dioxin Danger," Chemical & Engineering News 11 July 1983: 4.

⁵⁷ Severo, "H.E.W. Is Urged to Study Problem Over a Herbicide Used in Vietnam," NYT 27 June 1979: 14; "Science Unit's Leader Proposes Global Study of Exposure to Dioxin," NYT 17 Sept. 1980: B14; "U.S. Panel Asking a Broad Study of Toxic Agents of Vietnam War," NYT 18 May 1981: 17; "Americans in Hanoi Urge Defoliant Study," NYT 31 May 1982: 2; Boffey, "Congressman Asks Agent Orange Be Studied on International Basis," NYT 21 Jan. 1984: 14.

⁵⁸ Barron, "Veterans Criticize Agent Orange Tests," NYT 18 March 1980: 19; Severo, "Veterans, Fearful of Bias, Challenge Defoliant Study," NYT 8 May 1980: 16; Severo, "Furor Looms at Herbicide Hearing," NYT 18 Nov. 1981: 25.

the Air Force⁵⁹. Later, the ambiguity of the Ranch Hand study results was pointed out in accounts in which both sides claimed vindication of their position⁶⁰.

Numerous articles also covered design problems and delays in the VA's planned major epidemiological study of exposed veterans, the decision to turn the project over to the Center for Disease Controls, and the eventual scrapping of the project⁶¹. The study, eventually transferred to the Center for Disease Controls, was never carried out. Although 20,000 to 60,000 ground troops were estimated by a 1987 scientific review panel to have had "significant" exposure to Agent Orange in Vietnam, the number was not large enough to allow a meaningful study to be designed

⁵⁹ "Air Force Under Fire for Agent Orange Study," Chemical Week 21 May 1980: 18; see also "Suit Aims at Blocking Agent Orange Study," Chemical & Engineering News 12 May 1980: 5; and R. J. Smith, "Proposals to Study Veterans Criticized," Science 30 May 1980: 1015.

⁶⁰ B. Drummond Ayres Jr., "Air Force Reports No High Death Rates Among Defoliant Sprayers," NYT 2 July 1983: 9; "No Major Diseases Cited in Agent Orange Sprayers," NYT 25 Feb. 1984: 12; Kenneth B. Noble, "Defoliant Study Sets Off Debate," NYT 26 Feb. 1984: 33.

⁶¹ "Agent Orange Study Won't Be Completed Until '89, V.A. Says," NYT 1 Sept. 1982: 21; Severo, "V.A. Assailed on Delayed Agent Orange Study," NYT 16 Sept. 1982: 25; "Science Office Chief Says V.A. Is Stalling Agent Orange Study," NYT 14 Oct. 1982: 23; Philip M. Boffey, "Panel Sees Problem in Study of Effects of Agent Orange," NYT 10 Nov. 1982: 26; "Agency to Yield on Herbicide Issue," NYT 16 Oct. 1982: 6; Iver Peterson, "Study of Effects of Agent Orange on Veterans Is Stalled in Dispute," NYT 19 May 1986: 1+; Boffey, "Lack of Military Data Halts Agent Orange Study," NYT 1 Sept. 1987: 1+.

without seeking out exposed troops through individual blood tests, a prohibitively expensive procedure⁶².

The fact that at least some Agent Orange research was most likely an attempt to provide a scientific answer to a trans-scientific problem was rarely acknowledged. One exception was Science's coverage in 1981 of the contract award to UCLA for the epidemiological study of veterans exposed to Agent Orange. The headline, "UCLA Designing Big Agent Orange Study," suggests that the work will be not only extensive but important in resolving the controversy on the substantive level. The project's difficulties are quickly noted, however, the principal researcher pointing out that "it may never be possible to get definitive answers on the damage done by Agent Orange. A major and insurmountable problem is that there is no way to determine who has been exposed to the herbicide." The author continues,

No one expects science to lay the issue to rest. But as a political problem, Agent Orange may be expected to subside considerably if veterans can be persuaded that the scientific questions are being approached honestly⁶³.

More often, however, the difficulties of doing Agent Orange research were seen merely as obstacles to the forward march of science. Other coverage of the contract award to UCLA suggested a sense of restrictions overcome and real work about to begin.

⁶² Boffey, "Lack of Military Data Halts Agent Orange Study," NYT 1 Sept. 1987: 1+.

⁶³ Constance Holden, "UCLA Designing Big Agent Orange Study," Science 22 May 1981: 905, my emphasis; see also Holden, "Reviewers Pan Agent Orange Study Plan," Science 4 Dec. 1981: 1107.

"After a year-long delay," one magazine reported, "the Veterans Administration has awarded a contract to design a study to find what, if any medical effects result from exposure to Agent Orange."⁶⁴ Another reported the awarding of the contract as a "long-anticipated step toward resolving the Agent Orange issue. . . ."⁶⁵

Similarly, "scientists are moving far faster than is widely recognized to investigate the riddle of Agent Orange," wrote New York Times science writer Philip Boffey in a 1982 research roundup. The U.S. government, he reported, is conducting or sponsoring more than 50 studies at a cost of more than \$100 million. While few people expect the studies to provide unequivocal results or clear guides to policy, he continued,

"It is gradually becoming clear that there is a vast gulf between the expectations of veterans who believe they were harmed by the herbicide and the informed judgments of many scientists charged with investigating their complaints."⁶⁶

In sum, news about Agent Orange science played a much more complex role in the controversy than simply to transmit risk information. In particular, the volume of Agent Orange news was inescapably out of proportion to the scientific consensus' assessment of risk because of the complexity of the task, which

⁶⁴ "VA Contracts for Design of Agent Orange Study," Chemical & Engineering News 11 May 1981: 6.

⁶⁵ "VA: Curious Orange," Science News 23 May 1981: 325.

⁶⁶ Boffey, "Agent Orange: Despite Spate of Studies, Slim Hope for Answers," NYT 30 Nov. 1982: 1C.

was to expose, examine and resolve conflicts among the enduring values of the news. Science coverage became an important source of authority and credibility for the settlement. Developments in science, including its many difficulties, had to be covered along with the complex legal process to present a credible picture of a controversy working itself through to resolution.

With the settlement backed up by science, holdouts and protesters could be portrayed not as heroic victims struggling against the system but as irrational cranks. The democratic system could be portrayed as one which resolved the controversy with reasonable fairness to individuals, yet consistently with science. Violations of the norm of responsible capitalism, meanwhile, could be presented as having been punished with the \$180 million settlement. The major values of its Progressive, reformist ideology having been readjusted into equilibrium once more, the press turned to other controversies. Except for the occasional follow-up as new research results were disclosed, the Agent Orange story was over.

CHAPTER TWELVE: EPILOGUE

The dioxin controversy did not begin as a controversy about dioxin at all. It began as a controversy over the impact of human beings -- militarily and agriculturally -- on the natural world. Posed in ecologicistic terms, the original controversy put forward the idea of the natural world as a complex web of interrelationships, and of humankind as a subordinate part of that web. It challenged American warfare in Vietnam and American chemical agriculture at home, not simply for risking human life but for risking human life and much else by placing the web itself at risk. Thus it posed a radical challenge to long-established American ways of thought and behavior, based as they were on a conviction that nature could be -- indeed had to be -- forced into hospitability to a dominant humankind. The radical challenge of ecologism has not disappeared, as attested by such controversies as species loss, ozone depletion and global warming and such phenomena as Earth First! and the Animal Rights and Green political movements.

However, the introduction of dioxin into the dispute in 1970 as a technical explanation of the Bionetics research began the process of refocusing a major part of the controversy in less

radical and more familiar terms. And a major part it was made to be. The American media expended enormous resources over two decades to cover the multitudinous aspects of the dioxin controversy, resources out of all proportion to the scientific assessment of dioxin's risks to human health. This disparity has contributed evidence to a critique of the coverage as sensationalistic and misleading. How could the media, it is asked, devote so much coverage to an environmental health risk so marginal that not a single death has been demonstrated to have resulted from it?

Part of the answer, we have seen, is that the scientific consensus about the risk of dioxin remains open to challenge. Even had there been many "single deaths" resulting from dioxin exposure, research would not have turned them up, because the question of individual causation of disease or death from environmental exposure remains trans-scientific. Nevertheless, the case is the same with other environmental risks -- radon, for example -- that in the best scientific judgment pose greater cause for concern than dioxin. The question remains, why did dioxin become the issue that radon did not?

The larger answer is that coverage of dioxin was concerned only marginally with transmitting risk information to the public. The central business of dioxin news, this examination of the material indicates, was to expose and repair flaws and weaknesses in a widely accepted picture of the way American society operates

and is supposed to operate -- the Progressive, reformist ideology that Herbert Gans described in terms of the "enduring values" of the news. The news -- and as Gans points out, a large portion of its public -- values the United States, democracy, capitalism, individualism, leadership, small-town pastoralism, moderatism and respect for authority.

Even while the news deradicalized the defoliation and pesticide controversies, it saw dioxin in the environment as threatening these values and even exposing some as inconsistent. A central business of dioxin coverage was to see these values reintegrated in such a way that democratic processes, consistent with the authority of science, could be seen to have dealt appropriately with individuals and small-town communities exposed to dioxin, while errant capitalism and faulty government leadership were punished and corrected. The ideology is a complicated one, and the process of reintegration was long and difficult. Hence the quantity of coverage. When the reaccommodation was achieved, the dioxin story faded.

Tending the nation's ideology -- exposing flaws and publicizing the processes of correction and repair -- is a function of the news long acknowledged in media studies, but seldom examined in studies of science/technology controversy¹. It is roughly analogous to media sociologist Charles R. Wright's

¹ The notable exception is the work of Dorothy Nelkin, cited above.

"correlation" and "socialization" functions of mass communication, whereas "factual" transmission of risk information is analogous to his "surveillance" function. Surveillance, for Wright refers to the "distribution of information concerning events," and correlation to the "interpretation of the information . . . prescriptions about what to do about it, and attempts to influence" interpretations, attitudes and behaviors. Socialization, or transmission of the social heritage, concerns the process "by which society's store (or part of its store) of values, social norms, knowledge and other cultural components is made known to and instilled in members and potential members."²

Wouldn't the news do better, though, to adopt a more tightly focused -- and humbler -- role? Shouldn't its main business be the transmission of factual risk information, leaving the tending of the nation's ideology elsewhere, or nowhere? These questions are implied in the critique that the quantity of coverage was disproportionate to the scientific assessment of risk. Yet, as the chapters on fact/value separation suggest, any such effort to deal separately with fact and value matters in public controversy runs a substantial risk of begging the question of relevance. A purely "factual" transmission of risk information in such a controversy is likely to remain ideological, but with its value

² Charles R. Wright, Mass Communication: A Sociological Perspective 3d ed. (New York: Random 1986): 4-5. Wright's work on functions of the media is based on that of Harold Lasswell, carried out in the 1940s.

commitments left implicit and unacknowledged. As long as the media cover controversy at all, they have a role in the processes of ideological criticism, reform and stabilization. The question is, how can they best play that role in a democratic society.

Answers are beyond the scope of this study, which nevertheless suggests that the centrism and durability of the news' enduring values make it a force strongly for stability if not stagnation. Nearly three decades after Silent Spring redirected and energized environmentalism, there seems to have been a widespread adoption of environmental rhetoric, but much less fundamental change in American energy, agriculture, transportation or industrial thinking, policy or practice. This study suggests one contributing factor may be the tendency of the news to marginalize radical ideas by refocusing controversy in terms of tried-and-true enduring values. Criticized as sensationalistic and demagogic, dioxin news could more accurately be described as painstakingly conservative in its role as caretaker of one aspect of the nation's slowly evolving picture of itself.

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