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The Social Construction of Global Climate Change

By

Eric Graig

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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Approval Page

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy

28 January 1999 — Date

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Executive Officer

Professor Charles Smith

Professor William Kornblum

Professor Sheldon Ungar

Professor Tim Luke

THE CITY UNIVERSITY OF NEW YORK

Abstract

The Social Construction of Global Climate Change

By

Eric Graig

Advisor: Dr. Cindi R. Katz

This research traces the history of the climate change issue from the late 1950s through the late 1980s as it developed within the scientific, policy and environmental movement spheres. Overall its aim is to locate climate change discourse within the context of American environmentalism and offer an account of the issue's emergence, and the factors that influenced its development. These include the advent of a series of global resource crises in the 1970s which brought climate to the attention of policy makers, and the increased professionalization and bureacraticization of the environmental movement which enabled it to take on complex and highly technical issues like climate change. A shift away from issues requiring regulatory intervention where the movement's activities had been stymied by policy gridlock was also a factor. This dissertation argues that these and other factors led the mainstream environmental movement to adopt a rationalized market based rhetoric to assert claims about global warming. The implications of such a rhetoric, notably the degree to which it depoliticizes global warming discourse is also discussed.

The research offers a theoretical critique and re-working of the constructionist approach to social problems and broadens understanding of the environmental movement. On this level, the study argues for a constructionism that pays attention to the historical setting within which claims emerge since, as the work shows, social context constrains the range of rhetorical strategies available to social problems claims-makers.

Acknowledgements

The completion of a doctoral dissertation represents more than the end of a research and writing project. In every sense it brings to the close a chapter in its author's life. For this reason, rather than thanking only friends and colleagues who participated directly in the creation of this research, I wish to acknowledge those who have been with me throughout this lengthy endeavor.

First of course are my teachers in the Environmental Psychology Program at the City University Graduate Center particularly, Susan Saegert and Maxine Wolf. Equally important are those with whom I taught and worked in the sociology department at Queens College particularly Dean Savage, Joanne Miller, Patricia Clough, and Andy Beveridge. Whether it was through direct support, in the form of research and teaching opportunities that seemed to come one on the heels of the previous one (and continue to do so), or simply in the form of the friendship they offered, it was at Queens more than anywhere else that I gained the confidence to see myself as an author.

My thesis committee, Charlie Smith, Bill Kornblum and Cindi Katz were of course immensely important in the creation of this work as were my two outside readers, Sheldon Ungar and Tim Luke who were kind enough to agree to a teleconferenced defense. Cindi Katz, my advisor, deserves special mention for the grace and good humor with which she managed an alternately argumentative and paranoid advisee. Through all this she brought care and valued commentary to this and all my other work. Perhaps most important however was her friendship and the example she set as a scholar.

Like the construction of climate change discourse, a graduate education occurs in a social context. Here of course I wish to acknowledge the support provided by my family in this long journey. My wife Liz who shared my desire to see this project through to completion and who was willing to accept my frequent absences of course deserves first mention. There is no doubt it would have been impossible to complete the work without her help in locating and obtaining the many documents that were analyzed. My mother's support for the project and her willingness to help care for Analee and Owen, our two children, allowed me peace of mind to continue working before the completion of the project was a foregone conclusion.

This dissertation is dedicated to the memory of my father, Dr. Frank A. Graig, who passed away some twenty years before it was begun. It would have never have been conceived had I not had the benefit of knowing him for the first fifteen years of my life.

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Introduction and Overview

Early suggestions that human industrial activity might trigger changes in global climate first became a topic of serious scientific study in the early nineteen-sixties with the development of rudimentary computer models capable of depicting atmospheric dynamics. Since that time, Global Climatic Change (GCC) has developed into an important issue for both science and the environmental movement in this country and abroad. This study examines historically the ways in which GCC has been constructed as a problem by organizations and individuals within this movement and elsewhere. A constructionist approach holds that social scientists can say relatively little about the objective status of a given social condition. Instead, researchers should focus on the processes through which conditions become defined as problems and moved onto the larger political and social agenda. By adopting this perspective, I hope to accomplish two things. First, I hope to be able to expand interest in constructionism in environmental sociology, which has only recently begun to look at the way in which environmental issues are framed. Second, I hope to be able to address several theoretical and empirical deficiencies in the constructionist approach and in so doing move the paradigm forward.

This introduction lays out some of the scientific issues around the question of GCC and discusses some of the social dimensions of the problem. I then move to a discussion of the ways in which GCC and other environmental problems have been treated in the social science literature. Following this, I introduce the constructionist perspective to social problems and attempt to position this study

within that paradigm. From there, I offer a critique of the paradigm the purpose of which is to provide a theoretical rationale for this research. A final section summarizes each chapter of the work and concludes with a brief discussion of the contribution it seeks to make to environmental sociology and social problems theory.

The Scientific Status of Global Climatic Change

According to White, (1990) the idea that changes in atmospheric composition might lead to changes in earth surface temperature was first put forth in the second half of the nineteenth century when the Swedish chemist Svante Arrhenius calculated that a doubling of CO2 levels would produce a global warming of seven to eleven degrees Fahrenheit. It was not until 1957 however that scientists started gathering the climatic data necessary to verify this belief. Roger Revelle, then director of the Scripps Institution of Oceanography had long contended that the burning of fossil fuels represented an "immense geophysical experiment," and along with several colleagues began monitoring atmospheric CO2 under the auspices of the International Geophysical Year of 1957. These data which have since been verified by other studies and coupled with efforts to extrapolate backwards, show a 20% increase in global CO2 levels over the last century. Around the same time, John von Neumann and other scientists at the Center for Advanced Study at Princeton began attempts at modeling atmospheric processes on digital computers. These efforts were institutionalized in the 1960s at Princeton and in 1975 researchers there calculated that a doubling of atmospheric CO2 would lead to a 5° Fahrenheit increase in average global surface temperature. Since that time other researchers, also assuming a doubling of CO2[1] but using different atmospheric models, have calculated increases in the range of 2° F to 9° F. Attempts to reconstruct actual temperature changes from historical data suggest a warming of 0.5 - 1.0 degrees over the past century although this record

[1] There is widespread agreement among scientists that CO2 levels will double by the middle of the next century.

is sketchy. This issue and others are developed in the next chapter which traces the development of GCC science.

If these statements represent the area of widest scientific agreement, what are the areas of scientific controversy? First and foremost is the wide range of variation in predicted temperature changes and their consequences. White (1990) notes that while a nine degree increase in fifty years would be highly disruptive to human systems (a twelve degree decrease is believed to have been responsible for the last ice age) a two degree increase is probably within the range of human manageability. Equally significant, the models are blind to any natural mechanisms that might mitigate (or exacerbate) increases in CO2 and temperature or their effects on other geophysical systems. With respect to historical temperature changes, there are questions concerning the accuracy of the data (if only U.S. data— the most accurate— is used, then no increase is observed) and the degree to which it is possible, given the complexity of the atmosphere, to attribute changes to the effects of rising CO2 levels. Furthermore, even if the data are accurate, they are consistent only with the models predicting a very modest (0.5 - 1.0 degrees Fahrenheit) future rise in temperature. Finally, it is unclear precisely when the effects of a temperature increase will become manifest and how they may be distributed.

Global Climatic Change as a Social Problem

GCC of course is more than merely a scientific problem for specialists in fluid dynamics or historical meteorology— it is a *social* problem, or at any rate has been constituted as one by certain individuals and groups. To the extent that it alters geophysical processes such as precipitation, sea temperature or glaciation, GCC alters the circumstances under which human populations and social systems interact with the earth. It has, in other words, the potential to create a set of conditions which, in the view of persons concerned

about it, will be disadvantages to human existence. The list of potentially harmful effects is lengthy and includes such things as drought, coastal flooding, and increases in storm severity. These disruptions will affect non-human life as well and may be problematic for that reason too. Persons who express concern about GCC however, note that it is not too late to do something to prevent the occurrence of these conditions. GCC they say is caused by human behavior and can be halted if that behavior is changed. If, as many scientists have suggested, global warming is a function of atmospheric levels of CO2 and atmospheric levels of CO2 are related to the burning of fossil fuels, then reductions in the burning of these fuels should result in smaller temperature increases than would occur if burning continued at the present rate or accelerated. From a policy standpoint however a problem arises in that the structural changes necessary to significantly reduce emissions may be very costly and may not make sense if GCC is not in the offing[2]. However, if warming were to occur, then a failure to act now to minimize its effects could be disastrous. As White (1990) points out there is evidence for both possibilities and the choice of one course of action over another is a difficult one.

The importance of a number of these factors in defining GCC as a social problem can not be over-stated. GCC is definable as a social problem because it is said to have potentially harmful impacts to human beings and the things they value; because it is said to be the result of human action; and because it is said to be preventable if appropriate human action occurs. Unlike other potentially harmful atmospheric phenomena, thunderstorms for example, GCC possesses a moral dimension in that it represents a condition to which we may attach "should" or "ought" statements (c.f., Gouldner, 1990). In fact, it is a social problem only to the extent that it can be characterized as

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[2] Both the cost of emission reductions and the utility of undertaking them if GCC is does not occur are in dispute. Both in other words are typifications about solutions to the problem.

possessing a human cause. This dissertation is about the characterizations that are attached to GCC by individuals and groups within the environmental movement and within the scientific community who are concerned with defining it as a social problem. It is concerned in other words with the ways in which an atmospheric condition becomes defined as a social problem. Of course in order to define GCC as a social problem it is first necessary to establish its existence as an atmospheric condition. For a number of reasons, some of which have to do with the scientific uncertainty noted above and some of which are related to the physical characteristics of GCC, this represents a significant problem for persons attempting to move GCC forward on the social and political agenda. Therefore, in addition to addressing how GCC is characterized, this dissertation will explore the ways in which its "reality" is established by individuals and groups interested in putting forth particular definitions.

Coverage of Global Warming in Social Science

Wide spread interest in the issue of global climatic change among scientists, policy makers and lay persons, has resulted in the development of a large literature since 1990. A recent search of SocioFile (Sociological Abstracts, 1998) for example found a total of 84 articles all published since 1989, that touched on the issue. The majority of this literature however has been eclectic, focusing mainly on theorizing the causes of the problem (c.f. Crenshaw & Jenkins, 1996; Roberts & Grimes, 1996), the social repercussions of failure to address the conditions causing the problem (c.f. Ewert, 1991; Jacobson, 1990; Jamieson, 1992; Lewis, 1990), people's perception of it (c.f. Bell, 1994; Bord, 1997; Kempton, 1991; Nordhaus, 1994; Read, Bostrom, Morgan, Fischhoff & Smuts, 1994), and the sociological and politcal aspects of proposed solutions (c.f. Bhatti, 1993; Christie, 1992; Krebill Prather & Rosa, 1992). Significantly, this literature takes the existence of GCC as given and develops arguments designed to

further persuade the public about its seriousness and to assist policymakers in the formulation of prevention and mitigation strategies.

A number of scholars however have chosen not to accept the definition of the situation as it has been provided by scientists and those in the environmental movement. They focus instead on the processes through which public understandings of climate change have developed. Sheldon Ungar (1992) whose research is discussed in more detail below, addressed the ways in which abnormally high temperatures in 1988 created a social scare that moved the issue of GCC into the public arena. He notes however that once weather conditions moderated, public and media interest in GCC waned. Another study by the same author (1997) compared the marketability of global climate change discourse with that of stratospheric ozone depletion and theorized that the later was transformed in to a "hot crisis" because of its tangibility and its resonance with certain cultural themes, for example those related to public concern about cancer[3]. Romaine (1996) discusses the role of metaphor in popular and scientific discussions of GCC making note of the ways in which conflicting systems of moral accounting underlie the various environmental discourses she studied. Arcurry and Christianson (1980) measured the stability of environmental world view over time in a sample of Kentucky residents. While they noted slight increases in concern between 1984 and 1988, the only county with a significantly higher level of concern was the one which had experienced drought related water restrictions in 1988.

Williams and Frey (1997) relied upon a content analysis of *UPI* reports and articles appearing in the journal *Science* to show that the status of GCC as an issue was linked to its dramatic potential and its relation to experienced weather extremes (both factors that enabled the

[3] Both studies offer a number of interesting observations critical of the constructionist approach to social problems which are discussed in more detail in a subsequent section.

acceptance of claims-makers' discourses) and to its complexity, the viability of proposed solutions, their cost, and the political realities claims-makers faced (all of which constrained the acceptance of GCC discourses). Mazur and Lee (1993) focused on the a wider set of global environmental issues including tropical deforestation, species extinction and ozone depletion. They argue that public attitudes towards risky technology and environmental degradation rises and falls with the quantity of coverage allotted by media gatekeepers to stories on these topics. The increase in public concern about GCC specifically is tied to the emergence of these other issues which, for Mazur and Lee, heightened awareness of global environmental problems in general. "Each story," they write, "reinforced the attention given to the others so that linkages and common elements were emphasized" (Mazur & Lee, 1993, p. 712). Guay (1996) and Taylor and Buttel (1992) discuss the role of science in the construction of GCC discourse and its implications for the fate of such discourses once they move into the public arena.

Taken together, the majority of these studies may be linked to those mentioned on page 5 which address public attitudes towards global climate change. Their emphasis is on those factors that affect the public consumption of global warming discourses (primarily media delivery and the intrinsic properties of the condition). In contrast, the present research emphasizes factors affecting the production of these discourses. Such an analysis differs from these studies not only in terms of its focus but also methodologically to the extent that it takes a longer historical view and pays close attention to the organizational position of the producers.

Coverage of Environmental Issues in Social Science

To some degree, the growth of a literature devoted exclusively to GCC has paralleled the development of scholarship on environmental problems in general. This research was last formally reviewed by Fred

Buttel (1987) who developed a four part division of environmental sociology. The first is theoretical, and essentially represents an attempt to insert environmental variables into an overly anthropocentric social theory while at the same time accounting for environmental deterioration through reference to macro structural variables. Two variants of this approach are usually encountered. One, developed by Caton and Dunlap (1980) has its intellectual origins in Chicago School human ecology (Hannigan, 1995, p. 16) and calls for the development of a 'new ecological paradigm' in sociology. This strand of theory portrays contemporary environmental problems as rooted in a dominant social paradigm that sees human beings as exempt from ecological constraint. The other (Schnaiberg, 1980) is similarly concerned with the insertion of environmental variables into social theory but explains contemporary environmental pollution and resource depletion using a Marxist framework. This approach emphasizes capitalism's demands for ever increasing levels of production, which, stimulated by consumer advertising, depletes the physical carrying capacity of the ecosystems from which resources are withdrawn.

While these two orientations constitute the theoretical end of environmental sociology, they represent the smallest area of scholarship within the sub-discipline[4]. Indeed most of the field has been concerned with traditional sociological questions around issues of public opinion, pro-social behavior (e.g., altruism) social movements and community albeit with an environmental focus. The second broad approach in environmental sociology as Buttel describes it also concerns itself with understanding environmentalist organizations. A third focuses explores environmental attitudes and correlates of pro-environmental behavior. The fourth and final direction for environmental sociology has been the study of technological risk and community response to hazardous environmental conditions. Penelope

[4] The more recent work by Beck, cited below, is rapidly drawing theoretical attention within the field.

Canan (1996) echoes this characterization of the sub-discipline but adds to its portfolio the study of environmental conflict, and the role of race and class as determinants in hazardous facility citing decisions.

European social science has also developed an environmental dimension which in some respects parallels American trends. This work which is macro theoretical in nature discusses the development of environmentalism in terms of larger social forces and the move, at least in the West, towards a society based on 'post-material' values (Gorz, 1980; Inglehart, 1990). More recently Ulrich Beck (1992) has put forth the notion that we are entering an era in which people will act to maximize non-monetizable values such as freedom from risk. Under such a regime, working-class social movements which have traditionally focused on distributional issues will be replaced by middle-class movements centered around quality of life issues. Beck's concept of reflexive modernization which comes out of this work, has broader implications for the study of modernity. It is significant here to the extent that it places environmental and technological risk at the center of social theory.

By and large, sociologists and social theorists concerned with environmental issues have tended to view the size, shape and seriousness of the environmental problems they write about non-problematically. In their work, the existence of particular environmental problems is founded either upon common sense understandings of environmental harm or, in cases where a damage is hidden from direct observation, upon scientific pronouncements. Put differently, environmental sociologists have failed to explore the processes through which particular environmental conditions become defined as environmental problems. At a minimum, they have ignored the fact that the recognition of environmental harm is historically contingent, that conditions defined today as harmful may later come to

be viewed as benign or conversely that new harms may emerge around practices viewed as environmentally sound today.

This said, a number of interesting studies on the periphery of mainstream environmental sociology which do deal with the social construction of environmental issues bear mention. Although not explicitly within mainstream environmental sociology, contributors to Vincent Covello's (Covello & Johnson, 1987) edited volume *The Social and Cultural Construction of Risk: Essays on Risk Selection and Perception* adopted a social constructionist approach in their attempt to explain why lay people conceive of risk so differently from professional risk managers[5]. In a sense seeking to 'de-naturalize' environmental risk, contributors to Ken Hewitt's (1986) *Interpretations of Calamity* adopt a more critical perspective arguing that mainstream constructions of environmental hazard are blind not only to lay understandings but also to the ways in which political and economic inequality effects who winds up in harm's way.

John Hannigan (1995, p. 39) traces interest in the construction of environmental problems back to Mauss' 1975 text on social movements. Here, in a chapter co-authored with Stan Albrecht, Mauss addresses issues such as the social definition of the environment. Hannigan's book itself provides the most recent call for the study of the social construction of environmental issues. It offers both an excellent outline of environmental sociology as it is presently constituted as well as a discussion of social constructionism in sociology. In large part substantiating my own search of the literature, Hannigan notes only a small number of studies which examine environmental issues from a constructionist perspective. Putting aside those having to do with risk assessment, these studies, like those focusing exclusively on GCC tend to center on media presentations of the environment.

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[5] Constructionist approaches to risk share much in common with culturalist approaches to pollution in general. These are discussed in a subsequent section.

Pollution and Culture

With the exception of the sorts of post-scarcity explanations put forth by Becker and others, there remains only a little scholarship in environmental sociology or psychology that attempts to account for contemporary environmentalism historically or culturally in terms of larger personal and social issues. There is even less addressing the ways in which environmental concern is socially represented. The following section reviews an approach taken by anthropologists and others concerned with cultural representations of pollution and risk and concludes with a short critique of it.

Perhaps the best known cultural analysis of environmentalism is provided in Mary Douglas' and Aaron Wildavsky's *Risk and Culture* (1982). These authors argue that people focus upon those environmental issues that reflect their beliefs about social life, nature and morality. This argument is based on the idea that a culture's conception of pollution— the term is employed in the sense of impurity or defilement— serves to locate social objects within a universe of moral expectations and retributions. Pollution beliefs function to sort social objects as 'in-group' or 'out-group'; to say that something is polluted in other words is to say it does not belong with 'us.' This of course strengthens social solidarity to the extent that it limits the possibility of contact with the out-group and establishes the existence of external dangers which can only be resisted by such solidarity[5]. The essential point here is that pollution beliefs do not necessarily arise from actual physical dangers but rather from social or moral ones. Pollution beliefs tell more about what a group fears morally than about what is physically hazardous.

Douglas and Wildavsky apply this analysis to their discussion of environmentalism in a number of ways. According to the authors, environmental troubles are, for those who worry about them, part and

[5] See Douglas' *Purity and Danger* (1983) for an in-depth discussion of the social functions of pollution beliefs.

parcel of a broader set of troubles characteristic of modernity. They represent, in other words, outcroppings of a larger problematic. These sorts of fears, both those concerned with environmental pollution and with the modern problematic in general are, to the authors, essentially irrational and akin to archaic superstitions and taboos. Through the use of grid/group analysis Douglas and Wildavsky develop a model of environmentalism that characterizes it as a sectarian movement similar to the Hutterites. Like such sectarian movements, environmentalism's success is based on the existence of an 'outside' threat which can only be resisted collectively. There have been numerous critiques of such comparisons and indeed of the notion that pre-modern taboos are irrational (Johnson, 1987; Kaprow, 1985; Wartofsky, 1986), but beyond these critiques, Douglas and Wildavsky's more general speculations about the relationship between pollution, morality and modernity form the basis of the literature on the social construction of environmental degradation. Their ideas have been taken up in theoretical and empirical work by anthropologists, sociologists, cultural critics and media studies people.

A number of empirical studies have sought to verify Douglas and Wildavsky's assertions about the sectarian nature of the environmental movement. Raynor (1986) for example used grid/group analysis in an attempt to demonstrate how the world views of four different medical sub-cultures (entrepreneurial physicians, hospital administrators, clinic personnel, and low status hospital workers) dealt with safety issues surrounding the use of radio-medical technology. Kay (1991) also utilizes the grid/group model in a discussion of the ways in which entrepreneurial, hierarchic, egalitarian and isolated individual sub-cultures perceive nature. Dake (1990) employs a survey research methodology to identify two world views that are said to represent orientations towards certain features of contemporary society. Contemporary world view A, for example, is associated with support for a high growth, high tech, free market economy and a belief in rational,

quantified decision making. Contemporary world view B by contrast, favors slow growth, increased social spending, participatory decision making and the decentralization of authority. Not surprisingly, Dake's major finding is that people's attitude towards technology, environmental degradation and nature are strongly correlated with their world view— a discovery which supports Douglas and Wildavsky's notion that risks are best understood within their cultural, or better, sub-cultural context.

A number of symbolic analyses of environmental hazards have also appeared. Bronstein (1987) for example, discusses how elites manage work-place hazards so as to establish themselves as protectors of safety, purity and order. An excellent study by Janet Fitchen and colleagues (1987) examined threats to the cultural meanings of home when toxic chemicals are discovered in residential environments. Brown (1980) discusses the ways in which the germ theory of disease and the question of nuclear radiation, were popularly represented when they emerged in the early part of this century. According to Brown, in both instances the unknown was constructed in terms of the known. Nuclear power for example was presented as "harnessing the power of the sun."

A small body of literature has also emerged dealing with questions concerning the representation of technology, both hazardous and not, in entertainment media. Goldman (1989) for example, found that while nearly all of the 'techno-films' he examined presented a bleak and dystopic future, in most cases it was not technology itself but the power it gave to evil individuals and institutions that was responsible. Salvation, if it arrived, came from outside the technological realm, from the likes of a Luke Skywalker who ultimately overcomes "The Evil Empire" by switching the technology off and relying on instinct and "the force." Both are clearly prior to technology. A similar study by Schecter and Molesworth (1978) found much the same thing. The common denominator in each of the films they studied was the destruction of some sophisticated technology by natural forces

which in effect restores nature as the supreme power. As in the technology films, survival comes only to those who rely on physical strength and folk wisdom and who display a willingness to work against the system. Wilkens (1986) and Nimmo (1984) examined the representation of technological disasters in television news. Both authors found that network news producers focus on those aspects of such disasters which stress the helplessness of disaster victims and the sinister quality of the technology and those who control it. Viewing news reporting as essentially a form of storytelling, and therefore emphasizing its literary requirements, these two studies were able to argue convincingly that the news media both creates and incorporates an image of man-made disaster which is "mythically adequate." The interesting point in all of this is that the "myth" drawn on most often by news producers when an environmental or technological disaster occurs, is one in which individuals are portrayed as helpless victims and technology as menacing and essentially malignant. These themes repeat and provide empirical support for some of the speculations offered by Douglas and Wildavsky. They have been developed by more critically minded theorists as well.

Kirby (1990) for example develops the notion that environmental hazards are mediated within a larger 'public discourse' which in recent years has focused on the apocalyptic trajectory of modern American society (Kroker, Kroker & Cook, 1990). For Kirby, environmental concern is part and parcel of the renewed emphasis on the sanctity of local life and privacy (disrupted by pollution from the outside) and fears about a more general American and perhaps Western decline. Without this context, he suggests, concern for the environment would, if it existed at all, take a different form. Kirby's work also stresses the moral dimensions of apocalyptic discourse which often has focused, at least in Judeo-Christian cultures, on questions of individual corruption and social decay. Plague, leprosy, the Flood and AIDS he writes have always represented, or perhaps better, been

constructed around notions of retribution and punishment. As a form of millennial discourse, fears about environmental degradation share such a moral element.

Another interesting dimension to this discourse centers around the idea that disaster and calamity represent the intrusion of disorder and chaos into the seemingly stable and non-problematic fabric of everyday life. Viewed in this way, environmental calamity not only threatens physical safety but also the ontological security necessary for everyday functioning. This issue is addressed with respect to global climate change by Andrew Ross. Ross (1991) situates concern about GCC within the context of a recent wave of weather related apocalyptic scenarios such as nuclear winter and global cooling. Our susceptibility to these narratives, he writes, is based on our normally routine relationship with weather; a relationship which forms part of the ontological security we experience in everyday life. But more than a physical phenomena, weather has often been used to explain or naturalize social, political and historical circumstances including the business cycle and third world famine. Seen this way, a break-up of the "weather consensus," to use Ross's term, foreshadows much more than warmer temperatures.

Yet media outlets such as the Weather Channel, Ross writes, trivialize weather by emphasizing its effects on leisure activities while de-emphasizing its influence on the production process. If weather is essentially irrelevant, if it has receded that deeply into the taken-for-granted backdrop of everyday life, if it has been so profoundly routinized that we need not really pay any attention to it at all, then predictions that it is about to change, and moreover, that those changes are likely to be catastrophic are potentially alarming. Yet places like the Weather Channel are doing little to prepare us for all of this. They proceed as if nothing is the matter. The dissonance here is reminiscent of Dellilo's (1985) tragi-comic novel *White Noise*

in which victims of an "airborne toxic event" nervously maintain a veneer of normality in the face of an almost benign annihilation.

The cultural analysis of environmentalism is relevant to the present project because it points up the fact that environmental degradation may represent far more than merely a set of physical conditions. These approaches seek to show how environmental problems come to be represented, and how, in the process, they succeed in portraying a whole range of social concerns. Environmental pollution in other words, is said to be socially meaningful and 'made sense of' within a social context. The problem with much of this literature however is that while it makes the assertion that environmental degradation is socially constructed, it fails to examine empirically the processes through which particular representations come about. In other words, while these studies have tended to focus on the ways in which larger social issues are represented in discourse about environmental degradation, and the other side of that, the ways in which environmental degradation is represented within a larger social arena, they have tended to neglect the question of how these discourses are constructed. Uncovering these larger social issues is worthwhile project for social research and one that should be extended in more empirically rigorous research of specific environmental discourses. At the same time, this neglect of the question of process leaves an impression that these representations are either pre-existing, spontaneously generated, or at the very least, unproblematically produced. The analysis that I propose will address this difficulty by providing a much more microscopic examination of the construction of environmental representations. The strength of such an approach, in addition to its concern for process, is that it emphasizes the analysis of texts specifically designed to communicate representations of an issue. This lessens a number of the ambiguities associated with the project of cultural interpretation.

The Social Constructionist Approach to Social Problems

Introduction

A constructionist approach to environmental pollution follows on the strengths of the culturalist approaches mentioned in the last section in that it focuses on the ways in which environmental problems are socially represented. It differs from these approaches however by placing greatest emphasis on the ways in which these representations *are actively managed by individuals and groups seeking to define environmental conditions as social problems.* This focus, given its concern for the definitional process, follows very closely the constructionist approach to social problems developed in recent years in sociology. Malcolm Spector and John Kitsuse, the originators of this approach write: "Our definition of social problems focuses on the process by which members of a society define a putative condition as a social problem. Thus we define social problems as the activities of individuals or groups making assertions of grievances and claims with respect to some putative conditions. The emergence of a social problem is contingent upon the organization of activities asserting the need for eradicating, ameliorating or otherwise changing some conditions" (Spector & Kitsuse, 1987, p. 76).

Given the degree to which Spector and Kitsuse's approach to social problems represents a break with other formulations (in particular with respect to its denial of the importance of objective conditions), it is worth laying out their critique of social problems theory in some detail. One way to understand their formulation is to contrast it with earlier functionalist approaches which labeled anything interfering with a theoretically outlined social structure as a social problem. Even Merton's (1976) more modest definition of social problems as "sizeable discrepanc[ies] between what is and what people think ought to be" was suspect to the extent that it begged questions about exactly which people's thinking was important, how they knew there was a discrepancy, how they knew it was sizeable and how they knew what ought

to be. As Miller and Holstein (1993) argue, the essence of Spector and Kitsuse's critique is epistemological to the extent that it questions the notion fundamental to structural functionalism that social conditions exist independent of an individual's interpretation of them. They write "Spector and Kitsuse's claims-making approach undercuts [the assumptions of structural functionalism] by questioning the possibility of knowing objective conditions" (p.7). Unlike more traditional approaches to social problems, constructionism compels sociologists to forswear analysis of social conditions and instead focus upon the study of social definitions. This forces those in the discipline to eschew their traditional (and often remunerative) role as experts and instead adopt the role of commentator and critic.

Perhaps Best's (1989) discussion of the social constructionist approach to social problems most thoughtfully summarizes the difference between structural functional approaches and social constructionism. He notes: "a traditional objectivist approach to homelessness might focus on the size of the homeless population, learning why some people become homeless or otherwise exploring homelessness as a social condition, while a constructionist analysis would ask whose claims brought homelessness to public attention, how those claims typified the homeless, how policy and policy makers responded to the claims and so on" (p., 244). Conceived in this way the study of social problems becomes essentially an area for historical investigation.

Claims-making as an Activity

The starting point of any constructionist analysis of social problems is the claim. Claims are demands made by one party to another that something be done about an alleged condition. The focus in constructionist research is on the numerous claims-making activities that go into establishing the existence of a condition, and presenting and managing claims about it. These include, but are not limited to, formulating strategy, making speeches, mobilizing organizations (or

creating new ones), meeting with members of the press, attending rallies, filing lawsuits, producing position papers, lobbying officials, and providing testimony. The emphasis is on claims-making as a practical, readily observable activity— something people do. The key actor in all of this is the claims-maker (not necessarily an individual), who goes about the day-to-day business of establishing agendas and lobbying for solutions. Because constructionists view social problems as accomplishments of social activity (and not as phenomena in the world), it is this activity that they study.

Essential to claims-making activity is knowledge of where and how to make claims and the ability to gather the resources necessary to pursue them. These resources include such things as physical space and equipment, lists of likely activists and contributors, access to the media, access to officials, contacts, and favors owed[7]. Based largely on an analysis of several case studies, constructionists have developed the idea that social problems claims-making follows a particular sequence or to use their term, natural history. In the first stage of this sequence groups attempt to assert the existence of some condition, define it as harmful or undesirable, stimulate controversy and create an issue over the matter. If this effort is successful, the claim moves forward towards official recognition and legitimacy. At the next stage, claims-makers may express dissatisfaction with the progress of their claim and in some instances may attempt to develop parallel alternative institutions with which to deal with the problem. Wiener (cited in Schneider, 1985) notes that this relatively simple model probably presents too stable a picture of what actually goes on which she characterizes as an "overlapping" and "continuously ricocheting interaction."

As one might expect, the constructionist approach to social problems views the actual existence of conditions as immaterial to the study of

[7] The acquisition of funding of course is behind a number of these items.

the representation of that condition as a problem. Such a position is convenient for a number of reasons. First, with respect to some conditions— GCC is an excellent example— sociologists possess no privileged ability to evaluate claims made by specialists outside their area of expertise. As a social researcher for example, I have no more ability than a lay person to verify the validity of the climatic models purporting to indicate changes in atmospheric chemistry and thermodynamics. Secondly, the material existence of a condition often bears little relationship to whether or not it will be defined as a problem. This of course should come as no surprise since to a constructionist a "social problem" is essentially a folk characterization or reading of some social circumstance. It is, in other words, a putative condition which has been defined in a certain, usually negative, way. As such, any effort directed at evaluating whether or not particular conditions "really" exist is wasted.

Typification

It should be clear from the discussion thus far that the most important activity in the claims-making process occurs at the beginning. Only if conditions can be defined as problematic can claims be made about them. There are essentially two parts to this process. The first establishes the condition as a "fact" by appealing to "common knowledge," "official statistics," or statements by "authorities" such as scientists, physicians, engineers or sociologists. These "facts" may appear as simple descriptions of the condition or they may take the form of formal "expert" accounts couched in quantitative terms (e.g., GCC will cause a 10 foot rise in sea level). In the second part of the definitional process the condition, now established as "real," is given a characterization or "spin." This characterization is referred to as a typification. Typifications orient thinking about a condition in a particular way— a way which claims-makers hope will lead to an understanding of that condition as a problem. Typifications in other words, establish the domain in which the condition exists. For

example, is the condition a social problem, a technological problem, a personal problem, a political problem or some combination of these? Is it an inconvenience or a tragedy? By placing a condition within a domain, the typificatory process points towards solutions and provides a rationale for moving towards those solutions. Usually these reasons are based on a set of taken-for-granted norms or "ought" statements although they can be elucidated if required.

An essential resource in the typificatory process is images which, as Best, (1987, p.114) argues "become a convenient shorthand for describing and typifying complex social conditions." Images, created either visually or through narrative, function both to authorize the facticity of a condition and to characterize it in a particular way. Johnson (1989), for example, describes the ways in which newspaper child abuse "horror stories" establish the reality of child abuse and characterize it as a particular sort of condition. In this instance, as the author points out, such images portray child abuse as the result of the actions of an individual, the abuser. Because of the sorts of "facts" which appear in these accounts and because of their typically graphic presentation, we are led to "see" the individual abuser in action. Such a typification of course serves the interests of the various professionals and law enforcement agencies which have come into existence to manage child abuse and that depend upon it for their existence. Alternative typifications, for example those having to do with the lack of support systems for families, are left stillborn.

As a form of rhetoric then, claim-making involves selecting from a set of available arguments, placing them in some sequence and giving some arguments particular emphasis. It is through these arguments that claims become authenticated and established. This is not to say however that claims are established without contest. For example, the adequacy of "facts" may be disputed, there may be calls for further study, the condition may be recognized but minimized, experts may be impugned by other experts, or the "facts" may be characterized as

counter-intuitive. The characterization of a condition may also be challenged. There may be attempts in other words, to deny that a condition really is the "sort" of condition claims-makers suggest.

The development of AIDS as an issue is an interesting case in point. As Albert (1989) found, early attempts to characterize AIDS in moral terms were resisted by persons who sought to define it as a health problem and later as a political problem. So important are definitions to the social problems process that in some instances definitions themselves can form the basis of a social problem claims. Spector and Kitsuse (1987) provide one example of such a situation in their discussion of the transformation of the definition of homosexuality in the American Psychological Association's *Diagnostic and Statistical Manual of Mental Disorders* from one which characterized homosexuality as a disease to one which characterized it as an orientation. Given the adversarial nature of claims-making in general and the typificatory process in particular, some constructionists have chosen to analyze claims in terms of argumentation theory (Best, 1987).

Critique of the Constructionist Perspective

The constructionist approach to social problems offers researchers a starting point for understanding social problems superior to that offered by other theoretical paradigms. Given the impact of social constructionism within social problems theory, it is not surprising that a number of critiques have developed since Spector and Kitsuse's ideas were formalized some twenty five years ago. Putting aside those critiques which are essentially conservative of the older social pathology paradigm, the most significant challenge to social constructionism comes from Woolgar and Pawluch (1985) in an article entitled "Ontological Gerrymandering." The title of the piece reveals the essence of their critique. According to Woolgar and Pawluch all constructionist research is structured as follows:

> "First, authors identify certain conditions or behaviors. Second, they identify various definitions (or claims) about these

> conditions or behaviors. Third, the authors stress the variability of the definitions vis-a-vi the constancy of the conditions to which they relate. They imply that since the condition does not vary, variations in the definition of the condition must result from the social circumstances of the definers..." (p. 215).

The use of such a strategy by constructionists of course represents the backdoor insertion of conditions into constructionist research since it takes the position that conditions are stable. Representing, in essence, a deconstruction of social constructionism, the Woolgar-Pawluch argument holds that constructionists have merely moved the border of the 'objective' from conditions, to definitions about conditions. "The successful social problems definition," they write, "depends on making problematic the truth status of certain states of affairs selected for analysis and explanation, while backgrounding... assumptions upon which the analysis depends" (p.216).

Woolgar and Pawluch note that researchers insert objective conditions into their work in different ways. In some instances they may actually provide statistics which demonstrate that conditions themselves have not varied much between a point in time in the past and some time later when the condition became the subject of claims-making. Other studies discuss the condition's existence more loosely describing it as something which has been around 'throughout the ages' or 'for millennia.' Still other studies use the same approach except rather than describe conditions as constant, hold that actual levels of the putative conditions have declined. Finally, some studies "avoid any *explicit* claim for the objectivity of a condition [although they] organize their reports of definitions and claims so as to assign *de facto* an objective status to these conditions [and] appeal to our commonsense knowledge that these conditions have not changed over time" (p. 217).

Rather than calling for a 'solution' to the theoretical problem they outline, Woolgar and Pawluch urge researchers to pay more attention to the "match between their proclaimed objectives and their explanatory

practice" (p.224). The problem, they note, surrounds any attempt to explain social phenomena. They write that in all sociological explanation "certain phenomena are highlighted as the legitimate and pertinent objects of study which require explanation, while other phenomena... are backgrounded and taken as given" (p. 224). In order to explain a phenomena as socially contingent, an explanation has to be constructed in such a way that *it* (the explanation) appears to be other than socially contingent. Woolgar and Pawluch conclude their piece with a call for further research to uncover the discursive practice employed by gerrymandering constructionists. As Miller and Holstein (1993) point out, one solution to the inconsistencies Woolgar and Pawluch describe is the adoption of alternative rhetorical strategies for reporting the findings of field work which "remind readers that the authors are aware of the rhetorical devices that they use to construct textual realties, and that offer understandings that are partisan and potentially contestable by others" (p. 13).

In responding to Woolgar and Pawluch, Ibarra and Kitsuse (1993) contend that while researchers adopting the constructionist perspective may be guilty of the sort of clandestine objectivism Woolgar and Pawluch note, there is nothing in the theoretical formulation of constructionism that necessitates the insertion of discussions of conditions. The error, they go on to argue, may be due to the "ambiguous ontological burden placed on *putative* conditions in Spector and Kitsuse's original presentation... this language has been taken by constructionists to entail treating the [constructionist] perspective's axiom ('claims-making constitutes social problems') *as a proposition* thus formulating research which in one way or another focuses on social conditions" (italics in the original p. 30). Ibarra and Kitsuse argue instead for an approach which views social problems discourse as a language game and aims to discern the rhetorical idioms, motifs and styles used by claims-makers and the underlying issues particular representations signify. I return to Ibarra and Kitsuse's restatement

of the social constructionist approach to social problems in the concluding chapter of this work.

Other constructionists (Best, 1989; Best, 1993; Gusfield, 1985), while acknowledging that their analyses are in fact social constructions, question the utility of the ontological gerrymandering critique noting that without such gerrymandering their research would be largely irrelevant to most audiences. Best (1993) argues further that there is little analysts can say about a particular social problem construction that does not require at least minimal assumptions about objective conditions or social contexts. Despite the call for empirical research in Spector and Kitsuse's original work, an insistence on theoretical purity precludes any reference to conditions, or even to definitions as *experiences*. As Miller and Holstein (1993) show, *contextual* constructionists such as Best (who coined the term) argue that the goal of social problems research should be to offer "insights into the organization and workings of social problems movements, and the social conditions that claims-makers describe as social problems" (p. 11). Gusfield's reply to Woolgar and Pawluch makes this point very clearly:

> Woolgar and Pawluch illustrate too well the kind of sociology that seems to me to be a dead end. It is preoccupation with the logic of theory as something apart from and independent of the substantive questions to which [it is] directed. (Gusfield, 1985 as quoted in Best, 1993)

Gusfield's emphasis is on the usefulness of constructionist theory to empirical case studies. In the same piece he writes that:

> [Constructionism] provides us with new questions about the emergence or decline of phenomena and/or definitions of phenomena... It raises questions about the nature of 'facticity' that heretofore sociologists have not routinely raised. (Gusfield, 1985 as quoted in Best, 1993)

Unfortunately, contextual constructionism often goes beyond discussion of how objective conditions fit into the definitional process and instead attempts to evaluate definitions in terms of the existence or non-existence of conditions. Some definitions become

labeled as warranted and others as unwarranted (Miller & Holstein, 1993) and the overall purpose of the research becomes to critique the disjuncture between conditions and definitions. The analyst either identifies a 'real' condition and then questions why definitions have failed to emerge to describe it or identifies a 'false' condition and then attempts to account for the discourse claims-makers have produced to 'create' it. Surely such strategies fall quite a bit outside of Spector and Kitsuse's original formulation.

This dissertation takes a middle ground between the strict constructionists with their exclusive focus on the language of social problems and those contextual constructionists who evaluate definitions in terms of the existence or non-existence of objective conditions. While making no attempt to assess whether or not the definitions that have arisen around GCC are justified in terms of the objective status of the condition, I am interested in showing how the sensible or potentially sensible manifestations of the alleged condition may affect the definitional strategies employed by claims-makers. These ideas are especially relevant to discussions of environmental problems many of which are potentially available to direct experience. Studies of community response to toxic waste for example show that the experiential properties of the chemicals in question play a role in the local response to their discovery (Fitchen et al., 1987; Fowlkes & Miller, 1987). In my view, these features are at least partially implicated in the emergence and management of definitions. One question for this study therefore, is the impact of GCC's objective features[8] on the typifications claims-makers are able to develop.

More important however, this dissertation emphasizes the social context within which claims about GCC are lodged. By social context here I am referring not only to the somewhat amorphous 'structure of

[8] It might be better here to use the phrase 'putative object features' since such terminology would not privilege claims-makers descriptions of the condition.

feeling' characterizing the period in which particular claims arise (a question I do cover in great detail) but also to the detailed situation of the claims-making organizations that become involved in definitional activity. Such questions are key to the development of the sort of 'natural history' of claims-making that Spector and Kitsuse call for in their original formulation of the constructionist approach. Yet the empirical literature produced within the paradigm often leaves the impression that claims arise spontaneously from a pre-existing pool of conditions. Privileging the agency of claims-making entrepreneurs who periodically agitate for their recognition, such a view assumes conditions to be relatively stable over time. As Woolgar and Pawluch (1985) point out, such a position represents the covert insertion of conditions into an analysis since it assumes that conditions are constant (as opposed to getting worse or getting better).

The social and institutional context within which definitions arise not only influences their emergence but also the forms they take. For example, as I show later in this work, the tendency to discuss GCC in terms of the energy inefficiency it represents is closely tied to the increasingly rationalized nature of all environmental discourse. As I will argue, this rationalization is tied both to the extant political climate around the time GCC emerged as an issue and to the institutional trajectory of the environmental movement organizations that adopted the issue as their own. Different organizations in different periods would have developed the issue in different rhetorical domains.

The absence of much discussion of the rhetorical dimension of claims-making is another problem a number of constructionists have commented upon. Best writes (1987, .p 114): "Most constructionist research pays little attention to rhetoric, focusing instead on substantive matters— the recognition of problematic conditions, the interests of claims makers and those they address and so on. In comparison, the construction and presentation of claims themselves

seems relatively unimportant." This surprising neglect of the construction of meaning or "sense" is problematic for a number of reasons. As Schneider (1985) points out, definitions are logically prior to social problems activities since calls for action towards a condition demand, at least initially, that the condition be typified as a problem. If we follow along with the constructionists and come to view conditions as themselves irrelevant, then the process through which they come to be viewed as "problems" seems the thing on which to focus in empirical research.

Increased attention to social problems rhetoric provides other kinds of opportunities as well. Although very much outside of constructionist theorizing as it is presently constituted, a focus on definitions provides a wonderful opportunity for reading culture from social problems discourse. A focus on the description of particular social problems constructions and perhaps an aversion to social criticism within mainstream sociology has precluded any discussion of such matters. Ibarra and Kitsuse's (1993) re-formulation of social constructionism places greater emphasis on the ways in which claims come to signify larger moral discourses and as such they leave open the possibility for broader social interpretation. Again however, their emphasis is on the development of a general theory of social problems discourse and therefore never strays too far from that which bears directly upon this effort. The present analysis on the other hand holds "the stories people tell themselves about themselves" (Geertz, 1973) to be primary and views social problems claims-making as an ideal tool for describing taken-for-granted features of the contemporary moral order. Discussion of these matters runs throughout the work although it is addressed most explicitly in the concluding chapter.

A number of these criticisms come together in a study by Ungar (1992) which examined the rise and subsequent decline of GCC as a social issue in the United States and Canada. Adopting the public arenas model of social problems proposed by Hilgartner and Bosk (1988)

Ungar notes that despite earlier activity by claims-makers, GCC moved onto the social agenda only after the unusually hot summer of 1988 made the issue a part of public discourse. Because it was so out of the ordinary, the heat and drought of that summer demanded explanation. In searching for such explanations the media, for reasons relating primarily to the requirements of news production, picked up on the already existing interpretive packages put forth by GCC claims-makers. But these accounts were not accepted merely on the basis of their availability or rhetorical power. They were accepted because, as Ungar points out, they resonated with a broader set of claims and with certain underlying cultural anxieties. In this instance those themes were the same ones raised in the early 1970s with the advent of the environmental movement and related to the troubling notion that humanity was irreparably damaging the biosphere. The larger point here is that the career of a claim depends not only on the effectiveness of those sponsoring it but also on its sensible features— to the extent that these features make a situation plausible to the public and the media— and the extent to which the claims resonate with underlying cultural and other concerns. The power of Ungar's analysis is that it follows both components of the GCC problem and in so doing provides a thorough outline of the issue as it developed.

In sum, this research argues that the practical features of a condition and the context within which claims about it are lodged provides the moral and experiential universe within which claims-makers are constrained and enabled to develop definitions. Although such considerations are seemingly at odds with constructionism's refusal to say anything about conditions, I can see nothing in such a position that contradicts the basic tenets of the paradigm. So long as the focus remains exclusively on definitions and the processes through which they are formed there should be little to complain about. As Giddens (1984) and others point out, consideration of the experiences of individual actors and the structures within which they operate need

not lead to the sort of blind functionalism about which constructionists, and other interactionist sociologists, are so critical.

Summary- The Goals of this Research

The central goal of this research is to address, through the study of a particular empirical example, some of the issues raised in the preceding critique. Specifically, this research aims to examine the ways in which global climate change has been constituted as a social problem by claims-makers concerned with moving the issue forward on the social agenda. These claims-makers include persons active in the environmental movement, political figures with environmental agendas, and scientists active in promoting GCC hypotheses. The study follows closely that laid out by the constructionists in that I examine written artifacts produced by claims-makers including testimony, newspaper articles, speeches, position papers, policy summaries, books, films, exhibits, pamphlets, and other ephemera. My purpose here is to develop an understanding of how GCC has been typified by claims-makers whose task it is to overcome the difficulties of establishing the definition of the situation they propose. This in turn will require an understanding of how claims-makers go about the business of establishing the "facts" of GCC, how they connect these facts to one another, the sorts of "readings" they give to these facts and how they relate them- if they do- to a broader set of issues and agendas. In a word, this study seeks to understand how GCC claims-makers <u>make</u> and <u>manage</u> language and rhetoric in their effort to define GCC as a problem about which we should be concerned.

Prior to this discussion however, I address some of the features of the social and political context within which GCC emerged. Three chapters are devoted to a discussion of these questions. The first of these is concerned with the development of GCC science, and, more generally, with the growth of interest in climate and climate change

among policymakers outside the environmental movement. Here I show that environmental movement organizations were relatively late in coming to an interest in GCC despite scientific work on the problem dating back to the late 1950s. While the unusual weather that occurred in North America in 1988 is normally held to be the defining moment for GCC's emergence as a public issue, events, in particular the resource crises of the 1970s first introduced climate and climate change to policymakers in the nation's capital.

Following this discussion I lay out, in two chapters, a history of American environmentalism in order to explore the context within which environmental claims are made. The first of these chapters sketches out the major themes of the environmental narrative as it has developed over the last century and a half (it obviously represents a significant abridgement of this history). The second offers a more detailed history of contemporary environmentalism since the early 1960s paying particular attention to the transformation of environmental discourse in the years following the first Earth Day in 1970. These transformations as well as the immediate social and political context of the early to mid 1980s provide the specific field within which GCC claims emerged. Both chapters are based primarily on an analysis of secondary sources although the second one also makes use of original material, particularly from the later years. From this discussion I move on to the central concern of this work, an analysis of the content of GCC claims. The concluding chapter ties the position of the movement when GCC claims arose to the form those claims took and offers a contextualized understanding of the rhetoric claims-makers developed.

Significance of this Research

- First, an account of the GCC movement is in itself valuable as part of the historical record of the late twentieth century. In bringing together the materials I have, this research provides documentary evidence of the activities of the GCC movement in particular, and

environmental and other social problems organizations in general as they attempt to establish and pursue their agendas.

- Second, this study analyzes factors in the larger structure of feeling, to use Raymond Williams' term, that afforded (and constrained) the emergence of GCC as an issue both for scientists, policy makers and environmental movement claims-makers across a period of some three decades.
- Third, I offer an analysis of the sorts of discourses created by the various sectors of the environmental movement and tie them to the movement's political position at the time in which they developed. Put differently, this research juxtaposes the discursive culture of the movement— what it said and how it said it— with the political and organizational factors that influenced its creation around the time it picked up GCC as an issue. In so doing, I document the emergence of a new sort of environmentalism quite different from earlier environmentalisms and from popular understandings of the organized environmental movement.
- Finally, this thesis moves the social constructionist approach to social problems forward by demonstrating the ways in which contexts and objective conditions constrain and enable the claims that emerge about a particular social problem. My overall goal here is to offer a demonstration of what a constructionist analysis of a particular social problem might look like if it was sensitive to the issues raised in my earlier critique.

History of GCC Science

Introduction

This chapter lays out a view of the social context within which global climate change emerged as an issue. Unlike many of the "problems" typically discussed by social constructionists, discourse on global climate change emerged from the work of physical scientists and developed over a relatively long period of time. In addition, the issue was moved forward by a variety of different types of claims-makers including those located in the environmental movement, science, and various sectors of the government. In this chapter, I trace the paths the issue took through the scientific, and to a lesser extent, governmental sectors, and explore the ways in which anthropogenically induced increases in CO2 developed from a theoretical curiosity into a social problem. The background to this development, the larger social context within which it operated, is also a subject of this chapter since it was this context that provided the interests scientists and policy makers sought to advance. In what follows I 1) discuss the development of climate change science; 2) trace the history of attempts at making a "problem" of its findings; and 3) explore the intensification of state interest in climatology and scientists' success in gaining a seat at the policy table. A chronology of significant events in the history of GCC science and policy is appended at the end of this dissertation (appendix 2).

GCC Research Prior to 1960

Dating the beginnings of interest in the relationship between CO2 and climate is difficult since the subject has been picked up and then

dropped by a variety of scientists for nearly two centuries. First mentioned by the French mathematician, Jean-Baptist Fourier in 1824 and then demonstrated experimentally by John Tyndall in 1861, the thermal properties of CO2 have been discussed not only in the abstract or in terms of the possibility of anthropogenic climate change but also as a possible factor in paleoclimatic shifts. The important question for this research however is not so much when scientists first began speculating about the CO2 question but rather when, why and how they developed sustained interest in the question. The genealogy of contemporary interest in GCC is traceable back to the 1950s when scientists made a number of strides, both technical and conceptual, that enabled the development of GCC science. These included advancements in fluid mechanics and theoretical meteorology, the development of an intellectual structure which allowed systematic analysis of the atmosphere over relatively short intervals of time[9], the realization that growth in fossil fuel consumption was exponential rather than linear, and improvements in scientists' ability to resolve the infra-red absorption spectrum of CO2 (Victor & Clark, 1990). Hart (1992) points out the importance of the global integration of science—particularly significant in the earth sciences which by their very nature require international cooperation; developments in computer technology; and, important mostly later on in the history of the issue, an expansion of the role of technical experts in policy making. These developments in scientific theory and methodology of course took place within the set of larger structural changes that characterized the period between the end of the first world war and the 1950s. Foremost among these was the development of nuclear weaponry which made possible

[9] Victor and Clark (1990) note that a major shift in ideology occurred in the sciences around the time interest in GCC was reinitiated. This shift involved a move away from a belief in the temporal uniformity of nature towards one which sought to understand shorter term processes. In the case of the climate change issue this entailed a rejection of the notion that climate changed only over geologic time scales.

the realization that human action could have significant global effects.

Sustained interest among scientists in the CO2-climate connection can be traced back to the mid 1950s beginning with the work Gilbert Plass who is credited with reviving research on CO2 induced anthropogenic climate change (Victor & Clark, 1990, p. 15). Plass' work was the first to make use of new knowledge about the infra-red absorptivity of CO2 and also the first to employ a digital computer to calculate the effects of different levels of the gas on temperature. His analysis, which predicted that a doubling of atmospheric CO2 concentrations would yield a 3.6 degree Kelvin increase in global temperatures, was used to support a CO2 based theory of paleoclimatic shifts and to present a quantitative hypothesis about the possible effects of fossil fuel consumption on contemporary climate. Plass' work was further refined by Kaplan in 1962 and Möller in 1963 (Victor & Clark, 1990) both of whom developed more complex models that took into account the role of water vapor in atmospheric heat transport. The two models are important to the development of contemporary GCC research because, through their shortcomings, they posed the problem which in part led to the development of the global circulation models (GCMs) which now dominate research in atmospheric science.

The "Great Geophysical Experiment"

The paper most often cited as initiating contemporary interest in CO2 and climate appeared in 1957 in Tellus, the journal of record in geophysics, as part of a series of articles on the global carbon cycle. Co-authored by Roger Revelle and Hans Suess (1957), both then at the Scripps Institution, the paper examined the processes through which CO2 cycled between the atmosphere and the ocean. The question of element cycling was a basic one for oceanographic and atmospheric science around the time the papers were written although the support it received from the Office of Naval Research and the Atomic Energy

Commission was undoubtedly related to interest in the distribution and "uptake" of radioactive fallout from weapons testing. Earlier in the decade, Suess published two papers which found that the combustion of fossil fuels diluted the natural concentration of atmospheric carbon 14 since it released ancient carbon[10]. The purpose of Revelle's and Suess' 1957 research was to attempt to account for why the concentration of C-14 was not even lower than observed and looked at the role played by the oceans as a reservoir for the excess carbon. Victor and Clark (1990, p. 22) note that variations in this sort of "box modeling" approach (one in which carbon is said to flow from one reservoir or "box" to another) remain to the present day. The role of the oceans in particular continues to interest atmospheric scientists and persists as an area of substantial controversy. My point in detailing this bit of science however is to show that during the 1950's, interest in atmospheric CO2 had little to do with concerns about anthropogenic climate change. Carbon dioxide was studied not for its effects on climate but rather as a marker for carbon, which was the focal interest.

While not denying the contribution of this 1957 work, Handel and Risby (1992) note that its importance results more from the subsequent role played by one of its authors, Roger Revelle, in promoting the CO2-climate connection outside geophysical science. Perhaps even more important in explaining the article's longevity is its ominous and oft quoted statement:

> ..human beings are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries, we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years (Revelle & Suess, 1957, p. 19).

It is interesting to speculate about whether or not the author's contemporaries would have found the prospect of a "great geophysical

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[10] Ancient carbon contains no C-14 because, with a half life of 5,780 years, the isotope has completely decomposed.

experiment" threatening. Would it have resonated with the just under-the-surface fears engendered by atomic bomb testing, tied in the popular imaginary to incidents of unusual weather?.

The point here however is that those working on CO2 did not raise any sort of alarm. Revelle for example, did not view the "great experiment" as a threat. The passage above continues: "The experiment, if adequately documented, may yield far-reaching insight into the processes determining weather and climate. It therefore becomes of prime importance to attempt to determine the way in which carbon dioxide is partitioned between the atmosphere, the oceans, the biosphere and the lithosphere" (Revelle & Suess, 1957, p.19). This enthusiasm appears again in the following year when Revelle appears before Congress to lobby for support for the CO2 monitoring program at the Mauna Loa Observatory in Hawaii (Hart, 1992).

Interestingly, a subtle shift is apparent in a 1965 report about the "great experiment" bearing Revelle's name: "Through his worldwide civilization, Man is *unwittingly* conducting a vast geophysical experiment. Within a few generations he is *burning* the fossil fuels that slowly accumulated in the earth over the past 500 million years [both my emphasis]" (President's Science Advisory Committee, 1965, p. 126). In 1956 Man was conducting an experiment that involved "returning" carbon to the atmosphere whereas in 1965 the experiment was "unwitting" and involved not "returning" carbon but "burning" it. Admittedly these are small differences but they are illustrative of my larger point since the passages are otherwise identical. There will be more to say about this 1965 report below since it represents an almost sea change in outlook that goes well beyond this simple alteration of phrase. The point here is to provide a contrast to the ways in which the CO2 situation was typified in its early years.

Another key piece of the early scientific story was the program of CO2 monitoring instituted in 1958 under the auspices of the

International Geophysical Year. Although the monitoring effort was run from the beginning by Charles Keeling, the driving force behind it was Roger Revelle, Keeling's mentor at Scripps who first mentioned the desirability of such a program in his famous 1956 paper. The primary goal of the monitoring program was to answer a number of questions about carbon cycling between the atmosphere and the oceans and the role of the biosphere as a reservoir for atmospheric carbon[11]. Significantly however, Keeling's work was *not* meant to chart long term trends in atmospheric CO2 concentrations which, as I have pointed out did not become a worry until some time later. Yet as Victor (1990, p. 28) points out the importance of these observations derives from the fact that the multi-year trend they uncovered represents one of the few incontrovertible certainties in the greenhouse debate. Indeed, it is this trend, and not the finding about biospheric cycling that has endured in GCC claims-making discourses whether produced by lay people or by scientists. In this way Keeling's data is probably the piece of science most responsible for the development of GCC concern.

Summary- Climate Change as Opportunity

The point here and more broadly the point of everything I have said about GCC science in the 1950s is that it did not take the form it did because scientists were concerned about the possibility of anthropogenic climate change. Such change was discussed, but more in terms of the opportunities they might offer for testing and further refining geophysical theory. These included questions about the carbon cycle, the areal distribution of isotopic carbon from nuclear tests, and paleoclimatic change. This began to change with the development of environmentalism in the late 1960s and early 1970s.

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[11] Atmospheric CO2 levels vary with the annual cycle of plant growth. During the growing season, CO2 is absorbed by plants lowering atmospheric concentrations. In the winter the cycle is reversed. Plant decay produces CO2 and atmospheric concentrations of the gas rise.

GCC Science and Policy 1960-1970

Developments in the Scientific Sphere

Perhaps the most important development in the history of GCC science to occur in the 1960s was the growth of interest and expertise in supercomputer[12] modeling of atmospheric dynamics. According to Hart (1992), advances in climate change science during the 1960s revolved mostly around institution building and technological development. In 1960, in large part because of a perceived shortage of academically trained meteorologists, the National Science Foundation established the National Center for Atmospheric Research (NCAR) in Boulder, Colorado (Karin & Smith, 1987, p. 129). Over the years, NCAR has gone on to become one of the most influential centers for climate change research both because of the atmospheric modeling work done there and because of an institutional structure which encourages the work of visiting scientists (Victor & Clark, 1990, p. 35). In the same year, the U. S. Weather Bureau institutionalized its own interest in modeling with the establishment of the Geophysical Fluid Dynamics Laboratory (GFDL) in Washington, D.C. (the GFDL subsequently moved to Princeton). The establishment of both these centers is significant in part because they helped to create an institutional base for GCC research but more so because of the type of research they became known for— supercomputer modeling of atmospheric circulation.

The history of this sort of modeling in science is a fascinating one in itself since the growth of this technology ushered in an entirely new way of doing science which may lead to a new understanding of scientific epistemology. In a word, supercomputer modeling creates a virtual world based on the series of equations said to govern the system under study be it the atmosphere, an ecosystem, or the universe

[12] The term "supercomputer" is a misleading one to the extent that it suggests the notion a special kind of computer, perhaps one having a particular type of architecture. In fact a supercomputer is just the most advanced type of machine available at a given time. The misappelatation is interesting in itself of course since it suggests not just power but a special kind of power.

at the moment of creation. Such models allow scientists to test the ways in which a system responds to changes in these equations (which represent a change in the way in which the system is understood) and to changes in the values that specify the conditions under which the system operates (different inputs for example). In the case of supercomputer simulation of global circulation, this involves the creation of a model in which the equations describing the behavior of parcels of air (as they are differentially heated and cooled according to the degree of sunlight they receive) are solved at many points around the globe simultaneously and then through a series of iterations over time. Once the model is created, experimentation involves altering either the equations that are used (essentially altering the features of the system) or the values fed into them, for example, the level of CO2. In essence this opens up to experimentation, a realm of phenomena not ordinarily confinable to a test tube or observable in nature.

Interest in global atmospheric modeling has its roots in the efforts at numerical weather prediction initiated by John von Neumann, one of the most important mathematicians of the twentieth century and the father of modern computer architecture. In a sense, weather prediction presented an ideal problem for someone interested in both mathematics and computing. First, the basic laws governing the behavior of the system involved were known, as I have already noted, by the mid-1950s. Second, since the problem involves solving a set of identical equations at many points around the globe and over time, it lends itself to the sort of iterative processing at which computers so excel[12]. Finally, it

[13] Kaufmann and Smarr (1993) describe a "human" supercomputer envisioned by Lewis Fry Richardson in his 1922 book *Weather Prediction by Numerical Processes*. "Richardson's computing factory consisted of 64,000 people seated in galleries in a huge spherical room. A map of the Earth painted on the walls defined the computational mesh with a spatial resolution of one degree. Each grid zone was assigned to a single person, who calculated the state of the atmosphere at his or her own grid point using data provided by the nearest neighbors. A conductor, much like that of an orchestra, was responsible for

is a problem likely to spur the interest of funding agencies given its practical implications. Although the models developed to study short term weather are different from those designed to study climate the basic problem is the same. In order to approximate a continuous three dimensional atmosphere both must compute the equations of fluid dynamics and radiative absorption at a large number of discrete points around the globe. The more points the model uses, the more it approximates the real atmosphere. At the same time however, more points require more calculations making the whole project highly dependent upon the speed at which the computational machinery operates. By the mid 1960s computing technology had developed to a point where realistic simulations were possible.

In 1967 Suruhyro Manabe and Richard Wetherald both of the Geophysical Fluid Dynamics Laboratory at Princeton (GFDL), developed what many (Handel & Risberg, 1992; Victor & Clark, 1990) refer to as the first climate model which holds up to modern scrutiny. In some ways this model represents an extension of Möller's work which in turn is a refinement of Plass' research on the radiative properties of CO2. Strictly speaking, the Manabe and Wetherald model was not a global circulation model (GCM) since it represented the atmosphere in only one dimension (the vertical). Nonetheless it is heralded as the beginning of modern modeling studies since it was based in part on earlier studies at the GFDL including GCMs (Victor & Clark, 1990) and represented the culmination of seven years of work on the general problem of atmospheric circulation and the global radiation budget. The model predicted a 2.3 degree Kelvin rise in temperature for a doubling of CO2, a figure very close to more recent predictions based on the results of contemporary GCMs. Again however, like so much early work on the CO2-climate connection, the Manabe and Wetherald model was

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synchronizing the calculations. Instead of waving a baton, the conductor would shine a rosy beam of light on those people who were ahead of the rest, and a blue beam on those who were behind" (p. 176).

not intended specifically to test the effects of changes in CO2 levels on actual global surface temperatures. The focus was on global circulation and the radiation balance and not on climate. Variations in CO2 were run only to explore the model's sensitivity to such perturbations. Therefore, its importance in the CO2 debate came later. This finding supports Hart and Victor's (1993) contention that climate research only became oriented towards the social problems aspects of anthropogenic CO2 after policy makers, spurred on by entrepreneurs within science, became involved in the issue.

GCC Discourse in the 1960s

By the middle of the 1960s, basic interest in the role of CO2 in climate had been established although the science involved was still in its infancy. Despite an attempt by Roger Revelle to generate government interest in CO2 research on the grounds that a warmer world could benefit the Soviet Union, scientists were fairly inactive when it came to lobbying for research money for the study of anthropogenic climate change. In 1963 however, the Conservation Foundation, held a one day conference entitled Implications of Rising Carbon Dioxide on the Atmosphere. Although this meeting represents the first formal occasion in which the connection between CO2 and climate was presented as an environmental issue in a forum sponsored by an environmental organization, its significance to the development of the issue was limited. Global climate change did not become an item on the agenda of the Conservation Foundation or any other environmental group until much later on. What makes the conference interesting however is the degree to which it provides insight into the development of scientific and popular understanding about what GCC is. The report opens with the statement that:

> Carbon dioxide is not a pollutant in the ordinary sense. It is colorless and odorless. It has no immediate nasty effects. Even the largest amount likely to accumulate in the atmosphere if the entire reserve of fossil fuels were burned, would not be detrimental to the existence of life; in fact, plant life would be more luxuriant. It is an inevitable product of combustion and

> cannot be filtered out or precipitated out. Ordinary pollutants are washed out of the atmosphere after a month or so; carbon dioxide will continue to accumulate as long as fossil fuels continue to be burned at present rates.... It seems quite certain that a continuing rise in the amount of atmospheric carbon dioxide is likely to be accompanied by a significant warming of the surface of the earth... (Eichhorn,, p.1)

Implicit in this discussion are beliefs about what sorts of things constitute pollution and about what is (and is not) inevitable. With almost crystal clarity this passage illustrates exactly the difficulty early claims-makers had in convincing themselves and others that atmospheric CO2 levels were a problem. These difficulties were not resolved until at least a decade later.

Some of these sorts of definitional concerns were addressed two years later in a report issued by the President's Science Advisory Committee (PSAC) entitled *Restoring Quality to Our Environment* (1965). The report dealt with a variety of environmental issues including CO2 induced climate change but more importantly it laid out a typifictory framework within which to talk about the issue of pollution in general. The PSAC report is remarkable for a number of reasons including the breadth of issues it covered (everything from pesticides to noise pollution to the need for more park lands); the sorts of solutions it proposed (for example environmental impact statements for large public works projects— The National Environmental Policy Act with its Environmental Impact Statement requirements was still five years away); and the way in which it understood how basic aspects of American life— automobile use for example— degraded environmental quality. Its prescience in identifying emerging environmental problems stemmed precisely from the definitional work it undertakes at the outset. This work, which is still fully relevant today, makes PSAC one of the most important documents in the history of modern environmentalism:

> Environmental pollution is the unfavorable alteration of our surroundings, wholly or largely as a by-product of man's actions, through direct or indirect effects of changes in energy patterns, radiation levels, chemical and physical constitution or [the over] abundance of organisms. These changes may affect man directly or through his supplies of water and of agricultural and other biological products, his physical objects or possessions, or his

> opportunities for recreation and appreciation of nature. Huge quantities of diverse and novel materials are dispersed, from farm and city alike, into our air, into our waters and onto our lands. These pollutants are either unwanted by-products of our activities or spent substances which have served intended purposes. By remaining in the environment they impair our economy and the quality of our activities...threatening the health, longevity, livelihood, recreation, cleanliness and happiness of citizens who have no direct stake in their production but cannot escape their influence (President's Science Advisory Committee, 1965, p. 1).

The impact of the PSAC report at the time is not clear although in the years following its release many of its core recommendations (and understandings) were acted upon. In some sense it may have served as a blueprint for environmental legislation passed in the first years of the decade that followed. Although the PSAC report is not often cited as a source in the history of modern environmentalism, it is mentioned in a number of historical treatments of climate change. On one level, the report is important to the history of GCC because it represents the first time the issue is discussed as an environmental problem in an official document produced by a governmental entity. The chapter devoted to GCC introduces the CO2-climate connection, details recent increases in the gas with reference to the data collected by Keeling at Mauna Loa, outlines the probable future trajectory of CO2 due to growth in fossil fuel use and offers a number of predictions, having mostly to do with the effects of rising sea levels, about the world under global warming. On this last point, the authors do not seem at all alarmed by the prospect of a warmer world nor do they seem to really grasp the human consequences of the one or two effects they note. They write, quite matter-of-factly:

> The melting of the Antarctic ice cap would raise sea level by 400 feet. If 1,000 years were required to melt the ice cap, the sea level would rise by about 4 feet every 10 years, 40 feet per century. This is a hundred times greater than present worldwide rates of sea level change. (President's Science Advisory Committee, 1965)

Nowhere here are the kinds of diluvian images we see later on in discussions, even those by scientists, of sea level change. An explanation for this lack of concern is difficult to come by. It could

have been edited out by the authors who, as scientists, might not have wanted to present too alarming a picture. Or, for much the same reason, it may have never occurred to them. Alternatively, they may not have really believed it themselves.

Significantly, the PSAC report is the first document one can look at which defines CO2 as a pollutant. It is mentioned alongside of air pollution, water pollution, and pesticides in the first chapter of the report "The Effects of Pollution" and then again, albeit only briefly, in the recommendations chapter. Here, the report calls for continued monitoring of the CO2 content of the atmosphere, the development of a program to monitor CO2 in the stratosphere and further research on the carbon cycle in order to understand how anthropogenic CO2 might be absorbed. The PSAC report is therefore prescient on this front as well. At least through the early 1980s, recommendations about what to do about atmospheric carbon dioxide involved calls for more research. But then the committee assembled to write the CO2 chapter consisted of Roger Revelle, Wallace Broecker, Harmon Craig, Charles Keeling and Joseph Smagorinsky, all of whom were already invested in exactly this kind of scientific work.

Summary- The beginnings of a redefinition of anthropogenic CO2

The 1960s was primarily a decade in which interest in CO2's role in regulating climate continued as a routine area of scientific work. In terms of the development of this science, the most significant trend of the decade was probably the growth of super computer modeling of global atmospheric circulation. This sort of modeling enabled climate scientists to perform 'experiments' on the global atmosphere altering the concentrations of its various elements at will. Although a temperature increase was the result when these 'experiments' involved CO2, the consequences of anthropogenic climate change were never pursued since it was not at all focal for the scientists involved in producing (or more accurately, refining) the knowledge. Despite the

efforts of individuals like Roger Revelle, Hart and Victor (1992) argue that scientists during the period were primarily concerned with establishing independent research institutions free from the sorts of federal oversight often associated with federally funded applied research. They had little reason, in other words, to tie their work to the social problems aspects of what they found. More than that, it may simply be the case that the majority of the scientists associated with climate research had trouble conceiving of CO2 as a pollutant, tending rather to see it as a 'natural' product of industrial society. Related to this, their technological optimism may have led them to believe that if human activity could cause it, human ingenuity could reverse it.

The sorts of shifts in the definition of pollution that began with PSAC report and were extended and institutionalized with the reemergence of the environmental movement in the 1960s, while important to the rhetorical work needed to define anthropogenic CO2 as a pollutant, were not a sufficient condition for moving the question of climate change into the policy limelight. Next to more immediate environmental concerns, not to mention the myriad of other issues that characterized this unusually turbulent period, global climate change failed to attract potential claims-makers or to motivate sustained claims-making activity. During the decade there were no issues to which climate or climate change were relevant. By the middle of the next decade however, this was to change. As events on the ground and within the larger discursive context[14] led to renewed concern with the question of resource supplies, climate became, or rather could be presented by claims-makers as germane to issues of public concern. These changes are developed in the next section of this work.

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[14] I am referring here to events such as the United Nations Conference on the Human Environment held in Stockholm in 1972, the findings of the various reports put out by the *Club of Rome* and more generally to the re-emergence of Malthusian beliefs about the limited carrying capacity of the Earth.

GCC Science and Policy 1970-1980

Developments in GCC Science

It is difficult to find any major breakthroughs in the science of climate change during the 1970s. The decade was essentially one in which earlier research programs were continued (Keeling's CO2 monitoring for example) and earlier predictions re-examined and further refined. Much of this re-examination occurred formally, under the auspices of various distinguished panels and blue ribbon commissions put together by the National Academy of Sciences, the National Research Council, and the Department of Energy. In some instances these efforts came about because of direct requests from governmental bodies. This is not to say however that GCC science stalled in the 1970s, far from it. One of the most significant developments during the period was the discovery, in 1975, of the role played by cholorofluorocarbons (CFCs) in climate change. Already implicated in stratospheric ozone depletion, Dr. V. Ramanathan of NASA demonstrated that this class of substances absorbed infrared radiation at a rate that was 10,000 times more effective than CO2. At the same time, new methods for figuring historical sea surface temperatures, led to an increased awareness of the role of the oceans in maintaining global thermal equilibrium beyond whatever part they played as a sink for atmospheric carbon.

Victor and Clark (1990) point out the ways in which policy makers' interests affected the development of GCC science. For example, as the focus began to shift towards the question 'when will change occur?,' climate modelers had to begin to understand the work of the carbon cycle people since their research looked at how carbon was absorbed by various parts of the system and therefore specified how much was available for an enhanced greenhouse effect. These developments led to geometric increases in the complexity of the models used by climate scientists since they required the solution of more equations at more points around the globe. Whether driven by the needs of policy makers or the desires of scientists for greater precision, the newer models

required improvements in computing power and the development of expertise with modeling as a way of doing science. The former was provided by dramatic increases in raw computational speed and improvements in the techniques for harnessing it. The latter was largely a matter of the accumulation of experience with modeling as a way of doing science.

By 1979, in addition to the GFDL (Global Fluid Dynamics Laboratory) and NCAR (National Center for Atmospheric Research) models, there were models either in existence or under development at NASA's Goddard Institute for Space Sciences, RAND Corporation, UCLA and in Great Britain, under the auspices of the United Kingdom Meteorological Organization. As was the case four years earlier, Manabe and Wetherald's 1975 model (MW75) was particularly important. Again developed under the auspices of the GFDL, it was the first global circulation model to portray the atmosphere in three dimensions. Significantly, it was the first model to incorporate a role for the oceans and equally important, the first to integrate feedbacks which both accelerated and retarded warming. Manabe and Wetherald's 1967 one dimensional GCM included the effects of warming on cloudiness, believed to be a negative feedback since cloud cover reflects sunlight back into space[15], and on humidity, believed to be a positive feedback since water vapor is itself a greenhouse gas. Their 1975 model however also includes an ice-albedo feedback. As ice melts and the ground underneath it is exposed to sunlight, surface albedo or reflectivity, is diminished and more solar energy is absorbed. This feedback is a positive one.

Although the use of computer modeling in GCC science is traceable back to Plass' first computation of the warming effects of increased CO2 and extends to the present day, this may be a good place to note what impact modeling may have had on the development of GCC science.

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[15] High altitude clouds however are thought to enhance warming so the distribution of clouds is obviously important.

As I noted earlier, climate modeling essentially involves the creation of a virtual atmosphere governed by the laws of fluid mechanics and solar energy absorption which evolves from a set of initial conditions specified by the modeler. These initial conditions include, but are not limited to, particular levels of the various greenhouse gases. Once created, such models give atmospheric scientists the ability to conduct experiments on the system that could obviously not be conducted on the real atmosphere. These include varying the conditions under which the models run (changing the inputs) and altering the underlying processes that structure the system (for example through the addition of additional feedback mechanisms). Given the importance of this way of doing science, a question arises about whether or not GCC could have emerged as an issue without the development of modeling. Similarly, it opens up a question about whether or not modeling would have developed without phenomena like GCC to study. Both questions are difficult to answer since it is impossible to account for events that did not occur.

While the relationship between CO2 and warming was established theoretically and experimentally well before the advent of computer modeling and has since been verified in ice core studies of paleoclimate, important questions about the degree of warming, its geographic distribution and its time of onset, probably could not have been answered without the work of the modelers. This is true primarily because of the complexity of the global feedback mechanisms that regulate climate. In other words, the idea of anthropogenic climate change could have existed without the models but not much could have been said about it. Without the models, climate change would have been even less real to policy makers and lay people and therefore would have had even less purchase on their thinking.

As I already indicated, atmospheric modeling did not initially develop around the question of climate change. Its early origins were in von Neumann's work on numerical weather prediction and then later in efforts to understand the earth's radiation budget. Even through the

mid-1970s, CO2 induced climate change was not the focal interest of the modelers who experimented with changing a variety of factors in order to test the overall sensitivity of the models to alteration. Still, modeling represented a new way of doing science and because of that, carried with it a certain amount of interest and prestige (Woodcock, 1994). Unlike their empiricist colleagues who probed an existing world, the modelers were in the business of creating new worlds, ideal worlds, made up of materials that behaved with perfect fidelity to the laws of fluid dynamics. To what degree did the desire to be part of this new approach influence the choices made by atmospheric scientists in selecting problems to study? Put differently, to what extent did interest in a particular technique drive interest in the questions it was best suited to answer? Answering these questions requires a more thorough-going analysis of the institutional history of atmospheric science than is possible here. Such a study would entail the assembly of detailed genealogies of GCC and computer modeling research from oral history interviews with the scientists involved and from a study of the published scientific literature. Given the profound changes in scientific methodology that computer modeling represents it is remarkable that no such studies yet exist.

The Development of Impact Science

My discussion of GCC science has so far focused on developments in climatology and oceanography. By the mid 1970s however a whole range of scientific disciplines became involved in studying the impacts of the warming projected by the climate modelers. This research consisted for the most part of impact studies although social science research meant to refine predictions of the growth of CO2 production as a function of fossil fuel consumption was also published. At first, the impact studies focused primarily on questions of the food supply, a widespread concern because of a series of crop failures and famines which occurred in the early 1970s. The range of journals publishing these studies, from *Development Forum* to *American Biology Teacher*,

reflects the extent of this concern. If we extend the time period in question through the end of the following decade however, the number of potential impacts reported in the literature grows by several orders of magnitude. In essence these articles take the degree of warming projected in the output of a climate model and use it as an input in a model describing some other system said to be affected by climate. A review of articles listed by *Environmental Abstracts* between 1977 and 1990 under a heading related to climate change found literature concerned with the effects of global warming on coastal zone management, hurricane intensification, fiber production, water levels and commercial shipping on the Great Lakes, municipal water use in the Great Lakes, the thermal structure and cycle of Lake Michigan, dissolved oxygen in Lake Erie, freshwater inflow into San Francisco Bay, water resources in the Great Basin region, tropical forests, boreal forests, silver firs in the Vosges Mountains, the Pacific Northwest's timber industry, forest fires, range lands, salmon fisheries, great lakes fisheries, coastal stripped bass, large mouth bass, white perch, the sea lamprey, Great Lakes fishing, brook trout, valley glaciers, bio-diversity, wildlife habitat, the oil industry, the agri-chemical industry, the Caribbean, Alaska, the Netherlands, South Queensland and the state of Texas. The growth of this sort of GCC science was institutionalized in a series of "impacts" conferences sponsored by the Department of Energy in the late 1970s and more recently with the advent of the National Science Foundation's Global Change Research Program.

On one level, my purpose in enumerating the range of topics covered by this impacts literature is to illustrate the ways in which global change science, beginning in the mid-1970s, expanded beyond climatology to other disciplines. It is the results of this expansion however that I want to focus on here. What effects did it have on the advancement of global climate change discourse? On the one hand this expansion meant that the GCC hypothesis became an interest of more people in the

society. More articles appeared about it the popular press, the community of interest expanded further, and most important, constituencies for the condition developed beyond those already established in atmospheric science[15]. In a sense the expansion of GCC research worked to lend support to GCC as a political cause.

At the same time, the development of impact science served to support the underlying climatology intellectually. In using GCM results as a basis for their work, impact scientists granted the work of the modelers a certain authority as facts about the world, the starting point for a new scientific work. Latour's (1987) idea of "black boxes" is instructive on this point. A black box is a statement about some property of nature which is accepted as non-problematic and about which there is widespread consensus. The box is black because the "fact" it represents is taken for granted, left unexamined, in subsequent scientific work. For example, Watson and Crick's model of the structure of DNA functions as a black box when it is used by geneticists working on the humane genome project. The theory of plate tectonics is a black box to geologists working on earthquake prediction. Both view the earlier science non-problematically. Each is able to begin new inquiry without the necessity of unpacking and re-establishing a starting point. When first introduced of course neither the double helix model nor the notion that the earth's crust was made up of a number of plates floating atop a liquid core was viewed non-problematically. Latour's question relates to the processes which transform "science in the making"— scientific claims, into "ready-made science"— scientific facts, and ultimately, tacit scientific knowledge. Part of this process involves consensus building among scientists during the early stages of a claim's life. Here, Latour reverses the

[16] The motivations behind some of these constituencies are dealt with in a humorous interview with "Dr. Grant Swinger," Director for the Center for the Absorption of Federal Dollars (Greenberg, 1988) who views the greenhouse effect as an opportunity for scientific entrepreneurs after superconductivity and competitiveness fizzled out in the middle 1980s.

naive belief that "scientists believe a new claim is a fact because it is true" to "a statement is true when enough scientists believe it." Latour also discusses the role played by subsequent citation in establishing the credibility of facts. He writes: "In order to be turned into a fact, a statement needs the *next generation* of papers... Statements, are much like genes that cannot survive if they do not manage to pass themselves on to later bodies" (Latour, 1987 p.38, italics in the original). This introduces a second duality: a claim is used because it is true/ a claim is true because it is used. If Latour's analysis is correct, and I believe it is, then impact science served to advance climate change science and in particular research on global climate modeling. In this way, the foundation of impact science, global climate change science, was further strengthened by the structure built on top of it.

Several features of the relationship between climate science and impact science differ markedly from Latour's conceptualization however. First, the temperature changes predicted by GCMs and used by impact scientists were nowhere nearly as well established as the claims Latour uses for examples in his discussion. In some sense it may not even be appropriate to think about the predicted temperature changes as scientific claims at all since the question of CO2 induced warming was not focal for the modelers when impact science got started. It did not, in other words, represent a scientific claim in the same way as Watson and Crick's model of the structure or DNA when it was first proposed in 1953. Second, the study of GCC impacts exists in wholly separate domains of science from the climatology upon which it is based. Climatologists were unlikely to be moved by citations of climate research in the impacts literature (to the extent that they are even aware them) and therefore references in that work do little to transform GCC predictions into tacit knowledge for them.

In using Latour then, it may be best to think of two domains of knowledge, one for climate specialists and another for other interested

scientists, policy makers and intellectuals. Impact studies supported the broader discussion but not the discussion within climatology, although this broader discussion may have further legitimized the work of climate scientists (it certainly helped them secure funding). Within this broader sphere, the impact research shifted the focus from a question that had not yet been answered definitively— what will the warming be— to one that asked, what will the impacts be. In the process, the fact that the original question had not yet been resolved was lost.

The Emergence of GCC as a Social Problem

The decade of the 1970s was probably the most important period in the history of GCC discourse since it was during this period that the issue of CO2 induced climate change was transformed from a scientific curiosity into a social problem. By the end of the decade both the legislative and executive branches of government had their own experts on GCC and leaders in both branches were at least aware of the connection between anthropogenic CO2 and climate. The transformation which occurred was based less on immediately antecedent developments in GCC science than on a series of crises in the global resource system and realizations about its sensitivity to climatic fluctuations. Parallel to these developments, the social changes wrought by the upheavals of the 1960s brought about a new activism within certain sectors of the scientific community. Individual and organized groups of scientists emerged who were not afraid to press social problems claims within the halls of power. The following section details these transformations.

Connecting Science to Social Problems

If Roger Revelle's famous 1957 statement about "a great geophysical experiment" marks the beginning of the CO2 issue, the 1970s marks its coming of age. First, it was during the seventies that scientists in the atmospheric studies community lost their reticence about thinking

of CO2 as a pollutant. This was not so much due to any particular breakthrough, although what scientists knew was much more thoroughly certified by the end of the decade, but rather because of the development a new conception of what the term pollutant might mean. More precisely, it became possible to think of a man-made substance with possibly harmful effects to the environment as a problem even if that substance did not fit the traditional definition of a pollutant. With respect to the CO2 issue, the definition of the situation changed. The radiative properties of the gas could be thought of not only as an inherent condition of its existence but as a problem. Towards the end of the decade the same thing happened with respect to toxic substances.

Broadly speaking, the shift in definitions was the result of the anti-authoritarian culture of the 1960s. More specific to environmental issues, the shift was related to the ways in which this culture led groups of scientists to question the institutions their work had previously served. Prior to the late 1960s, science existed in large part as an institution in the service of a larger establishment of corporate, government and military interests. Indeed, scientists saw themselves as part of the Establishment and aligned themselves with the interests of those they served. The social movements that came into being during the 1960s changed this first by challenging the legitimacy of those interests and then by taking over authority for social problems claims-making. To some extent we see this in the raft of environmentally oriented books published starting in the middle of the decade. The first and most influential of these of course was Rachel Carson's *Silent Spring* (Carson, 1962). This volume more than any other is credited with launching the contemporary environmental movement. Works by other scientists, Barry Commoner (1966; 1971), Paul Ehrlich (1968), Renee Dubos and Barbara Ward (1972), and Donella Meadows and colleagues (1972) for example, which came out around the same time, were also highly influential and indeed are still regarded as movement classics. These changes in the role of scientists were

institutionalized with the advent of two new environmental movement organizations in 1968 and 1969— the Environmental Defense Fund and the Union of Concerned Scientists. Perhaps not coincidentally, both were and continue to be active on the issue of global climate change.

The Union of Concerned Scientists (UCS) was founded by a group of MIT faculty and students in 1969 in large part as a reaction against the role scientists had played in the post-war military industrial complex and in particular the conflict in Vietnam. The group's founding statement laid out a set of five broadly based goals for the organization that would guide its activities. Specifically, the scientists proposed to examine government policy where science and technology play a significant role; turn research away from military technology and towards the solution of pressing environmental and social problems; encourage students to consider the implications of their work (particularly military work); express a determined opposition to the anti-ballistic missile, biological and chemical warfare technology and further development of nuclear weapons; explore the feasibility of organizing scientists and engineers so that their desire for a more humane and civilized world could be translated into effective political action. The group's founding statement offered a rationale for organizing scientists around public issues:

> Misuse of scientific and technical knowledge presents a major threat to the existence of mankind. Through its actions in Vietnam, our government has shaken our confidence in its ability to make wise and humane decisions. There is also disquieting evidence of an intention to enlarge our immense destructive capability.
>
> The response of the scientific community to these developments has been hopelessly fragmented. There is a small group that helps to conceive these policies and a handful of eminent men who have tried but largely failed to stem the tide within government. The concerned majority has been on the sidelines and ineffective. We feel it is no longer possible to remain uninvolved. (Union of Concerned Scientists, 1968)

UCS then, was about making science (particularly physical and engineering science) relevant to social concerns and vice versa, making social issues relevant to science. It was about asserting a role for

scientists as worthy social problems claims-makers that called into question their post-war status as establishment technocrats. UCS made a place for physical and engineering disciplines within the counter-culture discourses of the late 1960s and in so doing helped foster a new kind of environmentalism based on the kind of high-tech science places like MIT were all about.

Compared to the Union of Concerned Scientists, the Environmental Defense Fund (EDF) is and always has been less self conscious of itself as a social movement organization of scientists. The group got its start in 1969 as an outgrowth of The Brookhaven Town Natural Resources Committee, a locally based citizen's group formed around the issue of pesticides and their effect on the reproductive success of Long Island sea birds (Rogers, 1990). The effort that initiated the group was spearheaded by a biologist with the State University of New York at Stony Brook, a local high school biology teacher and an attorney. The organization's strategy in challenging Suffolk County's pesticide program was based on litigation which in turn required expert scientific testimony in support of the group's legal claim. Their approach in other words was to utilize a court of law as a forum in which the claims of its scientists could be heard and acted upon. Scientists at EDF therefore share the limelight with other claims-making professionals, in particular the organization's attorneys, whose role it is to manage the fora within which claims are lodged. The strategy worked and indeed the group's written materials are quite explicit about its success. Despite this division of labor however, throughout EDF's history, the largest contingent of its board of directors, between one third and one half, have been scientists. Notable among these are George Woodwell of the Woods Hole Oceanographic Institute, one of the group's earliest directors who later went on to play a role in GCC claims-making at the national level and John Firor, executive director of the National Center for Atmospheric Research (NCAR), a major center for climate change research, who served as chair

of EDF's board from 1977 to 1982. Interestingly, it was during Firor's tenure on their board that EDF hired its first atmospheric scientist, Michael Oppenheimer, who led their early acid rain campaign and later was influential in their climate change program.

The difference between the Environmental Defense Fund and the Union of Concerned Scientists is a subtle one. Unlike UCS, EDF does not so much represent claims-making scientists as it does provide a space for scientific claims-making. This small difference aside however, both groups were significant to the extent that they carved out a role for scientists as social problems claims-makers with an independent voice of their own. Given the high levels of legitimacy accorded to scientific pronouncements, the impact of this development was significant. The growing grassroots environmental movement which was based primarily on a moralistic and sometimes emotional appeal now had as an ally "thoroughly researched scientific evidence and economic analysis" (Schardt, 1977, p. 2). More important to the development of the climate issue, the emergence of groups like UCS and EDF made possible a public role for scientists as issue entrepreneurs. As I show in the pages to come it was such scientific entrepreneurs who moved the GCC issue forward until the mid-1980s when more traditional claims-makers found it and made it their own. Without these early entrepreneurs the issue would have never gotten off the ground.

Connecting Resource Use to Environmentalism

The willingness to view what before had been technical issues as social problems issues was a necessary but not quite sufficient condition for the emergence of global climate change as a political concern. Equally important, was the emergence of a context within which climate could be viewed as a social concern. This is not to say that prior to the 1970s, there was no popular climate discourse or that people viewed climate as benign or non-problematic. Indeed in every year from 1957 to 1989, the New York Times featured at least a few

articles on climate anomalies or climate related disasters (to say nothing of their coverage of unusual weather events). What it is to say though, is that prior to the 1970s climate was not seen as condition about which anything might be done and following from that, not an area for organized state supervision. During the seventies this changed because of a series of international events which focused attention on the vulnerability of social systems to disruptions in resource availability. The first of these was not itself a resource crisis but rather a United Nations Meeting on the topic.

The United Nations Conference on the Human Environment held in Stockholm in 1972 is described as a major milestone in the development of the worldwide environmental movement by a number of historians of international environmentalism (McCormick, 1989; Rowland, 1973). According to Rowland, the idea of a high level political conference on the environment had been fermenting in the minds of a number of UN ambassadors in the late 1960s. When a member of the Swedish delegation offered a formal proposal in July of 1968 it was accepted by the General Assembly some months later without alteration. The Stockholm conference brought together delegates from 114 countries and included representatives from both industrialized and less developed nations and, in a contemporaneous side conference, leaders from the nascent international environmental movement. The meeting's final declaration was, as is characteristic of so many United Nations declarations, a broadly worded statement of 26 principles which set forth no new international regulations or binding provisions (several however became the basis of future more substantive conventions). Moreover, none of these principles mentions the CO2 question specifically or indeed the relationship of climate to the main issue of the conference, resource use. In fact, the only place I have been able to find any reference to CO2 at all is in an adopted recommendation (number 57) calling for better monitoring of the byproducts of energy production. Nonetheless

it is significant in the history of modern environmentalism and the development of the climate change issue for several reasons.

First, by focusing attention on environmental problems best addressed through international cooperation, the Stockholm meeting helped to institutionalize the notions of global interconnectedness expressed in the title of its unofficial call to action *"Only One Earth"* . Second, the conference expressed (perhaps institutionalized is a better word), the sense of urgency many felt about the world's environmental problems. Writing shortly after the meeting, Sverker Aström, leader of the Swedish delegation which offered the original proposal to hold an international conference, asked whether or not a world of independent nation states was capable of taking action on the environmental crises "within the available time" (Rowland, 1973, p. 33). Third, the parallel NGO gathering served to strengthen, professionalize and internationalize the popular environmental movement (McCormick, 1989). All three of these developments, the last two in particular, were to be highly significant when, some fifteen years later, environmental movement organizations elected to pursue climate change as an issue and worked to develop their campaign strategies. These strategies, which were to focus on the development of international treaties limiting CO2 emissions would have been inconceivable without the internationalization of the movement that began at Stockholm. Fourth, in seeking to create an agenda relevant to the interests of developing countries— one that included issues such as soil loss, desertification, water supply and human settlements— the conference offered a definition of environmental problems that expanded upon he western notion of dis-amenity to include the idea of resource scarcity and underdevelopment. In so doing, it institutionalized a linkage between environmental and social concern and reinserted resource issues into environmental discourse.

While the Stockholm conference itself failed to address the CO2 question in any detail, two scientific conferences held in preparation

for it were significant to its development. The first, entitled The Study of Critical Environmental Problems (SCEP) was organized by the Massachusetts Institute of Technology and took place in July of 1970 (Massachusetts Institute of Technology, 1970). The conference was attended by over 100 scientists and professionals with expertise in a wide range of physical, social and engineering disciplines and included a number of individuals who would, along with their institutions, become closely associated with the GCC issue nationally. These included Charles Keeling of the Scripps Institute, William Kellog of the National Center for Atmospheric Research (NCAR), George Woodwell of the Brookhaven National Laboratory whom we have already met through his activities with the Environmental Defense Fund, James Mitchell of the Environmental Services Administration, Joseph Smagorinski of Princeton's Geophysical Fluid Dynamics Laboratory and Roger Revelle, then at Harvard, who played a key role in choosing the topics the meeting would explore. The conference took place in Williamstown, Massachusetts over the course of a month and consisted of a series of working groups each of which focused on the climatic and ecological effects of human activity on the earth's atmosphere, oceans and terrestrial ecosystems. The second gathering, entitled Study of Man's Impact on Climate (SMIC) convened outside of Stockholm in July of 1971 and was meant to critically examine SCEP's findings on climate. The list of participants at SMIC is similar to that at SCEP although SMIC also listed as a member of its research staff a young scientist by the name of Steven Schneider who was, in just a few years, to go on to play a major role in promoting the climate change issue in Congress and the press. Syukuro Manabe, developer of the one of the first and most important climate models was present as well.

The primary outcome of each of these conferences was not the dissemination of new findings to expert scientists. Rather, judging from the reports that they issued, it was to translate data and theory that had previously existed in the realm of "pure science" into an

environmental and social problematic. This work of translation had started five years earlier in the PSAC report, some of the authors of which also played a role in writing the SCEP and SMIC findings. But SCEP and SMIC brought together more people from a wider range of backgrounds and therefore served to broaden interest. To the extent it is possible to discern their "process" from the written record, one gets the sense that the assembled experts essentially locked themselves together at the conference facility for a month and applied the theoretical knowledge of atmospheric and oceanic dynamics they had gained over the previous decade to information about the sources and amounts of various environmental contaminants. Written in an easy and accessible style, the final SCEP and SMIC reports were intended for lay people and policy makers, especially those "whose decisions govern the allocation of resources to support scientific programs" (Mathews, Kellogg & Robinson, 1971, p. 4).

The action plan called for in both reports is interesting to the extent that it had virtually nothing to do with developing policies to mitigate the problems brought out by the meetings. Instead, both reports outlined a research strategy, and in the case of SMIC, went so far as to cost out the proposed studies. The agenda they developed centered largely around improvements in climatic and ecological monitoring and the development of improved models of the global atmosphere and oceans. In seeking support for the conference from government departments with a clear policy focus and by bringing together experts in climatology, physics, chemistry and biology with those in the more applied and social sciences, the emphasis on research funding was perhaps precisely the point.

While the 1965 PSAC report is the first instance I can find where CO2 is discussed as a pollutant, SCEP and SMIC are more significant, since both played to a more receptive audience. By the early 1970s climatologists, policy makers and those in the general public who heard about the reports were more willing to define as a pollutant, a

familiar and seemingly benign substance produced by "normal" human activity. Axiomatically, the outcome of this shift was the recognition that that substance was a problem.

Connecting Climate to Resource Use

While the Stockholm Conference and the various reports which preceded it made climate an environmental issue, a series of international political events occurring around the same time made it a geopolitical issue for many of the same reasons. The failure of the Soviet winter wheat crop in 1972 (and the Nixon Administration's controversial decision to make up much of the shortfall with American grain), the concurrent failure of the Peruvian anchovy fishery— both of which were held responsible for a marked increase in U.S. food prices; the nearly decade long Sahelian drought and famine; the failure of the Indian Monsoon; and the two oil shocks all served to focus attention on the role of natural resources in the international economy and potentially in international conflict.

By the middle of the decade, the CIA had released a series of studies warning of global political and economic upheavals "almost beyond comprehension" if predicted (though not necessarily CO2 related) climate changes occurred (Central Intelligence Agency, 1976; Central Intelligence Agency, 1978). These reports stated that such changes were already underway in the United States, were likely to spread to other countries, and could lead to a period of widespread famine and social disruption lasting over 40 years. They received a good deal of coverage in the New York Times, Time Magazine, and elsewhere and can probably be linked to growing interest in climate among the nation's political elite.

Some years prior to the CIA report a committee of climatologists under the auspices of the United States Domestic Council and the National Academy of Sciences, put together an outline for a national climate research program. The agenda they developed was similar to one

defined by the House Subcommittee on the Environment and the Atmosphere. Specifically it called for study of climatic impacts on agriculture, energy use and land and water resources; prediction of climatic variation; research on the global radiation budget; and further study aimed at understanding the possibility of anthropogenic changes- CO2 induced warming for example. This report was typical of a host of studies issued around the same time both in terms of its content and tone. Aside from a specific research program, all of them are notable for the degree to which they establish climate as a domain for state management. By attaching climate to a set of concerns ranging from the performance of military hardware to employee absenteeism (through the effects of climate on allergenic plants), these reports effectively linked climate to a set of already established state interests to the extent that they effectively constructed climate as a determinant of social outcomes. Some implicitly, some quite explicitly, they all concluded that "climatic variation may well determine the future of society" (United States Interdepartmental Committee for Atmospheric Sciences, 1977, Introduction).

One of the first Congressional hearings on these questions took place in May of 1976 when the House Subcommittee on the Environment and the Atmosphere met to consider H.R. 10013, the National Climate Program Act of 1975. Although not explicitly focused on the national security implications of climate like the CIA report, the impetus for these early hearings was essentially the same. Shepherded along by scientists at the NRC (Fleagle, 1992), climate was increasingly seen as a factor in resource scarcity and as such, needed to be included in resource planning. In the face of a series of climate related disasters, those assembled to give and hear testimony wondered about the possibility that the climate was changing and more importantly about the impact of these changes on the global resource system. The source of this heightened sensitivity to resource disruptions was

overpopulation, and, one gets the sense to a perception that the system as a whole was too tightly strung. These beliefs about climatic vulnerability became the basis of the National Climate Program Act. The Act established the National Climate Program Office to provide a focal point for the growing interest in climate and climate change, and to coordinate the activities of agencies involved in climate research. By 1980 this translated into a 43% increase in federal funding for climate related research (Fleagle, 1992). More important than the creation of these new institutional arrangements, more important even than the increase in funding, the Climate Program Act gave official sanction in law to the notion of climate as a domain of active state management.

Connecting Resource Use to Climate

Following just a few years from these hearings was the second OPEC oil embargo. The effects of the ensuing crisis on the economy, foreign policy and more importantly on the sense of national vulnerability to disruptions in the delivery of vital commodities cannot be overstated. The second embargo forcefully demonstrated the political dimensions of resource shortages and for all these reasons renewed interest in factors affecting the global resource economy. At the same time, attempts to protect the nation from future embargoes through the development of a crash synthetic fuels program renewed discussions of the impact of fossil fuel consumption on CO2 and climate. In the course of hearings on the program, officially the Synthetic and Alternate Fuels Production Authority Act (S1377), members of the Senate Governmental Affairs Committee heard testimony (United States Senate Governmental Affairs Committee, 1979) regarding the detrimental impact of a crash synfuels program on the nation's, and the world's, climate[17]. A number of the witnesses at these hearings had been present at the

[17] The combustion of synthetic fuel releases the same high levels of carbon dioxide as the coal from which it is derived.

hearings on the Climate Act and into the next decade a regular panel was consulted whenever questions of climate were considered.

In a sense the synfuel connection to carbon dioxide was a tenuous one since measured against worldwide CO2 production even a vigorous U.S. program was not likely to have a major impact on the global situation. Aware of this, most of the witnesses side-stepped the official agenda (at times to the frustration of the committee members) in order to address the more general question. In the course of the testimony the Senators learned, in a good deal of detail, about the role of carbon dioxide in regulating temperature, the steady rise in CO2 levels recorded since 1957, the likely sources of the excess CO2, the probable effects of the increase, and the potential strategies for adaptation and mitigation.

Although this hearing was the first to deal in detail with the CO2 issue, the testimony that was heard did not change much in subsequent hearings except to the extent that the chances of warming advanced from the possible to increasing levels of the probable. What is most striking and I think important to the development of GCC as an issue, is the degree to which those who testified emphasized its connection to long term macro-level energy policy. Dr. George Woodwell, Director of the Ecosystems Center at Woods Hole for example testified that "the carbon dioxide problem is one of the most important world environmental problems... sufficiently important to enter into all of the decisions that we make in the exploitation of fossil fuels" (United States Senate Governmental Affairs Committee, 1979, p. 3). Climatologists, who had only recently, in the Climate Act, legitimized their subject as an adjunct to resource policy making, now argued for its primacy. By shifting the emphasis from the effect of climate on resource use to the effect of resource use on climate, these hearings presented a conception whereby the two were inseparable. As the scientists themselves noted, you couldn't speak of one without speaking of the other. The effect of this linkage was to allow those interested in

creating a definition of the CO2 situation to typify it in other than climatic terms. In these hearings GCC became less a climate problem than an energy policy problem. In later years not only would the details of this typification be filled in but others would arise to compete with it. In turn it would be seen as a population problem, and then by extension a third world development problem. Later, it would be viewed in terms of tropical deforestation and then in terms of a failure of the marketplace to allocate resources. All of these typifications follow, whether directly or not, from the way in which the CO2 situation was presented during this period in the issue's history.

Summary- Climate as Social Problem

As I noted earlier there were no major breakthroughs in climate change science during the 1970s. Instead, the decade saw further certification and refinement of earlier predictions. This certification and refinement had two sources. First, as policy makers were persuaded that climatological knowledge was relevant to their concerns, a series of evaluations of that science were undertaken by numerous distinguished panels both directly and indirectly under the auspices of the state. These panels, without exception, verified the findings of the original work and accorded it the status of truth. Second, the development of impact studies which utilized the temperature predictions of climate models as inputs in the study of the effects of climate change, served to establish the models as taken-for-granted scientific knowledge at least among the wider community of scientists and policy people whose beliefs on the issue mattered the most. In a Latourian sense, the model's truth was further certified by the practices of scientists who used their conclusion as the basis for deriving new knowledge.

There is no doubt that the most important development in the social construction of global climate change to occur in the 1970s was the

issue's transformation from a scientific curiosity into a legitimate and pressing concern of the state. First with regard to fears about the increased sensitivity of world resource systems to climatic fluctuation and then because of concerns about anthropogenically induced change, by the end of the 1970s climate joined the list of officially recognized problems subject to supervision by the federal government. In pursing the supervision of GCC, policy makers called upon existing institutions and individuals to prepare reports, make recommendations and provide testimony all for the purpose of "doing something about the problem." Through the 1970s, this "something" was for the most part more research. Spurred by a particular interpretation of a series of resource crises towards the belief that global resource systems might one day cease to serve American interests, climate and climate change found a place on the public agenda. Through the work of claims-makers in both the scientific, policy making, and later the environmental movement spheres, it has been able to maintain that place for over two decades.

GCC Science and Policy 1980-1990

At the beginning of the 1980s, the groundwork for a more widespread diffusion of the GCC story was in place. This diffusion occurred in two dimensions— outward, as more people became aware of GCC claims; and upward, as the issue moved to higher levels within the state's scientific and policy apparatus. Significantly, by 1985 it was possible to discuss GCC independently of its relationship to the resource questions that so dominated climate discourse in the 1970s. This is not to say that anyone thought GCC was no longer connected to such questions, but rather to note that it had become, by the middle of the decade, an issue in its own right. GCC in other words became a problem all by itself and not simply a factor causing other problems. In order to discuss it as such, one no longer needed to frame it in terms of resource issues.

Without a doubt the most significant event to occur in the history of the GCC issue was the unusual weather experienced in the United States during the summer of 1988. These events and the felicitous timing of a series of Congressional hearings on climate in June mark the start of widespread public consciousness about the possibility that the climate could be changing[18]. On one level it is difficult to determine whether or not the unusual weather by itself could have triggered the avalanche of public concern without a series of newsworthy hearings (some of which occurred before weather conditions got really bad) to provide an interpretation of events. The point I wish to make however is that by the middle of the decade the pieces were in place for a greenhouse effect interpretation of any incidence of unusually warm and dry weather. The unusual conditions could have occurred in 1985, 1986, 1987 or 1989 but the results would have been largely the same.

Between 1972 and 1979 the New York Times published a total of 30 articles on the CO2 question whereas between 1980 and 1987 44 articles appeared (Figure 1 below). Of the thirty during the earlier period, nine were published in 1979. Coverage of GCC was not only increasing in the early years of the decade, it was also changing qualitatively. In the earlier period CO2 was the subject of only one editorial piece. In the latter, it was mentioned in eight editorials and two Op-Ed pieces.

Most important however, the issue was presented less as an item of scientific interest than as a scientific warning. Whereas earlier coverage focused upon GCC essentially as a curiosity, material appearing after 1979 presented it as a problem. Government action on climate whether it involved hearings, official statements or blue ribbon reports was also followed much more closely than it had been in the earlier period even though, in point of fact, the level of activity

[18] The *New York Times* provided front page coverage of Hansen's testimony.

was not all that different. In addition to the increases in coverage the issue was receiving in serial venues, by 1988 a few book length treatments devoted to GCC had also appeared. It was also mentioned, albeit only very briefly, in a number of "State of the Environment" volumes published by environmental organizations. In addition, in 1983 PBS devoted an episode of NOVA to climate change. Finally many of the impact science pieces mentioned in the previous section were published during the 1980s, a good number in the second half of the decade.

In many respects GCC moved forward during the early years of the 1980s in much the same way as during the later years of the 1970s. Congressional hearings on the question were held in 1980, 1982, 1985, 1987 and early in 1988 (see appendix 2 for a partial chronology of GCC hearings). Significantly, they were more focused than what had occurred earlier, and as I mentioned, considered GCC as an issue in its own right rather than as something only connected to resource or energy policy. In 1980, as part of the Energy Security Act, Congress called upon the National Academy of Sciences and the Office of Technology Assessment to carry out a comprehensive 3-year study of the implications of an increase in CO2. This study, the first produced as the result of a governmental directive was completed in 1983. The NAS report was but one of a number of similar assessments of GCC science published in the first half of the decade. Like the blue ribbon studies released in the 1970s, it presented a general picture of consensus regarding the probable degree of warming while noting the uncertainties that remained as to its impacts. Significantly this particular report stated that while the exact degree of climate change was uncertain, waiting for certainty might leave too little time for the implementation of prevention or mitigation strategies. This particular theme has played through the issue up to the present time.

In addition to these blue ribbon reports, the government itself produced two studies of some importance in the early 1980s. The first

Year	Reports of research into CO2/ climate relation	Climate anomaly (could refer to warming or cooling)	Observed temp. increases	Editorial, Op-Ed or letter showing concern about climate or GCC	Warnings about negative impacts of climate change (warming or cooling)	Calls to action and /or policy changes or reports of actions designed to lessen production of CO2 or plans to do so	Reports on studies or editorials that question climate hypothesis or claim costs of mitigation are too high
1957	•	•					
1958		•••	•				
1959	•	•	•				
1960	•						
1961		••					
1962							
1963							
1964							
1965		••					
1966		•					
1968	•			•			
1969	••						
1970	•	•					
1971		•					
1972	•	•••					
1973	••						
1974		•					
1975	••				•••		
1976	••				•		
1977	••				•••	•	
1978							
1979	•	•••		•	•••	•	
1980				•••		•	•
1981	••			•	•	••	
1982	••	•		•			
1983	•••••		•	•		••	
1984						•	•
1985	••						
1986	•••••		•	•			•
1987	••			•	•	••	••
1988	•••••••••		•	••••	••••	•••••••	•
1989	••••		•	••••••••••		•••••••••••••••••	••••••

Figure 1

of these actually began in 1977 when, in an official statement on the environment, President Carter directed the Council on Environmental Quality and the Department of State, to make a study of the "probable changes in the world's population, natural resources and environment through the end of the century" (Global 2000 Study, 1980 p. vii). The study, which was released in early 1981 as a collective effort across thirteen federal agencies, came to be known as the Global 2000 Report. In many ways Global 2000 represented a continuation of the tradition of state sponsored research on resource issues. Its international focus however— the Department of State was one of the lead agencies in the study— and its willingness to examine and criticize the forecasting models it employed made it in many ways a landmark piece of work. Global 2000 represents an exception to the generalization offered above that GCC discourse was, by 1980, separated from the larger question of resources. Given that work on the report began in 1977 and that it was specifically meant to address resource issues there is little here to contradict the earlier statement. The CO2 question received mention in the report's executive summary and then again in a climate chapter that was meant, along with a chapter on population and GNP growth, to lay out the "driving forces" behind the resource projections. The report received significant press coverage and, most important to my larger story, contributed to the 'internationalization' of environmental concern among a number of national environmental movement organizations. This last point is something I take up in more detail in a subsequent chapter.

In terms of its impact, a study released by EPA in 1983 was more significant than Global 2000 since it focused exclusively on the question of GCC. This report, entitled *Can We Delay a Greenhouse Warming*, (Strategic Studies Staff, 1983) received front page coverage in the New York Times and elicited more than 500 requests for copies shortly after its publication (Lyman, 1984). Two features of the study differentiate it from other reports, both those produced earlier and

those produced by other agencies around the same time. First, EPA offered a presentation of GCC that portrayed the problem as more certain and more severe than reports issued by agencies such as the National Academy of Science. According to the New York Times, the EPA study represents the first time a report published by the federal government typified GCC as a threat rather than simply a theoretical problem (New York Times, 1983). The differences one notices between EPA's presentation and that of an organization like the more staid National Academy of Sciences are mostly rhetorical but the impact was a powerful one. The first sentences of the report provides a good example:

> Evidence continues to mount that increases in atmospheric carbon dioxide (CO2) and other 'greenhouse' gases will substantially raise global temperatures. While considerable uncertainty exists regarding the rate and ultimate magnitude of such a temperature rise, current estimates suggest that a 2° C (3.6° F) could occur by the middle of the next century and a 5° C (9° F) increase by 2100. Such increases represent an unprecedented rate of atmospheric warming. Temperature increases are likely to be accompanied by dramatic changes in precipitation and storm patterns and a rise in global average sea level. As a result, agricultural conditions will be significantly altered, environmental and economic systems potentially disrupted and political institutions stressed (Strategic Studies Staff, 1983, p. i).

The fact that the report was released by the Reagan Administration gives rise to speculation that its tone was indeed intended to present in such a way that made talk of prevention seem unworkable. Indeed, the report recommends the development of mitigation strategies and rather than strategies to reduce CO2 emissions.

Whatever the reasons for the report's tone, EPA's involvement as a claims-maker on the issue served to intensify concern beyond that engendered by the more cautious claims-makers located within the scientific community. Equally important, the EPA report was one of the first studies to specify the sorts of adjustments in energy use necessary to avert the predicted warming. This report, in exploring "the potential effectiveness and feasibility of alternative public actions aimed at limiting or delaying a CO2 induced rise in

temperature" (Strategic Studies Staff, 1983, p.1) effectively presented a view of GCC that made it appear inevitable. Such a presentation of its inevitability, coupled with the severity of the amelioration strategies it considered, was probably responsible for the level of media coverage garnered by the report when it was released. In point of fact however, the EPA report discounted the effectiveness of GCC prevention strategies by showing that even the most draconian measures– a total worldwide ban on the use of coal or a 300% tax on all fossil fuel consumption – could only delay by a few years increases that were, in the eyes of the study's authors, already a foregone conclusion. In any event the report viewed such measures as politically and economically unfeasible. The overall recommendation of the study therefore was for an expansion of research efforts on adaptation strategies.

By the middle of the decade there was no doubt that scientific and other claims-makers had been successful in positioning GCC as a major threat even if widespread popular concern had not yet developed. Several major reports on GCC and its potential impacts were published in 1985 and in the following year Congress held hearings specifically aimed at learning about the issue. Lee Thomas director of EPA issued a statement describing a scientific consensus on the question and calling for a governmental effort to address the problem. In 1987, GCC was mentioned in a joint U.S.- Soviet statement following the superpower summit of that year and Congress passed the Climate Protection Act which among other things directed EPA to study the question and report on potential impacts. NASA's James Hansen, Director of the Goddard Institute of Space Studies, testified at these hearings which garnered national coverage in the New York Times. He testified again in March of 1988 and then again in June. That June testimony was what launched the widespread interest in GCC which persists to the present day.

Summary- GCC and the apparatus of the State

As I noted at the beginning of this section, by the mid 1980s, awareness and concern about GCC had spread both outward and upward through the policy making apparatus to its highest levels. In part, this was evidenced by the accelerated pace of legislative action on the question of climate change. Although hearings on the general issue of climate occurred during the 1970s, CO2 induced climate change was never formally a topic of Congressional hearings during the decade. It made its way into the record through the efforts of climatologists who diverted discussion of other matters towards the question of GCC. In the 1980s this changed. No longer rhetorically tied to the resource question, although by no means detached from it either, GCC blossomed as a problem in its own right and was able to exist independently of resource policy constituencies.

The EPA report released in 1983 was also significant. Although it did not trigger the widespread public alarm that occurred in 1988 with the simultaneous occurrence of unusually hot and dry weather in the United States and particularly alarming testimony in the Congress, the report did put GCC very much on the radar screens of editors and other media gatekeepers. With that, it was only a matter of time before the issue erupted. When the weather became a crisis, already existing "interpretive packages" (Ungar, 1992) could be deployed to provide an explanatory framework. This framework provided the staying power that enabled the issue to benefit from the anomalous weather while at the same time allowing it to outlast the weather's relatively short duration. Had this framework not been in place, the issue might well have been buried by the snows that fell the following winter.

Conclusion

In this chapter I laid out the development of global climate change science tracing its roots back to the 1950s and interest in element cycling and the radiative properties of various constituents of the atmosphere. As I have argued throughout this presentation, the

question of climate change was *not* the focal interest of climatologists or geophysicists studying atmospheric carbon dioxide until at least the late 1960s. Moreover it was not actively marketed as a social problem by them, that is to say as a condition about which something ought to be done, until the middle to late 1970s. State interest in climate change was even slower to emerge. Despite mention in the PSAC report released in 1965, climate issues remained largely beyond official supervision until the 1970s. Even then, it was the association between climate and resource issues, and not specifically CO2 induced warming, that became the subject of official interest. Only in the early 1980s did the federal government begin to address the question of warming itself— some twenty five years after CO2 and climate had been linked in the work of Gilbert Plass, Hans Suess and Roger Revelle.

Hart and Victor (1993) provide a valuable theoretical discussion of this turn of events. They note that rather than seeking funding for their research during periods in which it was particularly productive— after a significant breakthrough for example— scientific entrepreneurs tended to pursue recognition only when they sensed that the political climate was likely to be receptive. Climatologists, Hart and Victor argue, adapted their rhetoric (though not the direction of their research) to the perceived agendas of policy makers in an effort to present their work as relevant to the issues of the day. Put differently, they marketed their work within the policy sphere only when they sensed that an issue had emerged to which their findings could be construed as relevant. Research work in other words neither responded to a social problem— the naive view, nor served to manufacture one— the cynical view. Rather, scientists attached findings to problems already possessing social and political currency and acted essentially as opportunists. "Solutions" to problems (to the extent they are based on scientific knowledge) developed independently from the problems themselves. The two only came together later when

policy makers sought to justify interest in an issue and scientists sought to promote interest in their work.

Precursors of Modern Environmentalism

In the last chapter I outlined the development of GCC discourse within the scientific and policy making spheres. Although a number of the scientists who brought GCC to public attention can be thought of as environmentalists (some even served on the boards of environmental movement organizations), my interest in this chapter and the next is to describe the political, organizational and discursive position of the environmental *movement* at the time GCC became an issue on its agenda. In so doing my goal is to develop an understanding of how GCC fit the movement's strategic position and direction as well as its overall discursive framework. In this chapter, I trace the roots of contemporary environmentalism through a discussion of the secondary literature. This literature locates the development of modern environmentalism in the changing conceptions of nature brought about in the mid-nineteenth century (and earlier). My focus here will be on the development of two opposing environmental discourses, conservationism and preservationism both of which arose in the late nineteenth century and continue to influence the contemporary scene. In short, the goal of this chapter is to locate contemporary environmentalism within the environmental movement as it has evolved over the last century. Chapter 4 then moves on to position GCC within the contemporary movement as it has developed over the last thirty years.

The idea of environmentalism, the idea that human beings might seek to maintain the integrity of non-human nature either out of self interest or for its own sake is, at least in western contexts, a relatively new one. Its history dates back only as far as the early

nineteenth century, and the social movements it inspired coalesced only towards the end of that century. Although it can be understood as a reaction to a whole host of nineteenth century and earlier concerns, environmentalism is, more than anything, a product of enlightenment science. This is so for a number of reasons. First, of course, scientific knowledge brought more of the natural world under human observation and control. Everything from the telescope to the development of new transportation systems made the appreciation of nature increasingly possible. The tools of science, in other words, expanded the range of the knowable. Second to the extent that science and technology led to the growth of industry and with that urbanity, it served to further separate human beings from nature. This separation however created a dialectical tension in the opposite direction exemplified by the growth of movements such as Romanticism and Transcendentalism both of which play a role in the development of early environmental philosophy. Before the growth of urbanism, people lived closer to nature. The notion therefore of getting back to nature, the notion of nature as an amenity would not have made much sense. With urbanism however that situation changed.

Preservationism

Through much of the nineteenth century, American environmentalism was concerned mainly with the preservation of the North American landscape as it had existed prior to the arrival of the first European settlers. It is possible to distinguish three strains of sentiment in the discourse of this period. The first was rooted in New England Transcendentalism and was based on a hybrid idealism/romanticism which located a universal spiritual center in wild nature. The second was related to the role of the frontier as a unifying metaphor for the American experience and sought in the American landscape, the material for forging a unique American character. The third saw the natural environment as an escape from, and an alternative to the urban-industrial way of life (both its practical and moral dimensions) which,

by the end of the nineteenth century had come to dominate the American scene. Although disparate in many ways, these three environmentalisms are discussed together since they shared as a purpose the preservation of nature in it original state. In the pages that follow, I discuss each of these preservationisms with the goal of elucidating a number of the underlying themes that carry over into contemporary environmentalism.

Transcendentalism

New England Transcendentalism was an eclectic philosophy which appeared in the early nineteenth century. Although it had little popular or scholarly impact as a systematic philosophy and essentially disappeared from the scene after its leading adherents were gone, it offered an expression of ideas about the divine presence in nature that underlie much of contemporary environmental belief. An American variety of German Idealism, the Transcendentalists believed that there existed a correspondence between a lower world of materiality and a higher realm of spiritual truths. Objects in nature were earthly symbols for those higher truths; in Emerson's words: ."the world is emblematic" (as quoted in Nash 1982, p. 84). A central component of Transcendentalist belief was the idea of the "Oversoul," a god like moral force that permeates everything in nature. Using intuition rather than reason and science, humans could transcend physical appearances and perceive "the currents of the Universal Being" binding the world together.

The relevance of all of this to environmentalism stems in part from the fact that the Transcendentalists believed these spiritual realms were most accessible in wild country. As the wilderness travels and writings of two well known Transcendentalists, Henry David Thoreau and John Muir demonstrate, wild country provided an alternative to urbanity. As Nash points out, the notion that God was to be more easily found in the wilderness than in the civilized world turned

upside-down centuries of western belief and "gave forceful expression to older ideas about the presence of divinity in the natural world" (Nash, 1982, p, 86). As a type of Idealism, Transcendentalism offered an alternative to empiricism and utilitarianism, privileging intuition and spirituality over crass materialism. This of course raises an interesting dialectic since the very possibility of environmentalism required a scientific and therefore an empirical understanding of nature. Philosophical questions like this aside, environmentalism's status as an alternative to materialism became a central part of environmental discourse and continues to this day.

Wilderness and the American Character

Despite the importance of Transcendentalism in establishing an intellectual pedigree for the preservationist position, the philosophy had little if any purchase on the popular consciousness. With this in mind, Nash (1982, p. 67) turns his attention to the role the American wilderness played in the creation of a national iconography. Lacking its own ancient inheritance, America in the early decades of the nineteenth century struggled to find the artifactual material upon which to found a uniquely American culture. Unlike Europe with its monuments and its palaces and all the culture and tradition that went with them, wilderness was a singularly American object and the chance to subdue it a singularly American purpose. Nash provides a vital quote from Washington Irving that shows just how the wild landscape could be juxtaposed alongside of American political ideology:

> We send our youth abroad to grow luxurious and effeminate in Europe; it appears to me that a previous tour on the prairies would be more likely to produce that manliness, simplicity and self dependence most in unison with our political institutions (From Irving's 1835 "A Tour of the Praries" excerpted in a collection by Nash, 1982)

Some years later, Thoreau picked up this theme in a lecture he gave in Concord Massachusetts. Stepping back from his more cerebral transcendentalism, he accorded a civilization's vitality to its contact with wilderness which, in his words, provided "the tonics and barks

which brace mankind" (as excerpted in a collection by Nash, 1968). For Thoreau, the Romulus and Remus story provided a powerful metaphor. At that same lecture he noted that "It was because the children of the [Roman] empire were not suckled by the wolf that they were conquered by the children of the northern forests who were."

Perhaps the best known spokesman for this idea that a civilization's strength flowed from its contact with wilderness was Theodore Roosevelt. Influenced by Fredrick Jackson Turner's frontier hypothesis (which extends Irving's idea that the essential ingredients of self-government, independence and self confidence, are fostered by contact with wilderness), and by his own experience as an outdoorsman and hunter, Roosevelt wrote that "As our civilization grows older and more complex, we need a greater not a less development of fundamental frontier virtues" (excerpted from Roosevelt's The Strenuous Life in Nash, 1982, p. 150). These themes carried into the twentieth century in the works of other preservationist leaders such as Bob Marshall, founder of the Wilderness Society who wrote, in a 1930 essay in Scientific Monthly:

> As long as we prize individuality and competence it is imperative to provide the opportunity for complete self-sufficiency. This is inconceivable under the effete superstructure of urbanity; it demands the harsh environment of untrammeled expanses. (as excerpted in Nash, 1968, p. 123)

Related as these ideas may be to Thoreau's and Irving's conception of the cultural value of wilderness, Roosevelt and Marshall, who came from a very different set of historical circumstances, were saying something somewhat different. At the same time that they make a point about nature's impact on the formation of the American character, they were responding to its loss and speculating on what that loss may mean to a country that created its sense of self out of its encounter with the primeval landscape. By the late nineteenth century and certainly well into the twentieth when Marshall was writing, the continent had been completely subdued and true wilderness had vanished.

Nature as Amenity and Escape

As much as a paean to the American landscape then, Roosevelt, Marshall, and other environmentalists of this era sought in wilderness an alternative, or better, an antidote to urban life (Brulle, 1996; McCormick, 1989; Nash, 1982; O'Brien, 1983). As early as 1857 however, Samuel H. Hammond, an attorney and sportsman in Albany, New York wrote "I have generally gone to the woods weakened in body and depressed in mind. I have always come out of them with renewed health and strength..." (as excerpted in Nash, 1982, p. 103). Frederick Law Olmsted presented very similar ideas in a report he issued as a commissioner of Yosemite Park when it was under the control of the State of California. For Olmsted, the value of the park was the opportunity for recreation and physical and mental renewal it offered:

> It is a scientific fact that the occasional contemplation of natural scenes of an impressive character... is favorable to the health and vigor of men and especially to the health and vigor of their intellect beyond any other conditions which can be offered them.... The want of such occasional recreation where men are habitually pressed by their business or household cares often results in a class of disorders the characteristic quality of which is mental disability... excitability, moroseness, melancholy or irascibility, incapacitating the subject for the proper exercise of the intellectual and moral forces. (as excerpted in Nash, 1968, p. 20).

In a similar vein, Charles Elliot, president of Harvard University from 1869 to 1909 wrote in National Geographic:

> The profession of landscape architecture is going to be... the most direct contributor to the improvement of the human condition because it is devoted not only to the improvement of housing and of town and city designing, but also to the creation, preservation and enlargement of opportunities for human enjoyment of mountains and valleys, hills and plains, forests and flowers, ponds and water-courses, spring blossoms and autumn tints, and the wildlife of birds and other animals in their natural haunts. These are the things that city dwellers need to have the opportunities to see and enjoy; these are the things that serve as antidotes to the unwholesome excitements and tensions of modern city life; these are delights which, by occupying the mind and satisfying the spirit keep out degrading thoughts and foul desires. (as excerpted in Worster, 1993, p. 177).

As O'Brien (1983) points out, and as a closer reading of Olmsted and Elliot will reveal, this belief in the restorative powers of an immersion in nature was primarily a phenomenon of the middle and upper

classes[19]. Certainly it was only the reasonably well off who were able to take advantage of these powers. Still, as many have pointed out, the middle class in the late nineteenth and early twentieth centuries was growing. Its influence in institutionalizing the nation's first environmental movement should not be under-estimated. After all, the Appalachian Mountain Club, created in 1876, the Boone and Crockett Club created in 1885[20], the Audubon Society created in 1886 and the Sierra Club created in 1892 all still exist to this day.

The escape nature offered was not only physical and mental but also ethical and spiritual. To the increasingly cynical and materialistic society of the late nineteenth century America, wilderness offered an alternative moral vision. Nash discusses a controversy that arose in the mid 1880s over an attempt by mining interests to secure a right-of-way through Yellowstone National Park— the first case where arguments for wilderness as wilderness were heard. Samuel Cox of New York characterized the bill authorizing the right-of-way as "inspired by corporate greed and the natural selfishness against national pride and beauty" as quoted in Nash (1982, p. 114). Representative William McAdoo of New Jersey put the question even more starkly asking his colleagues to "prefer the beautiful and the sublime... to heartless mammon and the greed of capital" as quoted in Nash (1982, p. 115). Coming somewhat later, in the 1890s[21], the debate over San Francisco's plans to dam the Hetch Hetchy valley, part of Yosemite National Park met arguments founded on very similar grounds. Robert Underwood Johnson, an editor of *Century*, a leading literary magazine of the day wrote "this is a fight between the sordid commercialism on the one hand

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[19] O'Brien discusses the class composition of a number of of the early sportsman's clubs and the role played by some of their leaders in the anti-immigration movement.

[20] The Boone and Crockett Club was founded by Teddy Roosevelt. A prerequisite for membership was the getting of three big game trophy heads.

[21] The battle over the Hetch Hetchy continued until 1913, when the President ultimately signed a bill authorizing the transfer of the land to the city of San Francisco.

and the higher interests on the other" (as excerpted in Nash, 1982, p. 177). In the Hetch Hecthy case, Nash makes it clear that this sort of moral discourse resonated beyond the intelligentsia and led to the formation of a much more wide spread social movement. Even John Muir, who was shattered by the loss the Hetch Hetchy, found solace in the knowledge that "the conscience of the whole country has been aroused from sleep" as quoted in Nash (1982, p. 180).

Summary- Environmentalism as social critique

Based on a critique of urban industrialism and utilitarianism and perhaps at some level capitalism, preservationism was ultimately a commentary on the growing materialism of American culture. As social commentaries, the three preservationist discourses I have described—nature as locus of divinity, nature as shaper of individual (and national) character, and nature as rejuvenator of body and soul—represent a profound reversal of earlier ideas about the meaning of the wild landscape. They mark the passage from a system of belief which saw nature as a sort of moral barrens to one where it represented "the good." But perhaps most important, preservationist discourses show how interpretations of nature carry cultural meanings. If anything, they demonstrate the degree to which nature can be employed as a vehicle for the expression of moral sentiment and social commentary. Just like the belief systems it challenged, preservationism was based upon the idea that wilderness and civilization existed at opposite ends of a moral continuum. With the advent of environmentalism the two poles had shifted one for the other but their relative positions remained the same.

Conservationism

I have already noted the role the closure of the frontier may have had on the development of preservationist discourse. But if preservationism represented in part, an effort to hold on to the frontier as a symbolic resource in the creation of American identity,

conservationism represented an attempt to preserve it as a physical resource. Bridged as it was with the completion of the transcontinental railroad in 1889 the American continent and its resources could no longer be seen as limitless. For Nash, (1993, p. 84) conservationism stood for the wise and efficient use of natural resources and was, in this way, distinct from preservationism which valued nature for its intrinsic qualities. Even more than preservationism, conservationism was founded on developments in science. While the earlier movement required the social context produced by enlightenment science, conservationism required science itself since ultimately it was a rationalizing movement.

A number of historians credit the work of George Perkins Marsh for laying the intellectual foundation of scientific conservationism. Unlike Thoreau and the other preservationists, Marsh accepted the notion of human domination over nature. More than that, he felt it was a part of human destiny. In an article published in the Christian Examiner in 1869 he wrote: "The study of Nature's laws, ...knowledge of her products and her powers, an independence of her influences, *a control over her action*, is an indispensable means of the first attainment and subsequent expansion of high civilization and social improvement" (cited in Worster, 1993, p.15). Yet at the same time, Marsh's travels in Europe and the Near East made him acutely aware of the effects of this domination. In his best known work *Man and Nature* he writes: ."..man is everywhere a disturbing agent. Wherever he plants his foot, the harmonies of nature are turned to discords. The proportions and accommodations which insured the stability of existing [natural] relationships are overthrown." Writing of the forests: "We have now felled forest enough everywhere, in many districts far too much. Let us restore this one element of material life to its normal proportions, and devise means for maintaining [its] permanence..." (as excerpted in Nash, 1968, p. 14, 17). Beyond this sort of diagnosis, Marsh offers in the book a call for repairing the damages he catalogs.

His confidence in the human capacity to reclaim and then better steward the land was based on his belief in the "ultimate power of man over inorganic nature" which he suggests can only expand with the development of science and technology.

Tension between the belief that human destiny involves the domination of nature and the realization that such domination is often destructive lays at the heart of conservationism which, in essence is both a scientific and an ethical discourse. What makes Marsh important is that unlike the preservationists, he wrote not so much about nature itself— what it 'did,' what it meant, what values it carried— but rather about its relationship to the material of human civilization. His two most basic ideas, that humanity's destiny was to dominate nature, and that that domination had to be managed since it often overwhelmed nature's self-sustaining processes form the basis of the conservation movement as it developed in this country at the end of the nineteenth century.

Conservationism as 'Reform Darwinism'

The human relationship to the land was being increasingly rationalized in nineteenth century America with developments such as the passage of the Land Grant College Act in 1862, the establishment of federal agencies for land reclamation (1902) and inland waterways (1907), and the establishment, in 1896, of several committees under the auspices of the National Academy of Sciences to make recommendations about how to best manage the nation's forests. As Worster (1993, p. 3) writes "The common sense and the intuitive feeling of the simple farmer seemed increasingly inadequate to a people awed by the authority of scientific reason." That authority, he continues was based in part on a moral imperative to check, in Thomas Huxley's words "the cosmic process"— survival of the fittest as described by Darwin, and to substitute for it "the ethical process," (from Evolution and Ethics, excerpted in Worster, 1993, p. 4).

Lester Ward, an associate of John Wesley Powel at the United States Geological Survey drew on Darwinian evolutionary theory to argue that natural processes were inherently less efficient than those guided by rational human design. In his book *The Psychic Factors of Civilization* he wrote that "organic forms are merely pushed into existence... and are fortuitous or literally chance products, human creations are conceived in advance by the mind, designed with skill for definite purposes, and wrought by the aid of a variety of mechanical principles... by which means the energy expended is small, usually trifling, in proportion to the result accomplished" (as excerpted in Worster, 1993, p.47). Therefore, Ward continues "It is in rational man... that the first application of anything worthy of the name economy is made. Nature has no economy. Only through foresight and design can anything be done economically..." (p. 49),. Ward's focus on natural and human economy should be understood here in the broadest sense. His concern about the costs of nature's methods is really a concern about their efficiency. Nature he says acts as if her resources were inexhaustible— "while she never buys a wholly useless article she pays an extravagant price for it," (p. 46). That price is the cost of producing all the life that doesn't survive the competitive struggle[22].

Ward's argument against the laissez faire principle (both in natural and human economies) continues with a discussion of the quality of the forms produced by the "genetic" (i.e., natural) process as compared to those produced by the "teleological" (i.e., rational) process. Here he writes that the popular understanding of evolutionary theory, that it is the fittest possible that survive the competitive struggle, is false. Using a comparison between domesticated plants and animals and

[22]In particular Ward uses the fact that many organisms produced large number of offspring to compensate for the low probablity that any individual will survive to reproduce the next generation.

their wild ancestors[23] he concludes that "the effect of competition is to prevent any form from attaining its maximum development, and to maintain a certain comparatively low level of development for all forms that succeed in surviving" (p.52). It is not the *fittest* that survive but rather the fit *enough*. Thus, the laissez faire principle suffers both from its inherent inefficiency and from the degree to which it limits the development of that which it produces.

As Worster points out, Ward's intention was to argue against the sort of social Darwinism promulgated by turn of the century social theorists such as Herbert Spencer. It is clear from the examples he uses to make his case that he was equally interested in developing a rationale for improving upon the processes of nature. While Ward did not reject Darwinian evolution as a theory that described the natural world as it was, he argued, like other progressive intellectuals, that it did not necessarily describe that world as it had to be. In some sense, this desire to counterpose an "ethical process" to Darwinian natural selection was at the base of all the reform efforts of the Progressive Period.

The ideology of progressive conservationism developed not prior to but rather alongside of its actual practice. Two areas that best exemplify the movement are water management and forestry. John Wesley Powell's *Report on the Arid Lands of the United States* and a series of articles he wrote for *The Century* for example, presented the idea that agriculture in the west would only be possible with a program of large scale dam building and federal involvement in irrigation (Nash, 1968). Nash points out that the importance of Powel's work was that it dispelled two opposing myths about the West— that it was an agrarian paradise or its opposite, a desert wasteland. Looked at in ideological terms, the conception of nature embodied in Powel's report fits

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[23] Contemporary understandings of the some of the vulnerabilities of highly domesticated species were clearly not available to Ward when he wrote.

perfectly with that outlined by Ward and by Marsh since it rejects both romantic conceptions of wilderness as pastoral idyll and earlier notions of the wilderness as irredeemable threat. Not a "given" in the sense that it possessed particular essential properties, Powel saw the Western landscape in terms of the human ability to transform it. It was a desert, but not an irredeemable one. It was not a pastoral idyll, but perhaps could be transformed into one. The mark of Powel's writing and indeed all of conservationist discourse was exactly this point, that nature existed to be improved upon and transformed into something more useful by organized human action.

Nowhere was the desire to rationalize the use of nature more apparent than in the work of early foresters such as Gifford Pinchot, who established, and then directed the United States Forest Service in 1900. Although concern over the practices of the lumber industry was institutionalized as early as 1875 with the founding of the American Forestry Association (Hays, 1959, p. 27) it was not until the Pinchot era that the idea of managing the forest for a sustainable output of timber could be realized. Influenced by the work of George Perkins Marsh (Nash, 1968), Pinchot traveled to Europe where he studied the science of sustainable forestry being developed in France and Germany. Applying the new approach first to the management of private forest estates, he wrote and lectured widely on the practices of scientific forestry and eventually became the chief of the Department of Agriculture's forestry division. Very adept politically, he served through the Administration of Theodore Roosevelt, played a role in the formation of the Progressive Party in 1912, and went on eventually to two terms as governor of Pennsylvania.

Pinchot's approach to the use of forest lands is significant here since it illustrates the differences between preservationism and conservationism. This difference is perhaps best expressed in his oft quoted assertion that Yellowstone and Adirondak Parks, touchstones of the preservationist movement, were wastes of good lumber. This

underlying approach towards nature is illustrated elsewhere in the books and articles he wrote throughout his career. In *The Fight for Conservation* for example, he writes that "The first principle of conservation is development, the use of natural resources now existing on this continent for the benefit of the people who live here now" (as excerpted in Worster, 1993, p. 84). For Pinchot, the forest was "a manufacturing plant for the production of wood" (as excerpted in Worster, 1993, p. 6), and the necessity of using it wisely was first and foremost justified as good business practice. Later in the same piece however, Pinchot notes that conservation is not merely a business concern "but a question of a vastly higher duty" (p. 90) to posterity. More interesting are the questions he raises about the distribution of the benefits that flow from wise use of the nation's resources. He writes:

> The conservation issue is a moral issue. When a few men get possession of one of the necessaries of life either through ownership of a natural resource or through unfair business methods, and use that control to extort undue profits... they injure the average man without good reason, and they are guilty of a moral wrong.... The people of the country have lost vastly more than they can ever regain... to men who gave nothing in return. It is true that we have made superb material progress under this system, but it is not well for us to rejoice too freely in the slices the special interests have given us from the great loaf of the property of all the people... excessive profits from the control of natural resources, monopolized by a few are not worth to this nation the tremendous price they cost us. (as excerpted in Worster, 1993, p. 91-93)

As this passage illustrates, conservation was sometimes discussed in terms of the political discourse of early twentieth century progressivism. McCormick (1989, p.14) takes this point even further by describing conservationism not as a movement in and of itself but rather as one plank in the larger corpus of progressivism and its fight against laissez faire capitalism. His argument is that conservationists were more concerned about the privatization of natural resources than their efficient use. Given the content of some of Pinchot's writing and his subsequent role in the establishment of the progressive party there may be some truth in this characterization.

Hays (1959) however goes out of his way to make the opposite point. For him, the forest conservation movement had more to do with establishing scientific forestry and a stable market for forest products than ensuring democratic control of forest resources. As Hays points out, the forest products industry supported Pinchot's efforts from the beginning. The American Forestry Association for example provided the Bureau of Forestry with funds for some of its operations, endowed a chair in forestry at Yale (Pinchot's father had persuaded Yale to start a forestry school in 1900), and most important, provided political support when the Forest Service came under Congressional attack (Hays, 1959, Chapter 3). In addition to assisting land owners with the management of private forest tracts, the forest service also played a role in assuring a stable price for forest products. Pinchot, Hays writes, recognized that scientific forestry was more expensive than traditional practices and that in order to insure its success timber companies had to be protected from competitive pressures to lower prices. For this reason he favored higher tariffs on imported lumber and, in certain circumstances, industry combines since these were more likely to lead to increases in technological sophistication, economies of scale and greater efficiency in the exploitation of forest resources.

Reconciling Hays' analysis of Pinchot's work with that of other scholars who view it in terms of progressive politics is a difficult task. A case can be made however that ties together Pinchot's efforts at promoting the interests of the timber companies with his progressive orientation if one thinks of progressivism not so much in political terms but rather as a rationalizing movement, devoted to science, managerial efficiency and a rejection, along the lines suggested by Ward, of the doctrines of laissez faire and survival of the fittest. What troubled Pinchot about private ownership in other words was not that it was anti-democratic, as other progressives might have argued, but rather that it was antithetical to efficient and sustainable use of

the forest. Conceived this way, the conservation movement can be seen as part of progressivism although not necessarily for the reasons even Pinchot himself sometimes offered.

Conclusion

For preservationists, conservationism represented little more than a movement dedicated to improving the human ability to exploit nature. Conceived of this way, it differs from the laissez faire model only to the extent that it seeks to manage this exploitation in a way which is sustainable over time. In fairness to the preservationist position, conservationism did represent a sort of managerialism and it did view nature in essentially utilitarian terms. But looking beyond the policies pursued by conservationists and at some of their more philosophical writings, I think that such a characterization misses a central point. Unlike preservationism, which was dedicated to maintaining the integrity of natural places for their intrinsic value, conservationism was about finding ways to better use nature to advance industrial civilization. As such it represented a utopian movement. If there was to a be an Arcadia, said the conservationists, it would only be through human agency, spurred by an ethical concern for the common good and engineered with knowledge of science. Like the larger progressive movement, conservationism represented a rejection of the fatalism inherent in many of the interpretations of Darwinian evolutionary theory proposed in the final decades of the nineteenth century. It held out, as Lester Ward showed, the possibility and the rationale for rising above the wretched existence inherent in the survival of the fittest principle to a more humane ground where the forces that Darwin described could be held in check.

The split between these two environmentalisms continues to this day in the conflict between the Deep Ecology movement and the more mainstream environmental movement which often takes a managerialist approach. Given the philosophical underpinnings of the two

orientations I doubt very much that the tension between the two can ever be resolved. As I show in the next chapter, the content of GCC rhetoric is similar to the sorts of discourses developed by conservationists to the extent that it de-emphasizes the intrinsic qualities of the 'nature' they are trying to save in favor of utilitarian concerns. As I will show however, these discourses are ultimately unsatisfying since they fail to construct a picture of GCC convincing enough to motivate action. Along side of these mainstream discourses however another quieter, but at the same time more powerful discourse based upon sentiments traceable to the preservationists has developed. Although equally incapable of actually motivating the development of strategies to combat climate change, it has at least presented a viable, if rather abstract, rationale for action.

Contemporary Environmentalism: The 1960s and Beyond

My goal in the previous chapter was to show that American environmental discourse has a history traceable back at least to the middle of the nineteenth century, and that understandings of its central object, nature, have varied from the very beginning. Whether they had to do with creating a national mythos or with offering a social critique, the environmental discourses that arose in the nineteenth and early twentieth centuries told a social story. More than being about nature, these discourses were about the social order, what it was, and what it might be. Nature existed as the antithesis of the social embodying, in a sense, what the social was not. Discourse about nature therefore represented fundamentally social commentary since it invariably presented an alternative vision.

It is possible to skip ahead from the end of the progressive period to the 1960s since there is little evidence (at least in the secondary literature) that environmental discourse had as much purchase on the popular imagination or that it was as heavily freighted with social commentary as it had been or would become in the 1960s and beyond. The series of Republican Administrations that followed the First World War, were as ideologically hostile to public conservation programs as they are today; the war effort in the 1940s; the advent of the cold war (Udall, 1963, p. 187); and the relative lack of social criticism in the 1950s left little space for the development of a widely followed public discourse about the environment.

This is not to say that the environment was abandoned as a domain for public policy[24]. The efforts at wilderness preservation started by John Muir and the Sierra Club for example were further expanded with the founding of the Wilderness Society in 1935. The society worked throughout the 1930s to preserve places as diverse as the Florida Everglades, the Olympic Peninsula in Washington State and the Quito-Superior country in northern Minnesota (Nash, 1982, p. 207). The programs of the Civilian Conservation Corps, the Tennessee Valley Authority and the Soil Conservation Service during the 1930s were clearly related to environmental improvement both in terms of resource conservation and the provision of amenity. Some of these programs were planned primarily for the employment they would provide (Smith, 1971, p. 364). Others, most notably the TVA were proposed for their intrinsic benefits since they represented an improvement to the national infra-structure (Smith, 1971, p. 447). Beyond these sorts of motivations FDR saw conservation programs, particularly those having to do with the National Parks, as something that might contribute to the spiritual rejuvenation of the depression weary nation (McCormick, 1989, p. 20).

Re-emergence of the Movement

Literature on the history of the contemporary movement tends to date the re-emergence of interest in environmentalism either to the first Earth Day in 1970 or to the publication of Rachel Carson's *Silent Spring* in 1963. Perhaps the biggest problem with these approaches is

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[24] One important exception in this period of relative quietude was the controversy that erupted around the proposed Echo Park Dam in Dinosaur National Monument in the early 1950s. Located along the Colorado-Utah border, the dam became, in the eyes of preservationist groups, a test case for the sanctity of the national park system and beyond that for the possibility of wilderness preservation itself. The controversy, which raged in the both houses of Congress as well as a host of popular newspapers and picture magazines lasted until 1956 when the dam was permanently deleted from the Colorado River Storage Project. In a sense, it represented a replay of the Hetch Hetchy controversy although under a different set of historical circumstances and with a much larger and much better organized preservation movement.

that they fail to recognize that in many ways the movement did not so much 're-emerge' as coalesce from several strands. Some of these, such as the effort for wilderness preservation, represented a continuation of earlier activities that culminated in 1964 with the passage of the first Wilderness Act[25]. Others had to do with increasing concerns about the health effects of pollution, particularly pesticides[26] and air pollution[27] (McCormick, 1989, p. 49); population growth, both domestic and international[28]; and more generally a host of issues best described as quality of life or amenity concerns. Beyond these particulars however, the movement in the 1960s was propelled by a belief that environmental degradation was a moral issue that had to be addressed for its own sake. Like earlier environmentalisms, the movement of the 1960s ultimately came to represent a social critique that went beyond a particular set of issues.

For Hays (1987) and a number of other scholars of the movement, the roots of contemporary environmentalism lay in changes in American social demography following the Second World War. Hays writes that public interest in environmental quality "stems from a desire to improve personal, family and community life... part of the drive inherent in persistent human aspiration and achievement" (p. 5). Unlike the conservation movement of the early part of the twentieth century, which was essentially about rationalizing production, the environmental movement as it arose in post-World War II society, was mainly about the development of new forms of consumption[29]. Hays'

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[25] Nash for example talks of the desire on the part of leading preservationists to mount a much more far reaching campaign for wilderness protection following their success in saving Echo Park.

[26] Largely the result of Rachel Carson's book.

[27] The middle years of the decade saw the regular occurrence of urban smog and more serious 'killer' smogs in cities like New York. Local concentrations of heavy metals, particularly lead also became a concern.

[28] Harvard biologist Paul Ehrlich, first published his widely read book *The Population Bomb* in 1968.

[29] In many respects, the work of the post-materialists discussed on page 8 says much the same thing.

analysis relates it to such things as suburbanization (which he sees as fueled by a desire to live where the air was cleaner, noise was reduced and more open space was available for recreation), the trend towards smaller families, new child rearing practices, the growth in second home ownership, and a new conception of nature. Hays' description of the re-emergence of the movement is problematic on a number of grounds not the least of which is his notion that an amenity rich suburban life style fulfills 'innate' human desires. In a sense offering up a peculiar variety of demographic determinism, it neglects even a passing discussion of the social, political and economic forces behind the creation of the new consumer society. It offers even less on the processes through which nature became an object of consumer desire. These criticisms aside, Hays' discussion is on the mark to the extent that it portrays the environment as a public concern which predates the counter culture decade and the development of environmental organizations.

The Subject of 1960s Environmentalism

The notion that environmentalism was essentially a movement centered around the creation and preservation of amenity values would have been anathema in the early and certainly in the later years of the 1960s. For activists certainly, and probably for others interested in environmental issues as well, the adoption of environmental values and environmentally sound ways of living, was viewed as a necessity for survival in an almost literal sense. Although activists discussed environmental problems using a spaceship or lifeboat metaphor, they rarely if ever specified why the threat was as serious as they made it out to be. In a sense that seriousness was taken for granted. Interestingly, the effects of pollution on human health were less a part of sixties environmental discourse than one might expect. Seemingly the issue most likely to be presented as a threat to survival it was instead secondary to concerns about wilderness, wildlife and

outdoor recreation. It may have been that medical knowledge about the effects of long term, low level, exposure to pollutants was insufficient to generate much concern (prior to the mid-1960s knowledge existed primarily about the effects of acute exposure to high levels of pollution; people worried about instances of 'killer smogs' for example and not low level chronic exposure).

Even the newer, more broadly ecological groups that organized in the late 1960s (c.f., Mitchell, 1991) considered preservation central to their agenda. The Environmental Defense Fund (EDF) for example, got its start working on DDT and its effects on bird life. Friends of the Earth (FOE), formed around the same time, ran a substantial anti-fur campaign and worked, along with groups like EDF, against the Alaska pipeline. When these groups addressed pollution issues, they were often presented in terms of effects on wildlife or natural habitats. Nuclear power for example, was first opposed not because of fears about radioactivity or waste disposal but because of the threat it posed to aquatic ecosystems from thermal pollution. Similarly, the Torrey Canyon and later the Santa Barbara oil spills, neither of which threatened human health or well being, got a great deal of media attention for their effects on sea and particularly bird life.

A particularly striking example of the de-emphasis of human health can be found in the literature published by the Environmental Defense Fund in its first decade. As I mentioned above, EDF was formed in 1967 around the issue of pesticide use in Suffolk County New York and its effects on bird life. Even into the 1970s, as it grew and began to operate nationally, EDF's focus continued to be the preservation of local ecosystems. In its 1971 annual report for example, the group listed its work opposing numerous water storage projects around the country, its efforts on phosphate pollution, and its opposition to a variety of highway projects, the Alaska pipeline and a number of power projects, as primary. While legislation to eliminate lead from gasoline was an important part of EDF's focus early on, human health

did not figure much in their own accounts of their work until the middle of the 1970s when they began to discuss chemical use in terms of human cancer rates. Interestingly, a good deal of its work on energy, which is relatively easy to discuss as a health issue (energy use causes air pollution, which since the 1950s had been discussed in terms of its effects on human health) was presented in terms of its more diffuse impacts on the ecology as a whole. Opposition to growth in energy production, the construction of new power plants for example, was justified in terms of the increased ecological degradation brought about by energy extraction activities (strip mining and the synthesis of oil from western shale), energy transportation activities (disruptions to local ecosystems from pipeline construction and increased threats of marine oil spills) and energy utilization, the effects of which were not enumerated but surely include the "environmental and social disruptions associated with highway construction" mentioned in their annual report in 1974 (p. 3). EDF's primary concern in each of these examples was the land itself.

Perhaps the era's environmental ethos is best summarized in the following passage taken from an influential essay published in *Time Magazine* in 1968 entitled "The Age of Effluence":

> What ever happened to America the beautiful? While quite a bit of it is still visible, the recurring question reflects rising and spreading frustration over the nation's increasingly dirty air, filthy streets and malodorous rivers— the degradation of a once virgin continent.... Man has tended to ignore the fact that he is utterly dependent on the biosphere: a vast web of interacting processes and organisms that forms the rhythmic cycles and food chains in which one part of the living environment feeds the other. (The Editors, 1968)

Rather than focusing on the material effects of environmental pollution, the essay instead revolves around the degradation of natural beauty (nature for its own sake) and on the human connection to the biosphere. What motivated those who wrote about the environment in the 1960s was a desire to preserve environmental quality for its intrinsic value. While noting humanity's ultimate dependence on the Earth and presenting, here and there, some evidence of the health effects of

pollution and the costs of continuing to live with it, this essay never depends on instrumental values in making its point. Unlike more contemporary environmental discourses which almost always rationalize the preservationist impulse with a language of health or market efficiency, discourses created in the 1960s present preservation as self justifying; a matter, simply, of doing the right thing.

Expanding the Scope of the Environment

Like the preservationists a century earlier, those who were concerned about the environment in the 1960s were motivated mostly by a desire to maintain the integrity of natural systems. Unlike earlier discourses however, 1960s environmentalism stretched beyond mere wilderness preservation to encompass natural systems of any sort. A local beach, suburban song birds, a small creek that flowed through town or one of the great lakes- all were worthy of preservation and repair. Although there were perhaps pockets of land where one might, like Thoreau or Muir find God, deep wilderness, the kind which men like Teddy Roosevelt sought out to build a hardy character, had vanished. From the sixties onwards, nature was no longer thought of as something located only in a few pristine areas tucked far away from where most people lived, it was everywhere. Nature itself became what people sought to protect.

Perhaps most indicative of the growth of such a sensibility was the substitution, over the years since the Second World War of the words nature and wilderness for the more all encompassing word ecosystem and environment. These terms of course, found their roots in the science of ecology which engendered an organicist conception of nature and emphasized the interdependence of each component of the natural community. From the very beginning, the holism inherent in ecological science, its core ideas of interdependence and community led to the development of new ethical understandings of the human relationship to the non-human world.

Nash (1989) turns to the writing of Albert North Whitehead and Albert Schweitzer to illustrate the ideology the new science afforded. For both Whitehead and Schwitzer, all life, indeed all matter, contributed to the ongoing "process" of the universe. To destroy either was to disrupt the fundamental unity of all things. I mention these two figures here not because their ideas are part of the history of environmentalism but rather because they illustrate the direction taken by others, with roots in ecological science. By far the most important of these was Aldo Leopold whose short volume *A Sand County Almanac,* originally published in 1949, introduced the idea of a 'land ethic.' What Leopold did in his work was to use his understandings as a scientist to argue, along lines very similar to those of Whitehead and Schweitzer, that the Earth itself, its 'living' *and* 'non-living' components represented manifestations of a larger organism (Nash, 1989). The basis of this claim lay in the mutually dependent relationships that developed between the various components of an ecosystem. Rights accrued to organisms in nature on the basis of the 'interest' various components of an ecosystem have in the welfare of other components— an understanding systematized with the advent of the science of ecology. Beyond its utility (or even its necessity) to human beings, nature preservation was justified in the same way as the preservation of individual human life— from the standpoint of its intrinsic value as life. Whether one accepts these ideas or not, in the final analysis the ethical impact of ecology was that it did with science what religion did with doctrine and faith, it gave everything in creation a reason for being.

Nash (1989) points out that most of these ideas had little impact on the popular imagination when they first appeared (Leopold published articles that form some of the basis of his later land ethic as early as the 1920s). The reception they received in the 1960s was due in part to the degree to which they resonated with other aspects of the decade's zeitgeist. Certainly, the impact of eastern religion on

various components of the counter culture expressed, from a different source, Whitehead's ideas about the uninterrupted unity of the cosmos. Perhaps even more deeply, the communal metaphor that is so much at the heart of ecological science resonated with the rejection of the mass society that characterized cultural criticism in the decade[30]. Although perhaps difficult to understand from a contemporary vantage point where, with the exception of a few deep ecologists and biocentrists, environmental issues are discussed in terms of market efficiencies, in the 1960s environmental discourse had a deeply moral dimension. If there was any doubt about the vulnerability of nature to human abuse, it came to an end when pictures of the Earth from space received wide publication. In 1969, *Look Magazine* published an essay entitled *The Earth From Space*. Its author had this to say:

> From Apollo, the receding earth (sic) looked as lonely in space as the spacecraft seemed from the earth. Suddenly we could understand what Adlia Stevenson had said: "We travel together, passengers on a little spaceship; dependent on vulnerable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care and work and... the love we give our fragile craft." The earth was revealed as Apollo's twin: Spaceship Earth. Man on one spaceship radioed man on the other: "The earth from here is a grand oasis in the vastness of space!" An oasis; a fragile outpost of life in a lifeless pocket of the universe. (McHenry, 1972, p.254, originally published in Look Magazine, November 4 1969).

Environmentalism as Social Critique

I have pointed out in this section some of the ways in which environmentalists in the 1960s broadened the scope of environmental protection beyond its traditional emphasis on wilderness preservation, to include preservation of all types of natural communities. Like earlier environmentalisms however, it grew over time to include a larger social criticism. The emergence of a field like environmental psychology, which was originally concerned with the application of

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[30] As I note later in this chapter, there is no doubt that a good deal of environmnetal discourse in the 1960s can be read as much as a criticism of the mass society as a criticism of the human use of the earth. See chapter 3 of Gottlieb's *Forcing the Spring* for an excellent discussion of the impact of the counter-culture and the New Left on environmentalism.

social psychological knowledge to the design of the physical environments used by people, is a case in point (c.f. Proshanky, 1970).

The development of a discourse around the question of beautification is another example of the migration of environmental ideology into other environmental contexts. While beautification certainly included nature preservation it also transcended it and came to include such things as anti-litter, anti-highway, anti-billboard and anti-noise campaigns; efforts at historic preservation, better urban and suburban planning and even highway landscaping. In a sense, these issues bring us back to Hays' thesis that the environmental movement, as it arose in the 1960s, was mostly about the creation and preservation of amenity values. As an interpretation of environmentalism as a mass movement, Hays' account may be useful, but in understanding the movement from the standpoint of those actively involved as claims-makers or even simply those with strongly held ethical convictions, it is probably not enough. Instead, I would argue that like the environmentalism of the progressive period, the environmental movement of the 1960s offered social criticism that went beyond particular ecological issues.

Consider the following passage from a book called *From God's Own Junkyard: The Planned Deterioration of the American Landscape* published in 1964:

> Our towns and cities boast many isolated handsome buildings but very few handsome streets, squares, civic centers or neighborhoods... Our suburbs are interminable wastelands dotted with millions of monotonous little lots and crisscrossed with highways lined with billboards, jazzed up diners, used car lots, drive-in movies, beflagged gas stations, and garish motels. Even the relatively unspoiled countryside beyond these suburban fringes has begun to sprout more telephone poles than trees, more trailer camps than national parks. And the shores of oceans, lakes and rivers rapidly becoming encrusted with the junkiness of industries that pollute the water on which they depend (as excerpted in Nash, 1968, p. 166)

On one level this piece discusses, albeit much more trenchantly, the same thing as the President's letter on beautification, that is to say the state of the sensible environment. More deeply however, it offers

a critique of what its author sees as the vulgarity of post war culture in all its manifestations.

As the decade progressed, discussions of the American environment composed along these lines appeared frequently in popular magazines and book length treatments. *Changing Times* for example published a piece critical of the tacky tourist "attractions" entitled "America the Beautiful– Heritage or Honky Tonk?" in 1962 (McHenry, 1972, p. 231, originally published in Changing Times, November 1962). Russell Baker penned a satirical essay entitle "The Great Paver" which appeared in the *New York Times* in 1963 on the seemingly endless effort to turn the entire nation into one vast expanse of asphalt (McHenry, 1972, p. 233, oringinally published in The New York Times February 7 1963 1962). Even *Fortune* magazine published writing critical of the wastage of the American landscape in both its physical and social manifestations:

> The society we have built fulfills the lopsided American Dream with a vengeance. Our immaculate homes are crowed with gleaming appliances and our refrigerators are piled high with convenience foods. But beyond our doorstep lies a shamefully neglected social and physical environment. Foreigners who come to these shores expecting to find splendid countrysides and magnificent cities discover other things instead: noise, vandalism, polluted air, befouled streams, filthy streets, forests of ugly telegraph poles and wires, decrepit mass transit systems, and parks that are unkempt and unsafe. They also see a countryside being devoured by housing sub-divisions and by shopping centers whose graceless buildings are little more than merchandizing barns; highways splattered with enormous billboards and hideous drive-ins that shriek for the passing motorist's attention... (by Edmund Faltermayer originally published in 1965 and excerpted in McHenry, 1972, p. 237)

It is of course remarkable that these words appeared in *Fortune*, much more so because the piece went on to affix responsibility for the decay of the American landscape to the capitalist system which, it suggested, often requires active management. My point here however is to illustrate the ways in which the notion of environment was enlarged to include not only nature, not only the built environment but also, as explicitly mentioned in this excerpt, the social environment. Enlarged to include so many seemingly disparate spheres of the lifeworld, environmental discourse in the 1960s became a part of, or perhaps

better, helped to create, the larger critical discourse that characterized the decade.

As a social critique, what was it that those cited here were troubled by? To some extent, 1960s environmentalism, like that of the progressive era, represented a critique of capitalism. As the article in *Fortune* demonstrates, the capitalist system was seen as part of the cause of the crisis as were, elsewhere, the actions of particular companies or large corporations in general. Some of the literature in fact made the role of corporate polluters central to their case. I think it would be a mistake however to say that the 'troubles' 1960s critical environmental discourses spoke about had mainly to do with the economic system. While the better world writers and activists envisioned would probably have been less dominated by large business enterprises, greater democracy or the overthrow of capitalism were not, by and large, what the movement was all about. Nevertheless there was a concern with consumerism and the system of ever expanding mass consumption that so characterized the post-war era. This part of sixties environmental discourse has much in common with certain nineteenth century preservationist discourses concerned with the rampant materialism brought about by the development of industrialism. Another glance at the excerpts above makes this point clearly. The one volume that illustrates this aspect of 1960s environmental discourse best however is *The Environmental Handbook* (TEH) published jointly in January of 1970 by Ballantine Books and Friends of the Earth. The book, which consists of 52 short articles by a variety of authors, was intended to "serve as a source of ideas and tactics for the April 22 first annual teach-in on the environmental crisis" (DeBell, 1970, p. xiv). Widely read, the *Handbook* represented the thinking of both the youthful organizers of Earth Day and, significantly, more well established intellectuals such as Kenneth Boulding, Lewis Mumford, Rene Dubos, David Brower and Lyn White. Given this range of authors and the fact that it contained material published earlier in the decade, the

volume offers in one place a window into the environmental discourse of the entire period.

Picking up the book, the first thing that strikes a contemporary reader is the urgency with which it presents the environmental crisis In the preface the editor notes that while he could have spent a year putting the book together, that amount of time represents one fifth of the time left if any kind of quality of life on earth was to be preserved (DeBell, 1970). While its various chapters cover the gamut of environmental problems— pesticides, water pollution, air pollution, the automobile, oceans, wilderness, the SST, etc.— what one takes away most from the book is the sense that a number of its contributors saw all of these problems as emblematic of a deeper, more intractable crisis. In one chapter on the environmental effects of transportation[31], Garret De Bell, the editor of the volume, asks whether we can replace the outmoded concept 'standard of living,' defined to mean the ever increasing consumption of luxury goods (he mentions such things as electric carving knives, golf carts, dune buggies and electric blankets), with a more 'human' quality of life concept (DeBell, 1970, p. 68). The question of consumption finds its way into a number of other articles in the book. Two chapters, for example, were devoted to a critique of the advertising industry and the role it plays in promoting high levels of consumption. A number of sections discussed the comparative level of consumption between the United States, Western Europe and the developing world. Paul Ehrlich and Garret Hardin presented their neo-Malthusian theses on over-consumption as well. Still other articles mention consumption in passing.

Critiques like these are certainly as old as upper-class murmurings about the vulgarity of middle class consumption practices— drive-in movies, hamburgers, ranch homes, fast-food diners, etc. To the extent

[31] Interestingly, several pages in this chapter are devoted to a discussion of the potential for CO2 induced climate change. It is clear that scientific knowledge of the greenhouse effect had diffused into lay discourse, as early as the late 1960s.

that they represent profligacy, they probably also owe much to the nation's puritan past as well. But beyond this critique of the consumption society, I think something else was operating which, interestingly, is best illustrated in discourse concerning the automobile. In addition to what one might expect to find in the environmental literature about the automobile's role in air pollution and resource consumption, a number of environmental writers discuss the question of automobile culture. In a very real sense automobile culture may have been implicated in the destruction of community life to the extent that the placement of new highways often disrupted established neighborhoods. But beyond its effects on the physical environment, critics of the period saw the automobile as an alienating instrument, one that separated people from the landscape and from one another. Certainly this was a central argument of Jane Jacobs' (1961) *The Death and Life of Great American Cities*. A chapter entitled "Cities and Culture" in Edward T. Hall's (1966) *The Hidden Dimension* discusses this as well. Hall's work is cited in *The Environmental Handbook* in a chapter called "Warning: The Automobile Is Dangerous to Earth, Air, Fire, Water, Mind and Body." Another chapter on air pollution asks:

> But the Man from Mars, standing beside a super-highway as the shiny monsters hurtle by at 75 or 85 miler per hour, the drivers bent tensely over their steering wheels with riveted lusterless eyes that see nothing but the pavement ahead, wonders what it is all about. What is this strange, strained Earth creature getting out of life? It is evident that he is not enjoying himself. (Rienow & Rienow, 1970, p. 120)

A.Q. Mowbray offered much the same thing in his book on highway development, *The Road to Ruin* published in 1969:

> The fine grained, human-scale diversity of shops and homes and barns and parks and newsstands and shoeshine parlors is being wiped out by freeways, interchanges, boulevards and parking lots. The bustle, the color, the friction, the exuberance of human contact are giving way to the sterile ooze of steel automata moving along corridors between high rise monuments to insurance companies and towering ghettos for their clerks, and marking their passage with the stench of fumed rubber and burned hydrocarbons (as excerpted in McHenry, 1972, p. 249).

At its deepest level, the critique environmentalists offered was a critique of the commodification of everyday life and the loss of human community. Attached to all of this was an anti-technology discourse (including the engineering of consent) which questioned the reductionist tendencies of science, and criticized its refusal to see the world holistically. Commonor's (1966) *Science and Survival* originally published in 1963, was mostly a warning about technology's inability to anticipate the side-effects of innovation while Gene Marine's (1969) *America the Raped* fired a broadside at the engineering mentality which "ruthlessly excludes questions of side-effects, works out solutions that meet only simplest definitions of the problem [and] never seeks out the larger context... [which] it regards as extraneous to the [strictly] engineering problem at hand" (p. 18). Roszak's (1969) *The Making of the Counter-Culture* is about much the same thing. This critique of technology coupled with even more deeply sedimented questions about the meaninglessness of existence in a consumption oriented mass society was, at its deepest level, what motivated claims-makers and those with strongly held environmental values. Envisioning a post-consumer world, Garret Be Bell wrote:

> We see an end to some of the contradictions in American life. Where we once burned fossil fuels and polluted the air to provide electricity to run the escalators and other labor saving devices that fattened us and sent is to the electric exercise machines and calorie free soft drinks we can rediscover walking. Where we over heated or over air conditioned our air, we rely again on the human adaptability to stress that shaped us and gave us our physical integrity over a million years of living... With conspicuous consumption eliminated, we have more leisure time and a shorter work week... There is less spectator sport and more participating. The American people, once a nation of watchers, are now 'do-it-yourself' people again... people buy less music and make more of their own. There is a world quiet enough to hear it (DeBell, 1970, p. 155).

Summary- The reemergence of environmentalism

While the development of widespread popular interest in environmental issues may owe itself in part to the sorts of demographic trends Hays discusses, environmental activism, as it developed through the decade of the 1960s came to encompass a broader social critique very

much in line with the sorts of issues taken up by the counter-culture and other social change movements of the period. Like the environmentalism of the progressive period, the movement of the 1960s embodied a critique of modernity that went beyond particular ecological issues. Its power as a discourse, the purchase it had on the popular imagination, derived not from the details of its subject but from the social commentary it offered and the sorts of deeper social issues about which it could speak.

More important than this integration with larger critical themes however, was the movement's success in expanding the scope and meaning of its main object of concern. As I have noted, environmentalism in the 1960s grew from an initial interest in wilderness preservation to a more broadly ecological concern for nature in all its manifestations. Borrowing this time from the relatively new science of ecology, environmentalism in the 1960s adopted the holistic ideology at the core of nineteenth century preservationist discourse. Coupled with other factors on the larger social scene, this holistic sensibility led to a climate in which nature preservation could be justified with an argument based on the intrinsic value of all life. Undoing the failures of technology, and (to a lesser extent) capitalism, became an end in itself— in a sense, a matter of simple justice.

My discussion of this material is intended to locate the re-emergence of contemporary environmentalism historically and to provide a counter-point through which to understand its transformation in the 1970s and 80s. At the same time however, I think that the new holistic sensibility which characterized environmentalism during the period has implications for the development of global climate change discourse. Holism after all represents a system of knowledge that is ultimately about the relationships between the components of a system— a notion central to GCC science and discourse as well[32]. The difference between

[32] Ecology was by no means the only 'systems' discourse that developed in the 1960s. During that period, as well as before it, a systems

the relationships that concerned environmentalists in the 1960s such as those within a pond, or patch of forest and those existing across the components of the global ecosystem is after all, only one of scale. Given the degree to which GCC discourse is imbued with these sorts of holistic understandings, one wonders why it did not emerge as a environmental problem in the 1960s. Perhaps the answer to this boils down precisely to the question of scale. More then merely requiring the sort of holism at the heart of environmental discourse in the sixties, the notion of a global ecosystem requires the sort of shrinking of distance that accompanied the development of an integrated global economic system. Those photographs of the earth from space, while powerful metaphorically, were simply not enough.

Environmentalism in the 1970s

In the previous section my focus was primarily on the social and philosophical underpinnings of contemporary environmentalism as it developed in the 1960s. While I spend more time in this section addressing the practical aspects of the movement's activities— membership patterns in environmental movement organizations (EMOs), public opinion, and organization culture for example— my larger purpose is to lay out the discursive context the movement created for the presentation of its claims. This context of course was not something engineered solely by the movement. Rather, it represented the narrative space within which the movement could operate as its discourse was constrained and enabled by the larger discourses that framed the politics, culture and social action of the period. Put differently then, the goal of this section is to elucidate the frames within which it was possible to create claims about putative environmental problems. Much of what I say applies to both the 1970s and 1980s but several events in the 1980s that are significant to the

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framework was applied to questions in the physical and social sciences and in policy and business analysis. As I noted in chapter 2, it lay at the heart of GCC science which was initially about understanding the carbon cycle.

development of GCC discourse in particular are discussed separately in a section devoted exclusively to that period.

The State of the Movement

Figure 2 below charts the changes in EMO memberships from 1960 to 1990. As the figure shows, membership growth usually occurred when events made environmental issues particularly

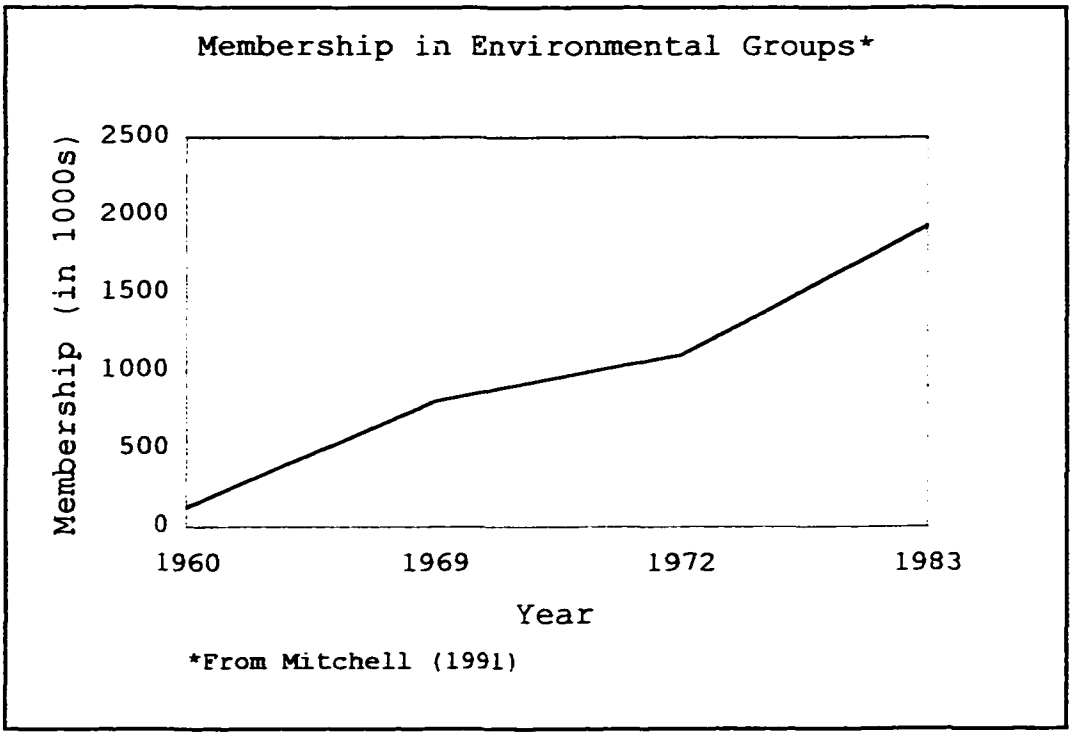

Figure 2

salient to people. The first surge in memberships occurred between 1960 and 1969 as EMOs became increasingly more aggressive in portraying environmental problems[33]. The next growth spurt occurred in 1970 around Earth Day. Growth then slowed through the 1970s but surged again with Reagan Administration attacks on environmental legislation in the early 1980s. Another surge took place at the end of the 1980s "stimulated by the visibility of ecological problems ranging from toxic wastes, beach

[33] Note that the figure somewhat overstates the surge in memberships since the increase in memberships for NWF between 1969 and 1979 is due the creation of new category of membership. Prior to 1969, its memberships were mostly in local affiliate groups and not the national organization.

contamination, the Exxon Valdez oil spill, ozone destruction and global warming as well as by the substantial mobilization efforts these organizations made in conjunction with the twentieth Earth Day anniversary" (Mitchell, Mertig & Dunlap, 1991, p. 15). As Ingram and Mann (1989) note this trend follows closely the political cycle as well.

Mitchell (1990), who has studied membership patterns for a number of environmental organizations attributes their ability to attract a mass membership to success with direct mail campaigns. Largely an invention of the 1970s, such campaigns were successful first because, sympathetic press coverage made the public responsive to the groups; second, because they typically relied upon picturesque (or at any rate highly imageable) presentations of whatever it was the group was trying to protect; and, finally, because over time, EMOs were able to rely on the continual emergence of new areas of environmental concern with which to maintain their relevance. Groups that adopted a wide range of issues were more likely to garner support since potential members were presented with a whole menu of activities worthy of support— if a potential contributor did not find one issue on a group's agenda compelling there were likely to be others he or she was concerned about. A number of these observations are germane to the present study since they touch upon more general aspects of environmental claims-making including the importance of taking on 'imageable' problems, the role of sympathetic press coverage and most of all the need to continually supply fresh problems in order to maintain popular relevance. While GCC fulfilled the last function for the movement as a whole, the rapid deployment of an anti GCC discourse (as well as the media's increasing tendency to portray scientific issues as controversies) made for a more critical treatment in the press. The difficulties associated with imaging the problem of course are legendary.

Public Opinion

Dunlap's (1991) work charting the development of public attitudes towards the environment expresses quantitatively the growth of environmental concern over time. Starting in the 1960s and citing items on a number of national polls, Dunlap notes a general increase in environmental concern from 1965 to 1970. Concern about pollution, the environmental issue most often asked about in such polls, more than doubled during the period. While the impact of Earth Day in 1970 clearly played a role in these results, surveys noted a steady increase in environmental concern in each year of the period. Interestingly, despite the high numbers environmental items garnered, few respondents found environmental problems particularly salient. While they might strongly agree with a statement about the importance of reducing pollution, and even indicate a willingness to pay for reductions, few respondents volunteered the environment, when asked a general question about the problems facing the United States in a given year. Salience questions (also called Most Important Problem or MIP questions) however are highly sensitive to media coverage of particular issues, a phenomenon certainly seen in the public opinion data on environmental issues in 1970 when, with Earth Day, the salience of environmental problem jumped considerably. From these salience and the less stringent opinion data, Dunlap concludes that by the end of the 1960s, the majority of the public had come to accept the idea that environmental quality was a social problem and that environmental protection was a worthy goal.

Not surprisingly, public concern for environmental issues declined significantly in the years immediately following Earth Day. As the decade wore on, these declines continued although the rate of the decline slowed. From these results, does it make sense to conclude that environmental quality was no longer a public concern? Both Dunlap (1991) and Mitchell (1984) argue no. They note that while environmental quality was no longer viewed as a crisis the staying

power of environmental concern was remarkable, especially in light of the two energy crises which were somewhat exacerbated by environmental regulation. With a state apparatus set up to monitor and police the environment, people may have simply stopped voicing concern for environmental quality even as their desire for it remained consistent.

One test for this idea would be to look at how public interest in environmental issues might change if all of a sudden this regulatory apparatus was threatened. If expressed concern for environmental problems was reduced because people thought the government was adequately managing the issue, then a removal of this management

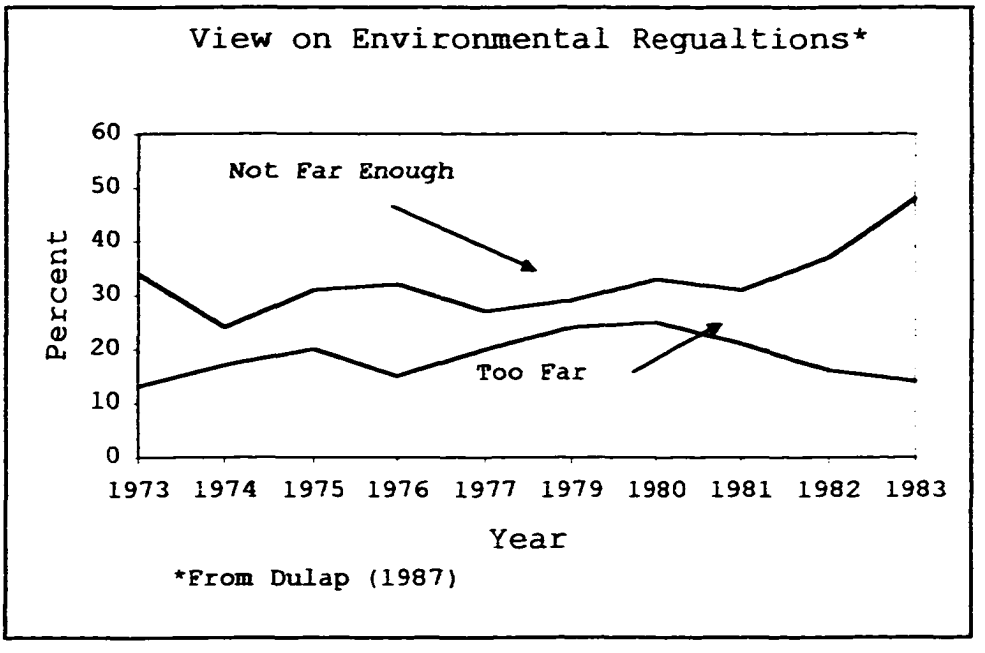

Figure 3

activity should result in a renewal of expressed concern. The Reagan Administration's attacks on environmental protection provide an ideal test of this hypothesis. As Figure 3 above shows the change in response over a ten year period to an item asking whether or not environmental laws and regulations have gone too far or not far enough[34]. As the chart reveals, from a low of 29% just prior to the

[34] The item was omitted in 1978 and for the sake of brevity I have omitted the neutral and don't know responses.

Reagan's election victory in 1980, the pro regulation response reached 48% in 1983. Another item worded: "Which of these two statements is closer to your opinion: We must be prepared to sacrifice environmental quality for economic growth. We must be willing to sacrifice economic growth in order to preserve and protect the environment" garnered similar results (Figure 4).

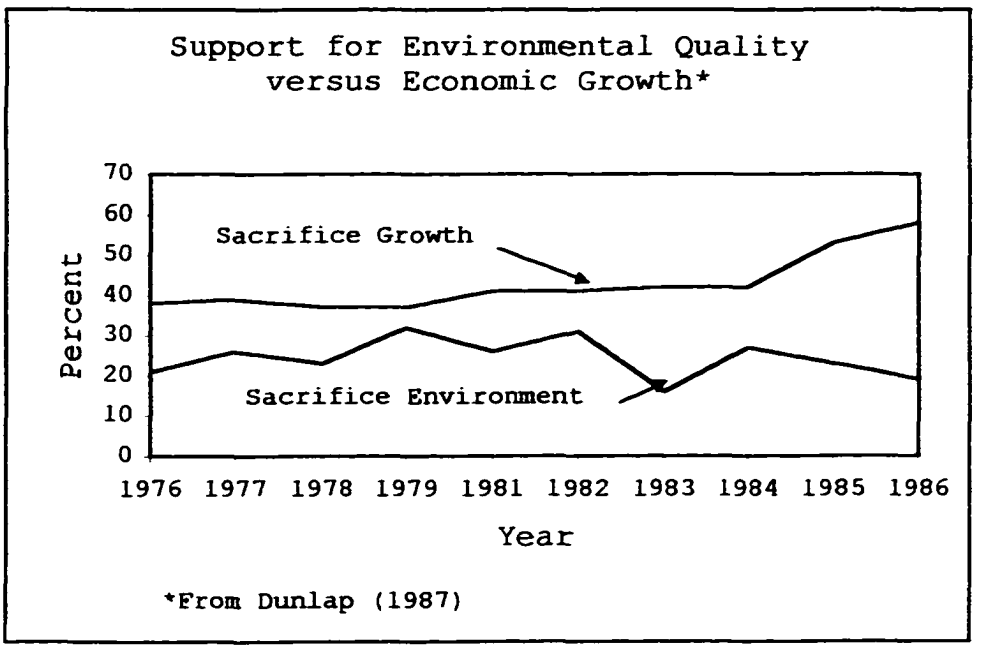

Figure 4

Dunlap (1987) points out that this renewal of concern for environmental quality may represent not only a response to the Reagan Administration's policies but also to an increase in public expectations. Even in the absence of the new political climate this line of reasoning suggests that the efforts of claims-makers to introduce new issues may have 'raised the bar' of acceptable environmental quality. A series of survey items asking respondents to rate the seriousness of a number of environmental issues between 1981 and 1985 found public concern to be rising. Retrospective items in which respondents were asked to compare pollution levels in the survey year with those of ten years ago found near majorities reporting a perception that things had gotten worse.

As the data on issue salience suggest, despite a significant increase in concern for environmental problems, the Reagan Administration's record on environmental issues did little to thwart its significant electoral victory in 1984 even though the challenger, Walter Mondale, polled consistently higher on environmental issues. However public sentiment had significantly tempered the Administration's rhetoric on environmental policy especially in 1983 with the resignation of Anne Gorsuch-Burford at EPA and James Watt at the Department of the Interior. The strength of this concern moreover compelled Reagan's Vice President, George Bush, to assert a desire to become known as the 'environmental' president during his own campaign for the White House in 1988.

Professionalization of the movement

Scholars (and movement insiders) have written extensively on the professionalization and bureaucraticization of national environmental organizations during the 1970s. Mitchell et al. (1991) for example attributes this professionalization to 1) the pace of the legislation and complexity of the issues under consideration which necessitated the development of internal legal, scientific and economic expertise; 2) the growth in membership which stretched the organizations' management capacity and extended its organizational obligations to include servicing members with newsletters and various other premiums; and, 3) the management of the sophisticated record-keeping, reporting and internal control apparatus associated with membership (and therefore budgetary) growth. Growing public support for the movement's goals also played a role (Mitchell et al., 1991) as it lessened the need for charismatic leaders capable of capturing the public imagination with their rhetoric. Indeed, as a number of cases have shown, charismatic leaders were sometimes ousted and replaced by professional bureaucrats with little name recognition.

In reviewing the development of organizations like EDF, the Natural Resources Defense Council (NRDC) and even FOE however it is difficult to find support for the notion that environmental groups *became* professionalized in the late 1970s. Most were professional organizations since from their inception they relied on the knowledge and skill of legal professionals, economists, scientists, and journalists many of whom found regular employment on their staffs. But why did mainstream EMOs reject a continuation of the sort of grassroots activism that characterized the movement in the 1960s or extend the public education campaigns initiated on Earth Day? Several explanations for this are available. First of course, the lobbying and litigating approach worked. With the granting of legal standing EMOs were able to pursue environmental protection in the courts and, through the 1970s, their efforts were at least partially successful. Policy makers, at least in the first years of the decade were responsive to their lobbying efforts as well.

The impact of foundation support is another important, though seldom mentioned aspect of movement professionalization during the 1970s. Gottlieb (1993, p. 119) discusses the role played by a number of foundations in encouraging groups like EDF and NRDC and more generally in the development of environmental policy during the 1970s. The foundations saw early on that litigation could effectively make environmental policy if it was targeted towards cases in which nationwide precedents could be set (Borelli, 1988). EMOs oriented towards litigation therefore received largesse not available to groups adopting other tactics. Those EMOs that accepted foundation support however became subject to foundation oversight. At EDF and NRDC for example, proposed legal actions were subject to prior review by a Ford created committee of past presidents of the American Bar Association and by a litigation review committee consisting of prominent members of both political parties. Gottlieb notes that these committees were instituted by Ford to shield it from any actions that might be deemed

too radical. They had the additional effect of further professionalizing the organizations to the extent that they encouraged the highest standards of legal and scientific analysis.

At the same time, the 1970s brought about a decline in grassroots activism of all sorts. The New Left, according to Gottlieb (p. 97) was in disarray and the less overtly politicized 'counter-culture,' with all its searching for alternative ways of living ultimately dissipated. Environmental groups like the National Wildlife Federation, the Audubon Society and the Sierra Club, which had never been very enthusiastic about the turn the movement had taken in the 1960s were there to reclaim their leadership and channel the movement's energies away from social criticism and towards more traditional environmental goals such as wilderness protection. The transformation of sixties environmentalism to the environmentalism of the 1970s however remains an area in the movement's history that remains under studied.

The corporate counter attack

The environmental movement's successes between 1969 and 1974 were, as Peter Borelli (1988) notes, due in large measure to the political palatability of environmentalism at least when compared to more divisive issues like the war in Vietnam and the civil rights movement. By 1970, it was clear that whatever the ideological commitments of early activists, the movement as a whole had taken, in the words of Russell Train, the first director of the Council on Environmental Quality (CEQ), the ideological middle ground. This position was further strengthened as the various components of environmental concern coalesced into a single movement. While the corporate sector did stand to lose from the new regulations, the overall popularity of the movement as a whole, and the fact that it had been caught off guard by the pace of legislative activity made opposition difficult. There is also some evidence that likely members of an anti environmental counter movement believed environmentalism was a fad and expected that business

as usual would return after only a brief hiatus. As it became clear that this was not the case and moreover as regulation began to threaten corporate profits all this changed.

Given prevailing economic conditions throughout much of the latter half of the 1970s, the environmental counter movement organized its attacks on environmental regulations around claims about their effects on employment and inflation. In some areas there was little doubt that environmentalism did affect the labor market. Certainly in the case of its frequent opposition to major construction projects (roads, dams, power facilities) the activities of the environmental movement affected the ability of these industries to create jobs. Similarly, regulations affecting the production and use of basic industrial commodities like coal or timber had the potential to alter their respective labor markets. As data began to accumulate on the effects of environmental regulation on employment however, it became clear that the job losses experienced by (especially blue-collar) workers during the decade had other causes. In any event, public opinion data consistently showed a willingness to accept some job losses if that was the cost of improved environmental quality.

Hays (1987, p. 311) discusses a number of the strategies business developed once the jobs argument (which has never been totally abandoned) lost its impact. By the end of the 1970s, everything from the decline of American competitiveness to inflation was attributed to environmental regulations. Unable to halt the progress of environmental regulations in the legislature, businesses moved to influence their implementation by various agencies of the executive branch where policy formulation was less in the public eye. In this arena Hays (p. 315) describes a situation which can only be called a war of attrition. Using persistent challenges to implementation policy, business was able to engineer a sort of regulatory grid lock in

which agencies became overwhelmed by the regulatory process itself[35]. In some instances however, complaints about implementation bypassed the agencies altogether and were lodged directly within the office of the President in such bodies as the Council on Wage and Price Stability and the Office of Management and Budget. In these quarters, as Hays points out, decisions were completely hidden from public view.

In addition to these sorts of behind the scenes manipulations, business developed a multi-faceted public relations campaign aimed at promoting its own Earth friendly actions while typifying the environmental movement as too extreme. Part of this involved attempts to capitalize upon the ways in which some regulations limited individual freedom of consumption. These sorts of campaigns were directed at off road vehicle enthusiasts, smokers, small property owners[36] and the general public, where attempts were made to typify environmental regulations as too restrictive of consumption choices. Freedom of choice discourses also fed the development of a nascent sagebrush rebellion over Western land policy (Evans, 1989). These discourses were located both on the consumption and production side. The former played up resentment about restrictions on the use of public recreation lands while the later involved tales about the hardships faced by small scale ranchers, miners and timber operators in the face of federal regulation of their activities. This sagebrush rebellion would prove important in the 1980s as it lent political support to the Reagan Administration's attempts to roll back many of the movement's accomplishments in the 1970s.

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[35] More recent attempts by the Republican Congress to de-fund EPA and other agencies with environmental portfolios clearly represent an extension of this strategy.

[36] In the 1990s the private sector, led by a bevy of conservative think tanks attempted to establish legal precedent against any and all regulation which prevented property owners from using their holdings as they see fit. These arguments were based on the constitutional prohibition against 'takings' without due process of law and eventually made their way to the United States Supreme Court.

In a society as oriented towards consumption as that in the United States, it is not surprising that consumption-side strategies had some effect. The second energy crisis, during the Carter years, had a particular impact here both on public attitudes and on the willingness of lawmakers to legislate exceptions to anti-pollution and preservationist legislation. The most serious of such exceptions was written into legislation establishing the Energy Mobilization Board since it explicitly gave the board authority to ignore anti-pollution regulations. The energy crunch may also have played a role in the authorization of the Telico Dam, a TVA project that threatened the snail darter with extinction and the relaxation of strip mining regulations to the extent that they affected coal production.

Finally, the corporate sector unleashed a campaign which attempted to portray the environmental movement as out of touch with the views of average Americans. Here business argued that while there had been environmental problems in the past, these had mostly been solved. Additional regulations went beyond reason and served only to justify the existence of the environmental organizations that pursued them. More seriously, if efforts at additional regulation continued, a backlash was likely that might threaten the important gains of the past (Hays, 1987, p.312).

Overall however, the institutionalization of environmental concern, both legislatively, and in terms of the beliefs and values of majorities of the electorate precluded a significant rollback of the progress made through the 1970s. As Evans (1989) predicted, while legislation passed during the 1970s did come under attack, whatever alterations to environmental regulations that did come to pass occurred mainly at the margins. The basic anti-pollution laws were there to stay.

Summary- A New Environmental Discourse

The professionalization of the movement, its new position as an inside player in the policy process, the challenges created by the corporate counter attack and of course the changing social context within which the movement pursued its agenda all led to a subtle, yet over time, profound shift in the content and style of environmental discourse. Although environmental rhetoric in the 1960s often took note of the material costs of environmental degradation, it represented, as I have shown, mostly a values discourse. By the end of the 1970s and, to an even greater extent, into the 1980s this changed markedly. Rather than emphasizing the intrinsic worth of environmental preservation, EMOs increasingly adopted what one might call a utilitarian discourse which privileged the material benefits of protection. There are numerous examples of this change in the literature produced by the movement but perhaps nothing makes the point better than the rationales offered for protecting wildlife. One of the most long standing environmental issues and one which lends itself so easily to justification on ethical grounds is wildlife preservation, which was, through the nineteen-sixties, accepted as a goal without the need for much explanation. It was viewed, as I suggested earlier, as worthwhile on its own merits given the intrinsic value wildlife possessed. Again, as I noted in the last section, this intrinsic value rhetoric was found more in the absence of utilitarian justifications for protection than in explicit arguments for the inherent worth of particular kinds of environmental protection. The following passage, taken from EDF's 1977 annual report illustrates what I mean:

> EDF seeks to assure that ecologically sound principles govern wildlife management programs and emphasizes the need to protect non-game as well as game species. (Environmental Defense Fund, 1977, p. 2)

One year later, EDF discussed its work on wildlife issues in exactly the same words but added this passage:

> ... and to preserve the genetic diversity of our planet by insuring the survival of endangered species (Environmental Defense Fund, 1978, p. 3)

By the 1980s it was difficult to find any discussion of wilderness or wildlife preservation in mainstream environmental discourse that did not make genetic diversity, and its importance as an investment in the future, the centerpiece of its rhetoric.

For some groups (EDF is notable in this regard) even environmental policies designed to protect human health, something most people would agree possesses intrinsic value, were (and still are) routinely justified in utilitarian terms around issues of worker productivity and insurance costs. In *An Environmental Agenda for the Future (Cahn, 1985, discussed in more detail below)* the CEOs of the ten largest American environmental organizations wrote "Economists and most business executives recognize that [pollution] prevention is cheaper in the long run than the costs of cleaning up pollution... [The benefits of regulation] include fewer medical bills, less time off work due to illness, reduced property damage, and increased crop yields. Also, the necessity of preventing pollution or cleaning it up has led to development of new industrial processes and served to increase economic efficiency" (p. 7)[37]. Other issues, typically those with global implications like GCC were rationalized in national security, resource availability and national competitiveness terms, three rationales with obvious purchase on the popular imagination during the Reagan years. As I show in the following section, these trends were further established in the 1980s.

[37] Unlike a number of other similar discussion, *An Environmental Agenda for the Future* allows that their are other benefits of clean environment beyond those the purely economic. "Health, safety and a livable environment should be seen as part of the national wealth" (p. 14).

The Movement During the 1980s

Issues

The Global Environment

At the end of the 1970s a number of pieces appeared in the movement's literature that attempted to assess the 'first decade' of its work and predict its agenda for the future. One such piece, *The Unfinished Agenda: A Task Force Report to the Rockefeller Brothers Fund* (O'Barney, 1977) is of particular interest since the board that put it together was comprised of representatives of eleven national environmental organizations. The most pressing item on this 'unfinished agenda' was population control since it was said to hold the key to a host of resource related problems— the central issue in the book. Conceptualizing a fixed stock of 'goods' in the world, the book comes to the simple conclusion that more population means a decreasing share of goods per person[39]. These questions were by no means entirely new ones for the environmental movement which had, since the 1960s, devoted a portion of its energies to resource related issues. The Stockholm Conference discussed in a Chapter 2, was followed closely by a number of American EMOs, most notably Friends of the Earth which cut its teeth in the international arena there. Yet despite the periodic appearance of resource related issues in public discourse, it was not until the 1980s that environmental movement organizations devoted much energy to the international scene.

With the exception of a number of wildlife organizations which had, since their inception, extended interest in species preservation beyond national borders (McCormick, 1989), there was little historical precedent for EMOs to take on environmental problems outside of the country. Pollution, after all was seen as a largely local, perhaps regional issue especially for a country like the United States

[38]While noting that people in the West, particularly Americans, consume much more of the world's resources than people in the developing world, the authors are oddly unable to consider differences in consumption in their overall discussion.

surrounded on two sides by large expanses of ocean. In any case, there was little American EMOs could do about environmental quality problems in other countries. At the same time wilderness preservation efforts, to the extent that they were rooted in concern for the provision of recreational amenities or in the quasi spiritual sensibility of a John Muir or Henry David Thoreau, were focused exclusively on the American landscape. Few people would have even used the word wilderness to describe a landscape outside of North America. Prior to the 1980s, several days of hiking in the North Cascades or canoeing in the Adirondacks was enough to get that rejuvenating dose of nature, one did not need to travel, as one does today, to the jungles of Belize or the frozen wastes of Antarctica. As the Rockefeller Brothers Fund report illustrates however, by the late 1970s, the mainline environmental organizations began to look at environmental issues outside of the United States[39].

Whatever impact the Rockefeller Brothers Report had, the watershed event that propelled this globalization of concern further was the Global 2000 report published in 1981. As I noted in Chapter 2, the report was the outcome of a directive issued to the Council on Environmental Quality and the Department of State by President Carter, to make a study of "probable changes in the world's population, natural resources and environment through the end of the century" (Global 2000 Study, 1980, p. vii). Aside from the high degree of press coverage it received, the Global 2000 report was significant for the impact it had on the environmental movement. The World Resources Institute for example as well as a consortium of environmental and other non-governmental organizations called the Global Tomorrow Coalition got their start in large measure thanks to the Global 2000 report. By

[39]McCormick (1989) and others point out that wildlife preservation had been an interest of conservation groups since at least the beginning of the twentieth century. The interest I discuss here however was relatively new to the extent that it focused on threats to the human environment.

1984, with the organization of a national conference to discuss what might be done about the report's findings, virtually all the mainstream organizations had some international involvement. The conference identified ten priority concerns: loss of crop land due to desertification and erosion, tropical deforestation, species extinction, rapid population growth, fresh water supplies, fisheries depletion, toxics and environmental health, climate change, acid rain impacts on agriculture, forestry and fisheries, and mis-management of energy resources (Speth, 1986, p.54-55). Not all of these concerns of course were taken up by the movement. Those, however, which could be fit into the movement's traditional agenda— wildlife, wilderness preservation and population control for example, were incorporated into environmental discourse in the 1980s with the development of active campaigns and lobbying efforts directed at institutions such as the World Bank and International Monetary Fund. These institutions, as the movement learned, often held more sway over the global environment than the U.S. government through their influence on third world development.

The discourse that developed around these new international issues borrowed a good deal from the rhetoric of the Reagan era as EMOs typically framed their claims about resource depletion in national security terms. As Speth (1986) wrote in his discussion of the Global Possible conference: "In a world that is daily more complex and interdependent economically, the economic and political interest of the industrial countries must be understood in a broad global context" (p. 54). The mainstream environmental movement was finally catching up with the CIA which had, as I mentioned in the last chapter, offered its opinions on the resource issue in the mid-1970s.

The sort of change in the movement's outlook that the shift towards international issues represents is nothing short of astonishing given the circumstances surrounding the renewal of environmental concern in the 1960s, the persistence of the national problems still unresolved during the 1970s, and the emergence of a new class of environmental

problems, toxic pollution, with significant purchase on popular conscience in the late 1970s and early 1980s. In the next section I discuss a number of structural reasons for this transformation as well as its overall impact on the movement. Suffice it to say here that the construction of a global environmental crisis along with other changes in the movement during the 1980s represented the emergence of a new kind of environmentalism quite a bit different from what had come before. Before moving on to that discussion however I would like to take up the re-emergence of grassroots environmentalism around issues of toxic contamination and local land use. The growth of this movement, while it may not have been successful in renewing the national movement's interest in the more down to earth concerns of everyday Americans, nonetheless offered a significant challenge to its hegemony.

Toxics

Up until the advent of the anti-toxics movement in the late 1970s, those national EMOs that pursued pollution issues (not all did, a number focused exclusively on wilderness and wildlife) usually targeted pollutants with a fairly even distribution in the environment; either those associated with processes that occurred ubiquitously, or those that were the common result of a number of different processes. The production of carbon monoxide and nitrogen oxides for example occurs wherever automobiles operate while injection of particulate matter into the atmosphere is the result of virtually every combustion process. This focus led the movement away from the grassroots and towards a national orientation. Instances of toxic contamination however were nothing if not highly localized. Distant from the localities where contamination occurred and unprepared to assist communities with efforts at cleanup or recompense, the environmental movement was exposed to a critique that had dogged it from the beginning— that it was essentially elitist, more concerned with saving whales than

people[40]. Social distance may played a role as well since instances of toxic contamination typically occurred in working class or rural areas quite far removed from the localities where the movement operated or drew its members.

For most of those who have written on the subject, the history of toxic contamination begins with the growth of the chemical industry in the years following the Second World War and its remarkable success in developing and promoting synthetic compounds with no natural analog (Freudenberg & Steinsapir, 1991; Hays, 1987). Formulated either as replacements for scarce or costly naturally occurring compounds, for their resistance to natural decay, or precisely because they functioned as biocides, these compounds, as we now know, are implicated in a variety of health problems ranging from cancer to reproductive failure. Presented in this way, Hays and others account for the development of new environmental health concerns in terms of the development of new environmental health threats. This sort of analysis however begs a question about why such concerns lagged behind the creation of the implicated chemicals by so many years. In part, this may be due, as Hays notes, to the slow accumulation of knowledge about the environmental effects of the agents in question. It was not until the 1960s after all that knowledge of bio-accumulation, the process by which compounds are concentrated in organisms higher on the food chain, enabled researchers to understand how chemicals released in minute amounts from widely dispersed sites could appear with such ubiquity. Still, the passage of the Delaney amendment in 1957, prohibiting the use in food of any substance found to cause cancer in laboratory animals; experiences with pesticide and PCB related fish kills; various chemical advisories about contaminated produce and fish issued

[40] Gottlieb (1993) offers evidence that number of national EMOs were involved in the toxics area. They differed however from locally based groups in that their regulatory orientation led them to think in terms of the setting of acceptable standards for toxic chemicals which, as far as effected communities were concerned, did not exist.

throughout the 1950s and 60s; and perhaps most importantly, concerns raised about above ground nuclear testing, gives evidence of the fact that concern about the health effects of the new chemicals did not emerge for the first time in the 1970s. Why then did it take until the mid 1970s for the toxics issue to develop the salience to spawn a formidable grassroots movement?

Freudenberg (1991) points out that it was not until the 1960s, and the successes of movements such as those which developed around civil rights and efforts to stop the war in Vietnam, that the potential of citizen action for social and political change was realized for the post war generation. Equally important was the profound sense of mistrust that developed in the post-Watergate years towards institutions of the state, particularly where they were involved in regulating the affairs of politically powerful moneyed interests. Ironically, it was this public skepticism about the State's ability to regulate such interests, that gave the anti-government rhetoric of Reaganism its relevance. Finally, changing beliefs about the sanctity of the body, the meaning of home and community, and more generally the inward turn of American culture in the 1970s, created a climate that magnified the meaning of whatever specific health concerns the presence of toxic chemicals might raise. These shifts in understanding in turn led to an interpretation of events like those that occurred at Three Mile Island or Love Canal which emphasized the degree to which the security of self and community could be shattered by forces with little interest in either. More than just a threat to health, toxic agents came to represent a sinister force.

Whatever the reasons for the emergence of interest in toxic pollution in the late 1970s, in the absence of effective action from national EMOs, a locally based anti-toxics movement sprang up to address the question. This grassroots effort sought to challenge corporations accused of dumping toxic chemicals, the state response to their activity, and proposals to locate noxious facilities in local

communities. Adopting tactics that were much more confrontational (in the famous Love Canal case, a group of local residents held an EPA official 'hostage' for several hours) and much less willing to compromise than the mainstream groups, the toxics movement has been able to achieve some success closing facilities where contamination has occurred, prevented the establishment of new facilities and secured compensation for those forced to relocate from affected areas. While initially characterized as self serving and parochial, this grassroots movement developed a discourse which was critical of the logic of an industrial system that produced substances it could not safely get rid of (moving from a 'not-in-my-backyard' to a 'not-in-anybody's-backyard' orientation), created a role for community participation in environmental decision making and influenced national attitudes about human health and environmental pollution. Moreover, much of its success was achieved without 'professional' help from the national EMOs, by ordinary and in many instances working class people, with little in the way of political clout or experience.

Although at first made up of localized groups organized around a particular issue, by 1981, with the establishment of the Citizen's Clearing House for Hazardous Waste, and somewhat later the National Toxics Campaign, one could say that the movement became loosely institutionalized. Eschewing affiliation with any of the national EMOs, and in fact choosing to locate outside of Washington DC, one could almost sense the development of two independent environmental movements. One was centered mostly around preservation and resource consumption issues and made up of members of the professional classes. The other was centered around pollution and health issues and situated locally in working class and minority communities where toxic waste contamination was most likely to occur. One achieved its institutional position through reliance on professionalism and was characterized by a belief in science and a commitment to working within the system. The other achieved its status from the moral legitimacy accorded to

victims, based its claims on the experience and intuition[41] of those who felt threatened, and was willing to go outside the system to achieve its ends.

The effects of this grassroots movement on the environmental movement as a whole are difficult to assess. On the one hand, it enlarged the popular (though not necessarily the organized) movement as a whole and enabled it to penetrate communities which had in the past been substantially indifferent to environmentalism. On the other it presented a challenge to the orientation and tactics of the more mainstream groups and to their legitimacy (Bosso, 1994). Beyond its use of guerrilla theater and the media, the anti-toxics movement was fundamentally unwilling to compromise with its adversaries. Unlike the mainstream movement which adopted a more conciliatory approach towards industry during the Reagan years, the various local anti-toxics campaigns that were initiated almost always refused to accept the sorts of "acceptable risk" solutions offered by the state and by polluters (c.f. Gibbs, 1995). Finally, the disproportionate impact of toxic contamination on Black, Hispanic, American Indian and other working class communities (c.f. Schnaiberg, 1993 for a review) led to the development of a discourse that tied environmental pollution to larger questions of inequality, power and political economy (Bookchin, 1990; Schnaiberg & Gould, 1994)[42]. This politicization occurred just as the national groups, undoubtedly in response to Reaganism, were increasingly framing their claims to avoid political critique.

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[41] Fruedenberg (1991, p. 32) cites a good deal of anecdotal evidence that grassroots activists rejected the idea that science is a neutral force, perceiving it instead as a resource used by government and industry to transform political issues into technical ones resolvable outside the framework of democratic decision making.

[42] A related discourse developed in the academic literature with the advent of journals like *Capitalism, Nature, Socialism* and the publication of book length treatments which characterized environmental degradation as an essential feature of industrial capitalism, as ineluctable as the exploitation of labor.

Despite a renewal of interest in the toxics problem, and the establishment of a number of community technical assistance programs, the mainstream movement was little changed by the advent of the sort of alternative environmental discourse the grassroots movement represented. The character of mainstream environmentalism continued to evolve in the direction already discussed. Rather than serving as a force that changed environmentalism, the failure of the grassroots movement to effect a shift in the mainstream movement's course gives evidence of the degree to which the mainstream had become institutionalized[43] and resistant to change. Despite the critique mounted by grassroots groups, mainstream groups were able to take on far flung and perhaps obscure (to everyday consciousness) issues like GCC whether they generated sustained popular interest or not.

The Reagan Revolution

Much has been written about the impact of the Reagan Administration on environmentalism in the United States. Entering office in 1981 with an ideological commitment to deregulation and the perceived existence of an electoral mandate for dismantling federal environmental protection programs, the new Administration installed into key departmental posts individuals who were openly hostile to goals of the agencies they were charged with administering (Kraft, 1984, p. 30). Some have written of the boon Reaganism provided the movement both in terms of the renewed support for environmental goals detected in surveys (as detailed above) and in terms of the surge in memberships. But as many mid-decade discussions of the movement show, despite the increase in movement resources and the fact that the most outspoken anti-environmentalists left the Administration in its first term, the Reagan revolution was at least partially successful in rolling back environmentalism for several reasons. Institutionally, the purges of

[43] The goal of the anti-toxics movement of course was not to change environmentalism but rather to influence policy, which, with varying degrees of success it has been able to do.

experienced personnel at EPA and other agencies as well as cuts in funding to those agencies worsened the regulatory backlog left from the 1970s and diminished their ability to implement environmental policy (Kraft & Vig, 1984). Rather than seeking the repeal of environmental regulations it opposed outright, it simply engineered an institutional arrangement which allowed regulations to lapse.

In addition to their impacts on the enforcement of environmental regulation, the policies of the Reagan Administration had a number of significant effects on the environmental movement itself. First, Reaganism forced the movement to switch to an entirely defensive posture since the Administration's efforts to prevent the introduction of new legislation, its veto threats and its recalcitrance in enforcing existing regulations made moot any new efforts at environmental regulation. Rhetorically, the movement's defense was founded upon an approach which positioned its discourse as 'official' while painting the environmental counter-movement as an upstart. As I show in the next chapter, specifically on the question of GCC, this strategy depended upon the claim that its positions were based upon 'the best scientific evidence.' Unlike the 1960s, when the movement typified itself as an insurgency opposed to mainstream discourses that glorified consumption and economic growth, in the 1980s it typified itself as representing the mainstream view and the counter-movement as a fringe insurgency out of step with public sentiments. Given the generally favorable public attitude towards environmental protection such a typification was probably accurate. But the acceptability of the movements agenda was bought with an understanding that environmentalism was to be about the environment and not larger social questions particularly those that involved the basic system of political economy.

The extraordinary success EMOs had in recruiting new members, a result of their ability to capitalize, in direct mail campaigns, on the threat Reaganism posed to the environmental cause, was significant as well. I noted earlier that scholars of the movement have characterized

the 1970s as a period in which environmental groups developed into professional or 'expert' organizations. With the influx of funds from direct mail efforts however, EMOs sought to recruit a new class of professional with expertise not in environmental issues but rather in organizational management and development and, significantly, in public relations and financing. This transformation, McClosky (1991) notes, helped create a leadership which in some instance was more distinguished for its fundraising skills than its ability to conceive and mount environmental programs. In reviewing the annual reports published by EDF for example, one notes a subtle shift throughout the 1980s from a tone suggestive of an activist environmental group to one more reminiscent of a foundation. Throughout the decade these reports became increasingly glossy and polished and read more like public relations material than the sort of matter-of-fact reports published in the group's first decade. They suggested that EDF was no longer an upstart but rather an important mainstream player, a going concern. Of course by the middle of the 1980s, with a board of directors that included prominent Wall Street attorneys this is exactly what EDF had become.

The Group of 10

Perhaps the most important impact of Reaganism on the institutional structure of the U.S. environmental movement was the formation, in early 1981, of a coalition of major national EMOs which came to be known as the Group of Ten[44]. Initially brought together by major funders of the movement in the mood of uncertainty surrounding the inauguration of Ronald Reagan, the Group of Ten was from the outset conceived as a means thorough which national EMOs could coordinate their response to the challenges posed by the new Administration. Up until its advent, the national EMOs, while increasingly similar in terms of their outlook and ethos, had failed, in Gottlieb's (1993)

[44] My discussion of the Group of Ten is based largely on Gottlieb's (1993) intensive examination of the coalition's papers.

words to "construct a coherent, movement-wide institutional framework commensurate with their role in establishing a policy nexus in Washington" (p. 120). With the ascendance of the Reagan Administration, the CEOs of the major groups were willing to put aside their often competitive relationship in order to map out a coordinated agenda and create a coherent identity.

The EMOs represented at the first meeting of the Group of Ten (there were nine initially) included the old line conservation and wildlife/wilderness groups such as the National Wildlife Federation, the Izaak Walton League, the National Audubon Society, the Sierra Club and the Wilderness Society. Also represented were CEOs from the newer more environmentalist groups like EDF, NRDC, FOE and the Environmental Policy Center. The National Parks and Conservation Society, one of the oldest environmental organizations, joined the group shortly after its first meeting. Notably absent from this consortium were groups such as Greenpeace, Defenders of Wildlife, representatives of the nascent anti-toxics movement and Environmental Action, one of the more outspoken and distinctly anti-corporate EMOs and the one most ready to invoke a political analysis of environmental problems. None of these were given invitations to join the consortium later on. According to Gottlieb's interviews with Robert Allen, an influential officer of the Kendall Foundation who is credited with instigating the Group of Ten, these omissions stemmed from a desire to keep the group small enough to assure a certain level of intimacy and to provide the capacity to follow through on any agreements the groups might reach. Regardless of the reasons for these omissions however, they obviously were significant in terms of the positions taken by the Group and the strategies that it developed. This became all the more significant as its ascendancy, especially in terms of the media attention it received, marginalized EMOs outside the ten national groups (Gottlieb, 1993). The composition of the Group of Ten, especially the inclusion of the old line conservationist groups, shifted the movement's direction in a

decidedly conservative direction tempering those favoring a more aggressive response to the Reagan Administration's policies. Despite their reservations about a confrontation with the Reagan Administration, the Group of Ten was largely successful in its effort to prevent the wholesale rollback of environmental regulation desired by many in the White House.

The Group of Ten is important to the story here since its creation represented the culmination of a process of movement institutionalization that had been gathering steam since the decline in grassroots environmentalism after the 1960s. This process, as I have outlined, was shaped by the influence of foundation support, the ascendancy of tactics such as litigation and policy analysis which privileged highly legitimized forms of professional expertise over more confrontational approaches, the relative receptiveness of various agencies of the state to environmental protection (which created a space for the work of the EMOs within the policy process), the de- politicalization of environmental concern (by which I mean the waning of any politically critical component to environmental discourse) and finally, the generally pro-environmental attitudes of the general public. With the advent of the Group of Ten, it became possible to view the agenda of the environmental movement as the coordinated strategy of a coherent political institution and to think of each organization within it as influenced by the dynamics of the larger entity. These dynamics, as I have argued, pulled the movement away from a more confrontational politics towards one which sought consensus and accommodation and that tried to work within the more conservative political field available in the 1980s.

An Environmental Agenda for the Future

The agenda set forth by the Group of Ten became a matter of public record in 1985 with the publication of *An Environmental Agenda for the Future* (Cahn, 1985). The CEOs who put the book together intended it as

a forward looking document the purpose of which was to move beyond efforts at maintaining the accomplishments of the 1970s and towards the problems and opportunities likely to appear with the approach of the new century and beyond. Given its appearance just as the question of GCC was about to burst on the scene, it is worthwhile examining since it sheds light on just what the leaders of the mainstream EMOs were thinking at the time.

The issues the CEOs deemed important were 1) nuclear war and the environmental costs associated with nuclear weapons production; 2) human population growth; 3) energy use, and in particular energy conservation and the development of more benign methods of energy production; 4) water resources, again with an emphasis on efficient use of water, prevention of groundwater contamination and wetlands protection; 5) toxics and pollution control; 6) species extinction which was increasingly being discussed, as mentioned before, in terms of the maintenance of genetic resources); 7) private land management and agriculture, including issues as diverse as soil erosion and the loss of farm land to suburban development; 8) 'protected land systems,' they refer here to the protection and expansion of wilderness areas and national parks; 9) protection of public lands used for grazing, mining, timber production and fisheries and a switch to fair market valuations of public resources exploited by private interests; 10) the urban environment, specifically issues such as indoor and outdoor air quality, threats to urban water supplies, solid waste disposal, suburbanization, sprawl and the provision of mass transit, and the development of recreational opportunities for urban dwellers; and finally, 11) the global environment, including such things as transnational migration of pollutants, sustainable resource use, and better scrutiny of internationally funded development projects that may do environmental and cultural harm. What is interesting in this enumeration of future problems is the extent to which it emphasizes resource issues and de-emphasizes the sorts of concerns that propelled

the environmental movement in the 1960s. Of the eleven issues mentioned seven (population, energy, water, species extinction, private land management, public land management, and the global environment) concern resource conservation while only two (toxics and pollution and the urban environment) have anything to do explicitly with human health[45]. Only one concerns wilderness preservation (arguments for the amenity value of the environment appear in items 8 & 10). In many ways then *Agenda* represents the re-emergence of the sort of conservationism associated with figures like Gifford Pinchot.

If the eleven issue areas set forth by *Agenda* are indicative of the substantive direction in which the movement was moving, the content of the rhetoric its authors employed gives evidence of the ways in which environmental issues were framed. Starting in the very first chapter of the work, *Agenda* emphasizes a utilitarian rationale for environmental concern. The environment should be protected, the book's authors argued, "since there is ample evidence that sound resource management and careful protection of the environment are necessary to American society and of value to the economy.... failure to protect the environment has disrupted lives and cost billions of dollars" (p. 6). Regulation in other words is necessary for a sound economy which in itself is a requirement for environmental protection. Environmentalists, this passages states, have as much interest in a healthy economy as everyone else.

Instances of this sort of economistic rationale appear throughout the work in a number of the issue areas the report covers. For example, although the book notes that some 800 million of the poorest people on the planet live in "absolute poverty... a condition of life degraded by disease, illiteracy, malnutrition and squalor" (p. 33), the

[45] While the authors mention other, more traditional rationales for protecting wild animal and plant species (their intrinsic value, the opportunities they provide for human self understanding, their amenity value) their emphasis is on the use value lost a particular organisms disappear. As such, the CEOs essentially treat wildlife as a resource.

overall thrust of the section on over population emphasizes the depletion of "our biological capital" (p. 33) rather than the toll in human suffering. Where impacts on the United States are discussed, potential effects on national security receive nearly exclusive emphasis. Reductions in energy consumption are similarly discussed in terms of a rationalization which along with a cleaner environment includes such benefits as a lessening of international tensions and a stronger economy (p. 42). Other issue areas the report covers also emphasize the market's inability to charge the costs of environmental damage to the parties creating it. In some instances the book notes that this failure can lead to costly government spending programs aimed at alleviating damage caused by private interests. In a slightly different vein, the chapter on water resources notes that government water management projects (dams, channelization projects, etc) "evolved according to the dictates of political convenience rather than economic efficiency ... [but that now]... An era of open-handed federal spending has been terminated by chronic federal budget deficits" (p. 56).

Agenda's subject matter then, and the manner of its presentation— the sorts of arguments the book's authors marshal to support their claims— give evidence of the degree to which the advent of Reaganism forced the environmental movement to frame issues on the discursive field created by its adversaries[46]. The movement in other words had to accept the terms of the debate as they were laid out by its critics. Despite their acceptance of this field however, the authors of the text make it clear that utilitarian concerns are not the sole rationale for environmental protection. Consider for example the book's discussion of toxics and pollution control. Early in a chapter on this subject the authors write:

> Pollution is destructive and the damage [it causes] is cumulative. It is neither efficient nor wise to allow essential, commonly

[46] Its ability to accept these terms predates Reaganism owing as much to the movement's desire for legitimation in the early 1970s as the election of 1980.

> held, life-sustaining resources— air, water and land— to be used without cost on a first-come, first-served basis, in a manner that destroys the utility of the resource for others. Such a system is cheap for the first user but very expensive for society. It is profoundly wasteful. (p. 66)

While the initial rather forceful typification of pollution as destructive seems to justify its elimination on no other grounds but the desire to avoid the unspecified damage pollution causes, the emphasis in the paragraph is primarily on the expense, wastefulness and inefficiency of environmental abuse. Later on in the same page however, the authors switch back to the sort of position they began with when they write: "Wealth includes not only goods and leisure, but health, safety, and a land worth living on and passing along to the next generation" (p. 66). Similarly, their discussion of urban and wilderness park lands emphasizes the provision of amenity and quality of life, while the chapter on wildlife protection mentions both utilitarian, aesthetic and intrinsic value arguments for preventing species extinction.

As these examples suggest, it would be incorrect to describe *Agenda* as a purely utilitarian treatment of environmental problems. To do so would only be to offer a caricature of what the book is all about. At the same time however, *Agenda* does represent a very different conceptualization of the environmental issue compared to earlier treatments. Certainly in terms of the issues it takes on— private and public land use, water resources, energy use— *Agenda* represents a move away from a book like *The Environmental Handbook* which emphasized pollution and was more explicitly oppositional. Moreover, unlike much of what was written about the environment in the 1960s, *Agenda* adopts an almost academic tone rather than the sort of hyperbolic, often sentimental language used in earlier discourse. But then the motivation for environmentalism in the 1960s was the loss of nature itself whereas at its heart *Agenda* is more about the loss of what nature provides. There is little of the sense of anger one would have seen fifteen years earlier, and perhaps not surprisingly, little of the

sense of loss. *Agenda's* authors, unlike their counterparts from an earlier period, are not intent upon saving the world. Nowhere does one find the sort of reverential feeling towards the land that comes across in *Time Magazine's* article *The Effluent Society* or even, for that matter, in certain sections of the PSAC report which was, after all, produced by a supposedly dispassionate scientific body. If these earlier discourses were at heart devoted to the repair of nature, *Agenda* devotes itself to the repair of the human exploitation of nature. One may lead to the other but at the same time they are fundamentally different and speak to two fundamentally different historical periods.

The degree to which the sentiments endorsed by *Agenda's* authors mirror those that characterized the Conservationist era is astonishing. Both discourses appeared around particularly rapacious periods in the history of capitalism and both were concerned with resources and the threat their over-exploitation presented to the maintenance of the capitalist system. Perhaps most interesting to my subject here, both movements were immediately preceded by an environmental discourse that based its claims on the intrinsic value of nature and was more broadly critical of the social order. My purpose in pointing out these similarities is not to argue for some sort of historical theory relating the tenor of movements critical of the market to the ebbs and flow of capitalism— there are probably sufficient differences in the history of the two movements and the two periods to invalidate such a theory anyway. Instead, I want to notice the way in which both the old and the new conservationisms are implicated in the preservation of the system they seek to reform. At the same time, by emphasizing market failures and individual decision making, both cloak the actions of the most powerful actors in the system, the private industrial enterprises which, as a number of critics have noted, are fundamentally incompatible with real environmental health. The market, however mystical or sublime it may be, is after all an abstraction. To blame

some fault in it in an account of a social problem is ultimately to blame no one, or, alternatively, everyone. There is nothing earth shattering in this observation but to some extent it may be related to the sorts of issues the mainstream environmental movement took on as the 1980s progressed.

These ideas are picked up in the next chapter and again in the conclusion where I show how GCC fit into the mainstream environmental movement's new found propensity to disperse responsibility for environmental degradation. In the case of GCC, this diffusion occurred not only through the adoption of a market discourse but also because the very properties of GCC afforded the development of a rhetoric which affixed responsibility for the condition to myriad local decisions about how to carry on individual activities. Important here are the circumstances which led to the development of these strategies.

New Strategies

Reaganism affected not only the issues the environmental movement pursued and the type of argumentation it employed in making its case but also the sorts of solutions to environmental quality problems it could use to address the issues at the top of its agenda. Through the 1970s, the mainstream movement's activities centered around campaigns for regulatory legislation and litigation. Both were employed to obtain enforcement of laws and to move into new areas where regulatory policy had not yet been made. Moving into the 1980s, these strategies began to lose their efficacy. McClosky (1991), writing at the end of the decade, notes that of the costs associated with mounting major legislative campaigns had become prohibitive especially since even the best legislation was rendered ineffective if the executive branch of government was unable or unwilling to properly enforce whatever standards were passed. In 1986 for example, EPA Administrator William Ruckelshaus was threatened with contempt of court for refusing to set radiation standards from uranium mines. In response, he authorized a

standard equivalent to existing ambient emission levels (Taylor, 1990, p. 19). Even in the years immediately prior to the advent of Reaganism some in the movement perceived a problem in this area. At a conference sponsored by the Conservation Foundation in 1980 for example, attendees heard about the regulatory bottleneck at EPA which was preventing the adoption of environmental regulations mandated by Congress (Carter, 1980). As McClosky (1991) notes even the best legislation supported by Congressional oversight and litigation can only move a reluctant executive branch so far. The "pragmatic reformers" he continues, faced "a crisis in their faith in government action" (p. 86) in response to these difficulties. From the tone of his discussion, one gets the sense that he viewed the movement as moribund.

Ultimately what McClosky questions is the dependence on federal policy to solve environmental problems. Others in the movement raised the same issue. Given the historical reliance on federal regulation however, alternatives were, at least in the beginning, in short supply. One approach which fit into the larger discourse of the Reagan era was the shift to regulation at the state and local level. William Reilly who was chairman of the Conservation Foundation in the early 1980s and who later went on to be director of EPA in the Bush Administration, advocated this approach in 1980 (Carter, 1980). Unfortunately the effectiveness of such an approach is compromised by the fact that the sources of environmental harm are in many instances far removed from the sites where the harm is felt. Pollution created in one state may manifest its impacts in other states creating little incentive for regulation at the source. GCC of course is a classic example of this problem. Additionally, states may be motivated to set low standards in order to attract industry. Ultimately this results in a sort of 'race to the bottom' with respect to environmental regulations. Lobbying and oversight are also more difficult politically for national organizations like those that make up the mainstream environmental movement. It is simply easier to mount a single campaign at the

federal level than fifty state level campaigns. Another alternative to regulation pursued in different ways and to varying degrees by different EMOs was public education. In the late 1980s EDF, along with the American Museum of Natural History, put together a major exhibition entitled *Global Warming: Understanding the Forecast.* Quite different than that approach, NRDC's efforts to bring the use of the pesticide Alar to public attention accomplished in a matter of a few months what EPA had been unable to do for over fifteen years. While such an approach requires an issue where consumer purchasing decisions can be influenced, it is clear that in the current climate it may be the most effective strategy available.

Third Wavism

I have already mentioned the effort, on the part of the Group of Ten, to move environmental protection from the political sphere to the marketplace where, if nothing else, it was protected from the vagaries of the legislative and enforcement process. This effort was heralded by EDF as the advent of a new, "third wave" (after Toffler, 1980) in American Environmentalism[47]. While assuring continued support for the goals of "first wave" environmentalism, preservation; and "second wave" environmentalism, pollution control; EDF's Executive Director, Fredrick Krupp, called for a new stage in environmentalism which broadened its agenda to include environmentally sound planning for jobs, agricultural productivity, and power for industry and consumers. In a 1986 piece which appeared in the Wall Street Journal, Krupp wrote that the environmental movement needs to .".recognize that behind the waste

[47] Gottlieb (1993, p. 139) discusses the role played by one early board member, Amyas Ames, an investment banker with Kidder-Peabody, in encouraging EDF's increasingly accomodationist perspective. Ames felt that the movement should focus its efforts on 'win-win' strategies—those that benefited both the environment and industry. EDF's work at developing a pricing model for the utilities industry which demonstrated how investment in conservation might be more profitable than increased production is a prime example of this sort of approach. This model is something the organization trumpets at length in a number of discussions of its work.

dumps and dams and power plants and pesticides that threaten major environmental harm, there are nearly always legitimate social needs—and that long term solutions lie in finding ways to meet those underlying needs" (Taylor, 1990, originally Krupp).

To its proponents, third wavism represented a shift in strategy from one which relied on government regulation of industry and litigation to one which emphasized market based solutions to pollution problems, compromise and, where possible, reliance on the enlightened self interest of polluters. EDF is probably the EMO most associated with these sorts of approaches. Its work developing a computer model demonstrating how investment in energy conservation could be more profitable for utility companies than new plant construction was one of the first efforts in this direction. Another example of EDF's third wave strategy was its work in 1986 authoring California's Proposition 65 to control toxic substances. Rather than mandating the usual sorts of emissions standards, EDF pushed for a simple public notification requirement when known carcinogens were to be used in a product. The idea behind this approach was to turn the use of such substances into a public relations problem for the offending corporations and thereby create private incentives for their elimination. In EDF's self-published volume *Ahead of the Curve* (Taylor, 1990) the organization provides several examples of how this approach has avoided the sorts of problems more traditional regulatory strategies have encountered (they give no indication of how it may have fallen short of traditional approaches). Despite its association with EDF, these sorts of approaches have been employed by other EMOs. The sorts of 'debt for nature' swaps orchestrated in the late 1980s and early 1990s by groups concerned with Third World wildlife and wilderness issues are another example of how EMOs have moved away from punishing environmental damage creation towards a strategy which incentivizes its prevention.

Summary- Environmentalism in the Reagan Era

The overall trajectory of the environmental movement in the 1980s represents a continuation of the shift in movement strategy and discourse begun in the 1970s. Aided and abetted by the ascendance of market oriented discourses, claims-makers continued their efforts to depoliticize environmental rhetoric and to shift its focus towards the sorts of utilitarian rationalizations for protection noted in the last section. Increasingly conservative and defensive through the period, mainstream EMOs took on abstract and rather amorphous issues like global resource utilization which, in addition to fitting nicely with the cold war rhetoric of the Reagan Administration, offended none of the movement's usual adversaries. Where controversy was unavoidable, mainstream EMOs sought positions of accommodation and compromise with polluters– the so called "third wave" approaches just discussed. Perhaps more than anything, these strategies represented acquiescence to the realities of the new political order.

Taken together, these shifts enabled claims-makers within mainstream EMOs to typify their positions as reasonable and rational– as 'mainstreamist' for want of a better term, while characterizing those in opposition to them as extremist. Put differently, the movement sought to position its discourses as centrist, as part of the establishment. In so doing of course it distanced itself not only from its opposition but also from much of its own history. But then as I have shown, the organizations themselves had changed; they could position themselves as centrist because increasingly they were centrist. The advent of the Group of Ten furthered this pull towards the middle to the extent that it excluded EMOs most critical of the existing order, while drawing its member organizations towards the sorts of compromises comfortable to very conservative group like the National Wildlife Federation[48]. More than anything however, the impact

[48] According to Gottlieb (1993), James Watt attempted to divide the environmental movement with direct appeals made to the membership of

of the Group of Ten lay in the degree to which its positions came to stand for those of the environmental movement as a whole. Whether this development is related to the realities of doing environmental work during the Reagan years or to the Group of Ten process itself, it is remarkable given the development of the alternative environmental discourses which emerged around the same time as the Group of Ten.

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the National Wildlife Association, a conservative groups with a membership of mostly of hunters and other sportsman.

Constructing Global Climate Change

The last three chapters spelled out the context within which GCC claims arose. In the first, I discussed developments in science where the possibility of global warming was first introduced. I also noted the ways in which a series of resource crises, or more accurately the interpretation of a series of agricultural failures as resource crises, created an opportunity for climatologists and other scientists to position their knowledge as relevant thereby gain a role for themselves in managing the problem. At the same time I noted the parallel development of a global consciousness. This consciousness was at the root of concern for global resources although it penetrated other realms as well. The two chapters on environmentalism outline the trajectory of the environmental movement when GCC claims-making activity, developed initially within the scientific community and the state, intensified in the late 1970s and early 1980s.

The purpose of this chapter is to describe the content of GCC discourse as it has been developed by claims-makers in the scientific, policy making, and environmental movement spheres. Essentially there are two foci of this analysis, one concerns what claims-makers say and the other has to do with how they say it— content on the one hand and form on the other. Specifically, I examine the ways in which the truth of GCC claims has been established, the reasons offered for the existence of the condition, the range of harmful outcomes that claims-makers describe, and the solutions to it that are suggested. My goal in this analysis is to deconstruct what claims-makers say, and from that, to elucidate the themes that underlie GCC discourse. In so doing, I

hope to place it in a larger discursive context which, as I stated in the first chapter, is often absent in research conducted within the social constructionist paradigm.

Methodological Note

In order to do this I examined, along with two research assistants, several hundred documents[49] produced by claims-makers, paying particular attention to issues that arose repeatedly and which seemed connected to broader social questions and emerging claims-making strategies (a computer program I developed aided the coding and indexing processes). Since no attempt was made to code every statement that could fit into one of the categories below, it would be misleading to view my analysis as statistically representative of the materials I looked at. This problem is compounded by the fact that the categories themselves are not mutually exclusive— most statements can fit into more than one of them. My method therefore is historical and interpretive and has little in common with quantitative content analysis studies sometimes used in sociological or media studies research. In essence what I offer is a close reading of GCC texts which focuses on what they say, how they are structured, how they work as argumentation and where they fit into larger social and cultural themes.

Three things stand out in the materials I studied, 1) the degree to which GCC claims-making involves typifying scientists, scientific knowledge and scientific practice; 2) the degree to which claims-makers focus on the GCC debate itself; and, 3) the way in which GCC discourse often "carries" other social/environmental agendas along with it. A two

[49] Documents for this study were surfaced after searches of the Alternative Press Index , and Environmental Abstracts and through an issue by issue study of the Environmental Defense Fund's newsletter *EDF Letter* since its first publication some twenty five years ago. I also contacted environmental movement organizations actively involved with GCC, in order to obtain materials (position papers, annual reports, press-releases, flyers) not formally published. Selection of materials was by no means random— in essence I looked at everything I could find.

level thematic classification effectively summarizes the content of the materials I looked at. The first level locates the discourse in one of three broad categories. A statement either A) worked to establish (or question) the truth of GCC claims; B) typified or described some aspect of GCC; or, C) typified or described something tangential to climate change. Within each domain, statements were categorized topically according to the following table. As I noted above, in many instances I found myself placing the same statement in more than one category. For example, a statement attributing GCC to the market's failure to

Level I	**A.** Statements Establishing Truth of Claims	**B.** Statements about GCC Itself	**C.** Statements about Other Issues
Level II	-Imagery -Evidence	-Causes of GCC -Relationship of GCC to other issues -Future under GCC -Seriousness of the problem -Solutions -Obstacles to solving problem	-Pro GCCH claims-makers and their activities -Anti GCCH claims-makers and their activities -The GCC debate -Other environmental and social issues -Scientists and the practice of scientific research -Politics, economy, culture or the social order -Nature

adequately price the true cost of fossil fuel use is both a statement about the causes of GCC, a statement about obstacles to solving the problem and a typification of the market system as flawed. This problem, while it makes the development of a consistent typology difficult, reveals one of the most interesting aspects of GCC claims-

making I discuss later on- the degree to which it links up with and is sometimes subsumed by questions quite tangential to it. At the same time it points up the degree to which these texts represent a sort of Gestalt best understood through interpretive synthesis rather than a more rigorously structured analysis. The scheme above therefore is intended as a heuristic, that is to say as a sensitizing device. My goal in this chapter then is to lay out the typifications attached to each of these aspects of GCC claims-making activity as they emerged from a study of claims-making materials produced by scientists, environmental organizations and persons and groups opposing their claims. All of these issues are discussed in this chapter.

Before moving into a description of these typifications a word needs to be said about those responsible for them. So far throughout this study, I have proceeded as if claims-makers could be described as coming from one of four distinct spheres: the science or the policy making area, the environmental movement, or the anti-GCC movement. In outlining a narrative history of the issue, this oversimplification did not present a problem since my concern was with substantive events and not so much with the content of GCC texts or their authorship. Unfortunately this simplification will no longer suffice. As I showed in Chapter 3 and 4 scientists move readily between research institutions and environmental or policy making organizations and in some instances may be responsible for establishing them. As the careers of individuals like James Hansen, Steven Schneider and others illustrate, many scientists, even those whose primary activity remains research, become involved in the sort of advocacy work that constitutes claims-making[50]. The same holds true for persons situated within policy making organizations. Even a simplistic typology which classifies

[50] While some studies of the role of *science* in environmental claims-making and in environmentalism more generally are beginning to appear (see Yearly, 1995 for a review of this literature), I have not been able to locate any discussion of the role of *scientists* in these areas.

claims-makers as either supportive or hostile to the global change hypothesis is problematic since it begs a question about what constitutes support. For example, would publishing an article critical of GCM predictions in a scientific journal be enough to classify a scientist as hostile? What if an author, even one holding a legitimately disinterested[51] position, made the same argument in congressional testimony? To force claims into categories of authorship not only distorts the role played by claims-makers, it masks an essential feature of their activity– the way in which they slip in and out of different spheres of identity. This ability is in part responsible for their success. For these reasons, this chapter will avoid attempting to account for the content of claims through reference to their source.

Establishing the Truth of GCC Claims

In order to define a condition as a problem, claims-makers have first to succeed in defining it as real. For some conditions the "reality" of a situation may be established non-problematically in everyday experience or with reference to "common" knowledge. For example, most people would agree that the air in New York City is polluted (how polluted and whether or not the pollution is a problem are other matters). For other conditions, particularly ones that are not highly imageable, vicarious experience often via sensationalized media accounts gives reality to a situation. In still other instances, "facts" can be determined through relatively straightforward scientific assays. Unfortunately for GCC claims-makers, the case for CO2 induced climate change is more difficult to make. Unlike air pollution it is not physically sensible. Unlike an event like the Exxon Valdez oil spill it not particularly imageable. Unlike toxic contamination the condition is not yet here (and therefore cannot be directly measured)

[51] Employing a social constructionist approach to science (e.g., Latour 1987) one could argue that all scientific discourse amounts essentially to claims-making, although in this study I am talking on a less philosophical level about a very different type of activity.

and in any event is likely to be masked by a large signal to noise problem[52]. Moreover, the predicted temperature changes when (and if) they do occur are small and therefore not particularly threatening in the imaginations of most people. How then has the credibility of global climate change claims been established?

In some instances, claims-makers employ the most direct strategy— explanation of the science behind GCC predictions. Credibility, in other words is built by presenting a detailed discussion of GCC science. Not surprisingly, this approach is taken most often in official settings such as Congressional hearings or similar venues where the claims-makers are scientists speaking on the record. Under such circumstances claims-makers employ the staple props of scientific claims-making like charts (the Mauna Loa CO2 curve is nearly ubiquitous), diagrams and maps, which, by representing the science physically, make it understandable and believable. At the same time, claims-makers in these venues employ the sort of dispassionate and contingent rhetoric that establishes their credibility as authorities. In a limited number of less official settings, detailed explanations of the science of GCC are also be offered. For the most part though, claims-makers usually rely on less direct approaches.

Imaging Climate Change

A good part of the problem faced by claims-makers in establishing the credibility of the threat posed by GCC relates to its temporal, physical and imaginary distance from everyday life. Carbon dioxide itself is harmless and threatens neither living organisms nor our aesthetic sensibilities. In addition, the predicted temperature changes are, from the standpoint of our everyday experience of weather, very small— less than the variation most people in the temperate latitudes encounter over the course of a single day. Complicating

[52] The signal to noise problem refers to the difficulty of separating the effects of CO2 induced climate change from periodic natural fluctuations.

matters further, CO2's harmful effects are thrice removed from increased levels of the gas itself since those harms are mediated through the climate system, the resource system, and the socio-political system each of which figures remotely, if at all, into the everyday concerns of those towards whom claims-making is directed. The difficulty claims-makers face is to portray the small temperature changes as significant and the otherwise non-problematic and taken for granted climate, resource and social systems as vulnerable. Claims-makers need to break through common sense understandings of temperature and expose the role it plays in creating the everyday life people experience as natural and normal. To the extent that many contemporary environmental claims revolve around invisible dangers, this problem is not unique. The task is to disrupt the faith audiences have in the taken for granted world. In the case of GCC, one way to do this is through the use of images.

Climatologist Stephen Schneider, a witness at Congressional hearings on the topic since the mid-1970s is particularly effective at making the problem accessible to lay people. In 1976 testimony before the House Subcommittee on the Environment and the Atmosphere he displayed two images of a village in the French Alps. The first was a contemporary photograph of the touristic variety. The second, a copy of an engraving that had been made several centuries earlier. It was clear both images were made from the same spot. In the earlier picture however a glacier filled the scene almost to the doorsteps of the village, whereas in the contemporary view the glacier was barely visible. The point Schneider made in his testimony was that global temperatures were only two or three degrees cooler when the earlier image was made. What a difference a degree can make. Schneider is by no means the only claims-maker adept at the use of imagery. A similar observation which appeared in the Sierra Club Bulletin (Sierra Club, 1981a) noted that future climatic conditions may be as different from those now experienced, as contemporary climate is from the last glacial

epoch. Allusions to glacial epochs also introduced *Global Warming: Understanding the Forecast*, an exhibition sponsored jointly by the American Museum of Natural History and the Environmental Defense Fund (1992). Quite literally bringing the threat of climate change to the doorstep of lawmakers in Washington, the exhibit featured a large contour map of the nation's capital. By pressing various buttons labeled with the temperature changes predicted under different warming scenarios, exhibit goers could inundate Washington, from the Jefferson Memorial all the way to the steps of the Capitol. Effects on agriculture are harder to image given the limited knowledge and concern most people have about the details of their food supply. The Conservation Foundation (1979) attempted to break through this indifference by comparing future conditions in North America to those now occurring in the Sahel. Defenders of Wildlife (1988) may have been more successful when they noted that in warmer times, Manatees browsed the New Jersey shoreline and oranges grew outside of Toronto. The World Watch Institute (1988b) was certainly on target when it suggested that GCC might reverse recent population shifts to the sunbelt as people seek more moderate temperatures in the Yukon or in Siberia.

But what are we to make of images of people fishing from the steps of the Capital or picking oranges in Canada? How do they work to make real the claims of those who created them? On one level of course they simply provide illustrations, pictures to hold in the mind's eye before the future provides the real thing. But more importantly these images bring to vision the unimageable and in so doing fracture everyday belief about the normal and the possible. More than just depicting conditions themselves, they illustrate the incongruous and dissonant character of contemporary life and in particular its relationship with nature. They show by how fine a thread spins the world as we know it and the power of human agency to disrupt all that is taken for granted. Consider a statement spoken by Paul Ehrlich, a well known ecological futurist and polemicist for population control, during a rally

celebrating Earth Day 1990: "a cow breaks wind in Indonesia, and your grandchildren could die in food riots in the United States," (as excerpted in Ross, 1991, p. 139). More akin to the disjointed world of our dreams than the linear logic of science, these sorts of connections shred the sense of continuity, relationship and forward motion through which we apprehend the world. To be sure, a linear logic does in fact underlie Ehrlich's statement— bovine flatulence consists mainly of methane, a powerful greenhouse gas and is therefore tied to the success of agriculture which in turn influences the price and availability of food. But to those unaware of this bit of science the statement reads more like *Alice in Wonderland*— a fine story until scientists start telling us it is actually true.

Portraying GCC Claims as Science

Image making, while necessary in order to establish concern and a sense of immediacy about a GCC future, is an insufficient condition for establishing its inevitability. For this reason, I want to look now at some of the rhetorical approaches claims-makers use to establish the veracity of their claims. Aside from informing the social constructionist approach to social problems— which sometimes lacks, as I have noted, a concern for the details of claims-making activity— the particulars of this persuasive discourse speak to the larger context within which GCC arose (for example by indicating sources of authoritative knowledge and illustrating styles of argumentation). These details contain a good part of the cultural information I am interested in uncovering and provide an understanding of the society that produced them. Indeed, more than "containing" culture, they *are* culture. By noticing and understanding them one comes to know the larger picture.

It is of course disingenuous to question, as I did at the end of the last section, whether or not people find scientific prognostications about GCC believable. Despite efforts by both the (academic) left and

the (political and religious) right to subsume science to politics, most people continue to have a powerful belief in scientific knowledge. Aware of the high level of legitimacy accorded to scientists and scientific knowledge in modern society, claims-makers have devoted considerable effort to constructing the scientific authority of their claims in part substituting it for actual explanations of the facts. Claims-makers in other words ask their audiences to accept the story not only on the basis of an understanding of its truthfulness but also because of the stature of those originating it. In some respects, such a strategy lessens the necessity for detailed explanations of the GCC hypothesis. By portraying an assessment of conditions as authoritative, claims-makers sidestep the necessity of providing the sorts of detailed explanations necessary for audiences to come to their own conclusions. At the same time they also assure that no one's reasoning has a chance to wander too far from the conclusions they desire.

Establishing scientific authority

The scientific authority of GCC claims may be established either implicitly or explicitly. Taking the former approach, it may simply be a matter of locating the source of GCC knowledge within the scientific sphere as in: "*Studies have found ...*" (World Watch Institute, 1988b), or "*For decades scientists have warned...*" (Environmental Action, 1984). Sometimes this approach may involve invoking the notion of a scientific consensus as in: "*Virtually all scientists agree...*" (Union of Concerned Scientists, 1990b), "*There is broad agreement within the scientific community*" (Union of Concerned Scientists, 1990a), or "*In the past few years the National Academy of Sciences, the Council on Environmental Quality, the World Meteorological Organization, the National Research Council and the National Commission on Air Quality have all come to the same conclusion*" (Sierra Club, 1981b). A variation of the focus on consensus involves outlining the pedigree of GCC claims. An article published by the World Watch Institute employed

this strategy in a 1988 piece on GCC that discussed the history of GCC science back to Svante Arrhenius (World Watch Institute, 1988b). By tracing it all the way back to Arhenius, claims-makers are able to locate the GCC story within an enduring, and therefore more legitimate, scientific tradition.

The authority of GCC science may also be established explicitly, with reference to its status as an observable fact– " [scientists'] alarm is based on cold hard data" (Sierra Club, 1989p. 26), or around the prestige of a particular scientist– "While critics of this giant of atmospheric physicists..." (Atmospheric Alliance, 1993i), "Amory and Hunter Lovins...perhaps the world's foremost authorities on energy efficiency argue that..." (Atmospheric Alliance, 1992c, p. 7)– or around a group of scientists as in: "52 Nobel laureates and 725 members of the National Academy of Sciences recently joined the Union of Concerned Scientists..." (Union of Concerned Scientists, 1990b). The creation of heroic identities– scientist as iconoclast– is also a possibility (Environmental Action, 1989 p. 25). With the emergence of a movement opposed to the global climate change hypothesis (GCCH) however, pro GCCH claims-makers not only needed to typify their claims as science but also as the best possible science. In some instances this may involve comparing the credentials of scientists on both sides of the issue. These comparisons often center around the disciplinary backgrounds of the scientists. For environmental movement claims-makers, pro GCCH scientists are always located in a field relevant to climate study whereas anti GCCH scientists are often portrayed either without a field or with an irrelevant one. Sometimes they may not be referred to as scientists at all[53]. Other times credibility is vested in the institution with which the scientist is associated. Again for environmental movement claims-makers, pro GCCH scientists are typically

[53] In more than one instance scientists opposed to the GCCH were typified not as scientists but sarcastically, within quotes, as "scientists."

listed along with prestigious affiliations (e.g., "Charles Keeling of the Scripps Institution...," Sierra Club, 1989,). Scientists who question the GCCH however, even those with otherwise legitimate government or university credentials, are mentioned either without an affiliation or with one having a political or industrial connection. Part of this jockeying relates to the degree to which claims-makers on both sides of the issue attempt to ascribe conspiratorial motives to the other side and infer their own 'objectivity.' Finally, claims-makers, again on both sides, may discuss the degree to which a particular fact or theory has been validated through the processes of peer review (Atmospheric Alliance, 1993h; Michaels, 1992).

Conditional rhetoric

Despite all these efforts to establish the truth of what they say, GCC claims-making materials often include statements that describe the uncertainty of the story. Consider the following lines excerpted from several GCC texts:

> The experts are not sure exactly what the rate of warming is- or what its effects might be. (International Wildlife Federation, 1981, p. 13)
>
> The local impacts of this temperature rise cannot be predicted with certainty The global climate is a marvelously complex mechanism which is poorly understood. (Sierra Club, 1981a, p. 15)
>
> Because there is little historical experience to draw on, scientists find it difficult to predict all of the consequences of such a temperature change. (Conservation Foundation, 1982, p. 74).
>
> Some economists believe taking steps to combat global warming will wreck the economy; others predict economic disaster if we do not prevent global warming. Some politicians urge the US to lead the world in attacking global warming; others caution us to wait until other nations act first... Does that mean that future global warming is a certainty. No one knows for sure. (Union of Concerned Scientists, 1990b)

Although seemingly at odds with the work that goes into making a strong case for the GCCH, the inclusion of these caveats in fact strengthens the overall project of claims-makers that include them. On one level of course, these sorts of typifications set up the case for

more research, a primary objective of many GCC claims-makers. More importantly, the typification of GCC knowledge as tentative helps establish its scientific pedigree. By employing the sort of conditional and highly qualified voice typically found in scientific discourse and by extension representing themselves as focused on the 'facts *whatever* they may be,' claims-makers establish a certain 'disinterested' status. This status in turn lends authority to the story.

Finally, the uncertainty of the story will, for some audiences, serve to make it more threatening to the extent that they adopt a 'what we don't know *can* hurt us' attitude. Claims-makers, aware of this predisposition may exploit it further as in the following examples.

> ...our understanding of the "ecology" of the atmosphere is limited and significant potential exists for the increasing greenhouse effect and ozone depletion to interact so as to magnify each other... (Atmospheric Alliance, 1993b,)

> Looming behind these identifiable dangers is the threat of massive and unpredictable changes in climate. A temperature drop of about five degrees C accompanied the last ice age when much of the northern hemisphere was covered by ice sheet kilometers thick. The long range consequences of an equally large--and far more rapid-- rise in temperature cannot be confidently predicted.... (Union of Concerned Scientists, 1989,)

> Warming beyond three degrees, the boundary of experience for the modern human species, is like going over a cliff with little notion of how far we will fall. (Environmental Defense Fund, 1990a).

In each of these statements uncertainty is used to show that things may actually be worse than predicted. Surely if things may not turn out to be as bad as predicted they may also not turn out to be as 'good' as predicted.

Summary

All of the rhetorical strategies mentioned in this section serve to establish the credibility of GCC claims through reference to their status as science. In some instances such typifications may be all claims-makers offer their audience. Challenges to GCC claims however have emerged also couched as science. Pro GCCH claims-makers have

responded by positioning their own science as superior. For example they may cite its greater adherence to norms of scientific practice (e.g. publication in peer reviewed journals, disciplinary specialization), or the prestige of the scientists or institutions that support the view they present. Although establishing the legitimacy of GCC claims is a central task for claims-makers, as I pointed out, persons engaged in typifying the problem must also make it real to people. In order to do this, claims-makers have created imagery which makes the outcome of a warmer world imaginable to people. For the most part, this imagery works by fracturing our assumptions about weather and climate and their relationship to everyday, taken-for-granted reality.

An understanding of these strategies is important for two reasons. First, they are part of the history of GCC claims-making. Second, they show the degree to which claims-making activity in general relies upon narrative technique and rhetorical strategy. More than that they point out where people believe authority for knowledge is located, show how that authority is established or constructed, and finally point out the kinds of things people feel vulnerable about. This last item is taken up in more detail in the next section.

Typifications of GCC

As I noted in the last section, the central issue for any meta-analysis of the social construction of a social problem is: What kind of problem is it? How is it articulated within a particular society's terrain of meanings? Or, emphasizing the agency of claims-makers, in what domain is it placed, as what sort of thing is it defined? Answers to these questions are bound up in the moral order of the social group defining the problem since they have to do with 1) the objects and values that social group sees as important and vulnerable; 2) the range of agents that can possibly be held responsible for this vulnerability; and, 3) the limits on the solutions open for consideration. The social

problems a group decides to focus on in other words indicate what they care about, who and what they see as threatening and the range of possible social actions they can bring about. This is not necessarily to say that values lead people to define conditions as problems, or that value conflicts 'cause' social problems. As Spector and Kitsuse (Spector & Kitsuse, 1987, p. 93) argue, value talk usually occurs after claims are made and as such can not be said to cause them. For these authors, to say that values cause claims to be lodged is to confuse causation with explanation[54]. Instead, they view values as resources claims-makers bring to bear in arguing their case. The interesting issue that arises here is: Which values will be resources for which problems? That question is the subject of this section.

I looked in vain for a pattern to the statements appearing in the materials analyzed in this study which explicitly typified GCC– statements that took or could be reduced to the form "GCC is" or "GCC represents." Such statements were few and far between and in any event did not really share common themes. As I noted in Chapter 2, even climatologists had difficulty conceiving of CO2 as a pollutant through the early 1970s. I was surprised to find some environmentalists echoing this same difficulty as late as 1989, one year after global warming had become big news. An article appearing in the Sierra Club described GCC as: "Not a 'pollutant' that can be scrubbed, trapped or otherwise eliminated, CO2 is a fundamental by-product of the combustion process...one of the hidden costs of progress" (Sierra Club, 1989). The notion of CO2 as a fundamental product of "progress" was present in the earliest typifications of the issue. Following on this logic is the idea that human society is coming to a sort of threshold point in its relationship with the natural environment, in some sense to an

[54] Their position is based upon earlier work on motive talk and social accounting by Scott and Lyman (1968). But because values, unlike motives or accounts, can be assessed independently of the events that bring forth value talk, a middle position which allows their prior existence seems more reasonable. Indeed, without the a priori existence of values, value talk would be worthless.

"ultimate environmental dilemma" (International Wildlife Federation, 1981, p. 13). Also reminiscent of the earliest typifications of GCC, a few of the pieces I examined cast the problem in national security terms (Natural Resources Defense Council, 1984; Union of Concerned Scientists, Undated Pamphlet 1). Borrowing from the geopolitical concerns discussed in the previous chapter NRDC (1988) for example stated that it represented a "new foreign policy crisis" to the extent that a warmer world was expected to disrupt global resource production. Along these same lines the Atmospheric Alliance noted that it "poses an unacceptable risk of the highest urgency to the nation's security, the global environment and future generations." (Atmospheric Alliance, 1993b, p. 8).

Vulnerabilities

Perhaps a better place to start an attempt to uncover claims-makers' characterization of GCC is in the representations they offer about its importance. Where in the scheme of all environmental problems does it fit? Not surprisingly, most claims-makers characterize the problem as very serious. An article in the Sierra Club Bulletin for example predicted that global warming was "destined to become a planetary emergency..." (Sierra Club, 1989). EDF similarly noted that ."no environmental issue is of greater long term consequence than the current global warming trend" (Environmental Defense Fund, 1987, p. 6) while UCS stated that "global warming has emerged as the most serious environmental threat of the 21st century" with "substantial and irreversible" consequences (Union of Concerned Scientists, 1990a). Clearly, claims-makers portray GCC as a very serious problem. Interestingly however, all of these typifications project its consequences into, but not *too* far into, the future. Claims-makers' emphasis on effects to future generations (Atmospheric Alliance, 1993b, p. 8; Council on Environmental Quality, 1981, p. 51; Union of Concerned Scientists, 1990b) gives evidence of this as well although it clearly

fits into a justification for environmental protection that dates back to Gifford Pinchot and the conservationist discourse that characterized the progressive period.

Related to questions of GCC's seriousness is the issue of what the future world under conditions of global warming will look like. What will happen if the threat is realized and where will the predicted dislocations occur? Although often couched in the sort of conditional rhetoric I alluded to earlier, GCC claims-makers have been quite adept at imaging the wide ranging changes in planetary ecology under an altered climatic regime:

> ..entire growing zones, deserts, grasslands and forests could all shift. Melting sea ice in the polar regions could raise sea levels by 15 feet. The very patterns of life on our planet could be drastically altered (International Wildlife Federation, 1981)
>
> [A change of 6 degrees Fahrenheit would be] unprecedented in human history, would drastically change the world's climate and could vastly alter weather and storm patterns, sea level, agriculture and living things worldwide (Environmental Defense Fund, 1987).
>
> ..if the greenhouse-affected future unfolds as anticipated, it will eliminate species in huge numbers" (Greenpeace, 1989).
>
> [GCC] could touch every aspect of life from food production to sea levels (Environmental Defense Fund, 1987).
>
> The severity and rate of climate change cannot yet be confidently predicted, but the impacts of changes on surface temperature, sea-level precipitation, and other components of climate could be substantial and irreversible on the time scale of centuries. Such changes could result in severe disruptions of natural and economic systems throughout the world (Union of Concerned Scientists, 1990a).
>
> Such a radical increase [in temperatures] is guaranteed to trigger economic and social upheaval on a grand scale (Sierra Club, 1989, p. 28).

In addition to outlining these sorts of grand, and I think rather abstract, alterations to planetary ecology and economy, claims-makers sometimes specify the anticipated changes in some detail and with reference to their material effects. These include such things as shifts in human migration patterns (World Watch Institute, 1988b), changes in the distribution of diseases (Defenders of Wildlife, 1988;

International Wildlife Federation, 1981; Natural Resources Defense Council, 1988), reductions in fisheries productivity (Conservation Foundation, 1979, p. 4), and threats to toxic waste sites and nuclear power plants currently located in areas subject to inundation (Environmental Action, 1984, p. 13). As shown in one of the excerpts above, effects on wildlife populations and species extinction has also figured prominently in GCC discourse.

In a sense, this discussion of GCC's effects serves to connect the impacts on climate discussed above with their effects on things about which targeted audiences are in theory supposed to be concerned. As obscure as some of these impacts may be, their mention brings the future under GCC closer to the specific details of everyday life— an essential task given the absence of other possible motives (aesthetic for example) for curbing CO2 emissions. Whether claims-makers bring these details close enough is a question I take up later on. At the same time the connections claims-makers forge serve to expand the relevance of GCC claims to wider audiences. In a sense they say 'if you are interested in species extinction (or whatever the specific issue may be) you ought to get interested in GCC since it will make things even worse.' This aspect of GCC claims-making— the degree to which it joins claims about climate change to a host of other social and environmental concerns— has been a key to its success and is one of the issue properties I discuss in the next chapter. My purpose here however is to point out the sorts of things claims-makers, and by extension the culture within which they operate, can conceive of as vulnerable or at risk. On one level, as many of these excerpts show, GCC discourse holds that *everything* is at risk, the Earth itself is in the balance to use the title to Albert Gore's (1992) book on global environmental problems. For now however I want to stay closer to the details and to what claims-makers actually say and examine who and what they are talking about when they specify the impacts of global change.

A good part of this can be seen when claims-makers discuss the sites of the anticipated impacts.

The sites of GCC impact

In their accounts, claims-makers identify two places likely to suffer under conditions of global warming, the United States and the developing world. Citing Dr. J. D. Mahlman of NOAA for example, UCS noted that although "global warming would very probably increase worldwide precipitation... the American plains and other mid-latitude interior continental regions would likely end up with drier soil" (Union of Concerned Scientists, 1990b). In another piece they were more direct: "A change in global temperatures of just a few degrees could bring severe economic dislocation and hardship to many parts of the nation." (Union of Concerned Scientists, Undated Pamphlet 1). But this is about as far as it goes. Perhaps perceiving the difficulty of persuading Americans that they are personally threatened by natural disaster (and understanding that local impact models were not well developed anyway), claims-makers devote relatively little ink to direct effects of GCC in the United States.

Claims about the effects of climate change on developing nations are closely related to discussion of American vulnerabilities to the extent that they are ultimately concerned with the geopolitical effects of resource crises. As with much GCC claims-making discourse, this focus on third world effects originated with the climatologists who first placed the issue on the public agenda. UCS picked up these themes in a briefing paper it published: "Needless to say, more frequent droughts would be truly devastating in developing countries that already cannot adequately feed themselves" (Union of Concerned Scientists, 1989). EDF tied this vulnerability to over population in the LDCs: "[If warming] were to occur suddenly, it could disrupt human societies that are already stressed by limited resources and rapid population growth" (Environmental Defense Fund, 1992b). The Conservation Foundation

presented the impact even more starkly: "the famines ahead, wherever and whenever they occur, will assure that millions in the poorer, less developed countries will not survive to witness a warmer earth" (Conservation Foundation, 1979). Even Patrick Michaels, someone concerned that too much is being made about the threat of GCC, admits that temperatures may rise a bit in places like the Sahel. He is not particularly worried about it however since famines in the recent past have assured that "few will be there to notice" (Michaels, 1992).

Given the relative absence of discourse on effects in the United States and the West, this concern for impacts in developing countries is worth noting. As I mentioned, some of this focus stems from efforts in the 1970s to link climate change to concerns about the geopolitical effects of famine and other resource crises. Another component of this focus may relate to the growing internationalization of the environmental movement discussed in Chapter 4. More likely though this focus on impacts in developing countries and the absence of discourse about effects in the West owes itself to the difficulty claims-makers may have imagining advanced industrial societies as threatened by phenomena originating in the natural world. Famine, food riots, and social collapse after all happen elsewhere; specifically in developing countries where other people live. They are expected, perhaps even 'natural' there. Our day to day environmental worries are different. They tend to center around the chemicals in our food and not its availability or around the last molecule of asbestos in our dwellings and not whether we will have dwellings. These are our environmental experiences. Protected as we are by technology and most important by our wealth, who could really believe disaster might happen here (O'Keeffe, Westgate & Wisner, 1976).

Summary

I noted in this section that the material I studied failed to provide any single description of what GCC is beyond a series of

statements that characterized it as a very serious, perhaps even dire problem. Interestingly, anthropogenic CO2 production was portrayed first as a threat to climate, and then through climate, as a threat to the weather, a variety of natural systems and, to a lesser extent, agricultural production. Given the degree to which increases in anthropogenic CO2 are three or four times removed from their impacts on human systems, claims-makers face a difficult task in portraying how a very common and otherwise harmless gas could pose the sort of danger which might justify action. By and large, claims-makers were mostly unsuccessful in making their case. The threats listed to human affairs were hard to imagine— they were to things that are far removed from everyday concern— and in the final analysis, human vulnerability was located in developing countries were various 'natural' calamities may be seen as normal.

Accounting for Climate Change

Causes Discourse

If talk about the sites of disruption points towards what claims-makers view as vulnerable (and not vulnerable), talk about the causes of GCC gives evidence of what they view as threatening. Most often, claims-makers locate the causes of global warming very simply in first principles. It is, they say, the result of increased levels of atmospheric carbon dioxide. Seemingly so obvious as to be hardly worth reporting, such a starting point in fact shapes the larger framework into which the condition is placed. From this beginning, explanations quickly move to the anthropogenic sources of these increases and then to the role of fossil fuels in creating them[55]. The Natural Resources Defense Council called global climate change "the most significant environmental effect of fossil fuel use" (Natural Resources Defense Council, 1983). A bit more strongly worded, the Atmospheric Alliance

[55] In some instances deforestation and the production of other greenhouse gases are mentioned as well.

wrote in its newsletter that: "Human activities are currently pouring billions of tons of gaseous waste into our only atmosphere, altering its chemical balance on a global basis." (Atmospheric Alliance, 1993d, p. 3). Carried to its logical conclusions GCC becomes nothing more than that "familiar nemesis, the energy crises, returning in a new guise" (Sierra Club, 1989, p. 29). In offering this sort of account of GCC, claims-makers wind up transforming it into a technical problem. While this may represent a useful strategy, it forestalls the development of alternative interpretive frameworks (e.g., social ecology or deep ecology). The problem, in other words, becomes mostly a practical one and from this emphasis flows a set of solutions that revolve around simple measures like reductions in fossil fuel consumption through strategies such as improved energy efficiency.

Although I found one or two pieces (Atmospheric Alliance, 1993f, p. 5; Sierra Club, 1989, p. 29)that characterized energy use as an addiction (and therefore not simply a practical problem), the sort of social commentary such technical accounts have engendered tends to center around the market's inability to price energy resources correctly (Atmospheric Alliance, 1993a, p. 5; Union of Concerned Scientists, 1989; Union of Concerned Scientists, 1991) and on the state's failure to provide a level playing field for alternative energy development (Environmental Defense Fund, 1988; Sierra Club, 1981a; Union of Concerned Scientists, 1990b; Union of Concerned Scientists, 1992). Related to these, one piece blamed the failure to adopt alternative energy strategies on "the short term focus that has run rampant in the American industrial and financial sectors [which]... places renewable energy sources at a disadvantage" (Union of Concerned Scientists, 1991). I mention this particular example since the notion that private businesses have only a short term focus had (and continues to have) widespread currency as an explanation for a variety of problematic social conditions. The talk about "addiction" mentioned above makes the same point. Both point up, in other words, the ways in

which claims-makers employ existing cultural narratives to account for global climate change.

Solutions Discourse

Since the range of possible solutions to GCC are circumscribed by the causal accounts claims-makers offer, an examination of solutions is also an examination of causes. Clearly, if condition A causes problem B then one solution to problem B is the removal of condition A[56]. More than this however, the sorts of solutions to problems people are capable of imagining illustrates their beliefs about the forces constraining social action. Solutions discourse therefore informs one of the central issues of this research, the link between GCC discourse and the larger social scene, to the extent that it illustrates what claims-makers and by extension their audiences feel it is possible to accomplish. An analysis of this discourse is an analysis of the realm of the possible in their eyes.

Efficiency and alternative energy solutions

The solutions claims-makers offer to GCC flow directly from their descriptions of the problem's causes. Like the former, solutions most often center on calls for greater energy efficiency. As early as 1979, the National Academy of Sciences was advocating an alteration in prevailing patterns of energy use as a solution to the problem of global climate change (Carbon dioxide and climate..., 1977). The Conservation Foundation noted that "at present, the only feasible way of limiting CO2 concentrations is to reduce the amount of energy we

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[56] An interesting case could be made for placing solutions *before* causes. One might argue that claims-makers construct the causes of a problem with reference to the solutions that can be brought to bear to solve it. For example, knowing (whether explicitly or not) that fundamental social change is not possible, claims-makers may construct the causes of a problem in ways that do not suggest that social change is required to solve it. The inability to effect such change may force the causes of problems into the realm of the practical. Surely this is the case with problems like unemployment or crime the causes of which are so often individualized since the social changes necessary to solve them (a policy of full employment for example) are outside the realm of reál politik.

produce" (Conservation Foundation, 1982). Other groups argued much the same thing (Conservation Foundation, 1982, p. 74; International Wildlife Federation, 1981; Natural Resources Defense Council, 1984, p. 43; Sierra Club, 1981a, p. 75; Union of Concerned Scientists, 1991; World Watch Institute, 1988a, p. 29; World Watch Institute, 1988b, p. 15). EDF reported that in order "to slow the upward spiral [of CO2 production] we must increase energy efficiency and shift to less carbon intensive fuels (Environmental Defense Fund, 1989b). Perhaps in an effort to nullify the arguments put forth by those challenging the GCC hypothesis such as Patrick Michaels (1992) who, citing a study by the Electric Power Institute, noted that the cost of any real attempt to reduce greenhouse emissions would entail annual GNP reductions in the United States alone of more than two percent, the Union of Concerned Scientists reassured its audience that "improved energy efficiency is the best way to reduce the emission of greenhouse gases and we need not sacrifice our standard of living in the process" (Union of Concerned Scientists, 1990b). Talk of conservation and efficiency figured into most of the materials I examined as did this idea that solutions are entirely feasible. But going a step further and turning an argument like Michaels' against itself, UCS went on to state that .". in reality energy efficiency saves money" (Union of Concerned Scientists, 1990b).

In addition to efficiency measures, claims-makers have also called for the development of alternative forms of energy: "even with improved [energy] efficiency, we will need new sources of energy to replace fossil fuels. The best solution is renewable energy since it is inexhaustible, produces no pollution or hazardous waste and poses few risks to public safety" (Union of Concerned Scientists, 1990b). Citing failed state policy as the reason renewables were not yet well developed, this piece went on to report that the Department of Energy "spends much less money on renewable technologies than on fossil fuels or nuclear power." Other organizations offered a similar analysis

(Atmospheric Alliance, 1993c, p. 20; Conservation Foundation, 1979, p. 6; Environmental Defense Fund, 1989b).

Market based solutions

Equally as concerned with deflecting counter charges by anti-GCCH claims-makers, EDF pointed out that GCC "can be solved without harsh taxes or coercive regulation" (Environmental Defense Fund, 1988). Typically favorable towards market based solutions to environmental problems, in 1991 EDF called for the development of a system whereby polluting companies could acquire CO2 emissions credits either on an international open market from firms involved in CO2 absorbing businesses (e.g., forestry, manufacture of CFC substitutes) or by engaging in these activities themselves[57]. Once market mechanisms are brought into play they write the range of possible solutions "are almost endless" (Environmental Defense Fund, 1991). According to these accounts, the development of efficiency and renewable technologies is constrained primarily by government policy which favors fossil (and nuclear) fuels. To some extent therefore, many claims-makers call for a reordering of state energy, economic and environmental policy (Atmospheric Alliance, 1993b). For a number of groups, this reordering consisted mostly of correcting the market failures discussed above and leveling the playing field for non fossil fuels (Natural Resources Defense Council, 1984, p. 43). For others it involved more comprehensive policy changes including increases in funding for alternative energy projects, the inclusion of climate impacts in environmental impact statements and generally a more coherent and rational energy policy (Union of Concerned Scientists, 1990b; Union of Concerned Scientists, 1991). Once again one can see in these statements the presence of two generic explanations for social problems with contemporary relevance— state intervention in the marketplace, to

[57] The notion of such a market of course depends upon a fully globalized economy— something perhaps difficult to imagine a decade ago. In this example therefore, one sees the convergence of the international economy and international ecology.

the extent that the state creates and helps maintain a less than level playing field, and state incompetence, to the extent that it fosters an incoherent and irrational energy policy.

The notion that the market offers a workable strategy for dealing with GCC implies a technologically optimistic outlook and indeed one finds just such a view in the accounts offered by the more mainstream groups. This optimism though is not so much one that says 'the problem may not be that serious' but rather that 'human beings have the ability to solve it.' This idea is echoed in much of the discourse coming out of the more mainstream GCC groups. EDF for example noted that "although the threat of greenhouse warming is real and serious, it is not inevitable" (Environmental Defense Fund, 1992a). Similarly, UCS offered that: "the US should show the world that the situation is not hopeless and that the global warming problem can be solved" (Union of Concerned Scientists, 1990b).

The international dimension

In addition to solutions geared towards reducing CO2 production in the developed world, a good deal of solutions discourse centers around policies aimed at lessening the LDC contribution. For many claims-makers, the economic growth then being experienced in LDC nations is a major source of environmental concern (Environmental Defense Fund, 1993). For this reason, a number of groups hold the position that national action is not enough to reverse GCC trends (Population-Environment Balance, Undated Pamphlet; World Watch Institute, 1988b, p. 10). Not surprisingly, the nature of the policy offered depends in large part on the degree to which a claims-maker is willing to locate the LDC contribution at the doorstep of the LDC nations themselves. For example, some claims-makers account for factors like LDC deforestation and agricultural failure with reference to Western exploitation of Third World resources (Atmospheric Alliance, 1993b, p. 8), while others cite (without much examination) over-population (Environmental Defense

Fund, 1990b) and local social and political failures (Atmospheric Alliance, 1993e, p. 12). Most accounts however take a middle ground which, while recognizing the responsibility LDCs have in helping to solve the problem, emphasize the West's role in assisting such nations reduce their output of CO2. In some cases this assistance takes the form of know-how as in "we should help other nations pursue environmentally safe economic development by using our resources and know-how to develop technologies that will help them avoid dependence on fossil fuels." (Natural Resources Defense Council, 1988; Union of Concerned Scientists, 1990b). In others it consists of the development of mechanisms for funding transfers of Western technology (Environmental Defense Fund, 1993; Friends of the Earth, 1986). Both aspects of this international dimension, the role of the affluent countries and the role of the less developed nations, were summed up in a 1990 article in *EDF letter* reporting on an international meeting of NGOs: "A consensus developed that affluent nations must establish funding mechanisms to aid the response of poorer nations to climate change, but also that Third World nations must do much more on their own— for example, control population" (Environmental Defense Fund, 1990b). For EDF and other groups then, it is mainly a question of finding a framework for the negotiation of international agreements (Environmental Defense Fund, 1990b). Work on treaties and international conventions therefore remains a central part of the activity for a number of environmental movement organizations with a GCC campaign.

The solutions mentioned so far center around efforts to lessen the severity of the predicted climate changes. A number of claims-makers however have discussed the ways in which human activities might adapt to the changes. These involve such technological fixes as the development of new crop species genetically altered to survive hotter and drier conditions (Conservation Foundation, 1987, p. 86), the establishment of a system for storing large quantities of surplus grain

(United States House Subcommittee on the Environment and the Atmosphere, 1976), the creation of migration corridors for wildlife species threatened by changes in habitat (Greenpeace, 1989), engineering works to protect against sea level rise (Conservation Foundation, 1987), and more generally, the development of social mechanisms that enable greater flexibility in the resource system (Conservation Foundation, 1979; Sierra Club, 1981a). Perhaps more aware of the political obstacles to even limited changes in the patterns of energy consumption, the Conservation Foundation sees adaptation as the only practical strategy to deal with GCC.

While telling audiences to *think* globally, GCC claims-makers in the late 1980s and early 1990s asked them to *act* locally and personally. As EDF put it, "[Greenhouse warming] must be addressed not only at the highest levels of international diplomacy but also in our day-to-day lives" (Environmental Defense Fund, 1992b). UCS said much the same thing in a pamphlet it produced on the subject: "since global warming is caused by human activity, it is a problem that we can do something about- not just by influencing policy, but through individual decision making as well" (Union of Concerned Scientists, Undated Pamphlet 1). For the most part the changes suggested centered around fairly well known energy conservation and recycling efforts. UCS offered a sort of 'pledge' form readers could fill out and return (Union of Concerned Scientists, Undated Pamphlet 2) while the Sierra Club developed a series of activities for children. Whatever real impact such activities may have on the overall CO2 situation they serve to underscore the idea that global warming, as difficult a problem as it may be, is manageable in ways that turn out to be rather straight-forward. More than this, by creating a discourse that focuses on how changes in individual activity can solve the problem, claims-makers further situate the issue in the routine behaviors of everyday life. Like their focus on the market, as opposed to particular actors in the market, a focus on individual action diverts attention from those

actors with the greatest ability to affect significant reductions in greenhouse gas production— the industrial sector.

To reiterate what I said earlier, the notion 'act locally' places GCC in the realm of practical problems. At the same time, by encouraging participation in solving the problem, this discourse inoculates audiences against an apathy borne of helplessness. This seems to be precisely what EDF had in mind when it noted that "although few of us can affect international policies, except through the effort of organizations we support, our individual actions can also help greatly to reduce emission" (Environmental Defense Fund, 1992a). UCS was equally reassuring when it noted that while "some [personal actions you can take] are more difficult than others... it is important to remember that anything you do will help" (Union of Concerned Scientists, Undated Pamphlet 1).

Despite the generally optimistic presentations GCC claims-makers offer, some discourse is offered outlining obstacles to solving the problem. In a sense these obstacles are part and parcel of the problem's causes since they 'cause' a blockage of solutions. For GCC claims-makers these obstacles center around the distant and diffuse nature of the problem and concomitant low level of public concern and that fact that people are "emotionally unable to deal with the notion of climate change" (Conservation Foundation, 1979, p. 3). In 1992 the Atmospheric Alliance offered the sort of explanation for this inability that may have been in the minds of these earlier authors: ."..history and evolution have not prepared humans to battle a threat as bizarre and unprecedented as an altered global atmosphere. We're better suited to solve much more down-to-earth threats. And we all possess a denial instinct which works to shield us from mortifying realities" (Atmospheric Alliance, 1992a). Here, claims-makers locate the causes of GCC in the genetic wiring and emotional makeup of individuals.

For a few claims-makers obstacles to solving the problem were located in the political sphere. Christopher Flavin of the Worldwatch Institute noted that "the bitterly contested battle over the Clean Air Act during the 1970s will make the debate over what to do about GCC look like child's play" (World Watch Institute, 1988b, p. 11]). Jeffrey Knight writing in the Sierra Club Bulletin approached the question strategically in terms of the political realities of the early 1980s when he said: "the political climate is such that people aren't willing to look down the road in Congress right now." (Environmental Defense Fund, 1990a; Sierra Club, 1981a, p. 18). After 1988, with all the media coverage the issue received, public apathy was no longer an obstacle to action on the problem and perhaps for this reason it dropped out of GCC discourse. The political difficulties to passing GCC related legislation of course remained but once picked up by mainstream groups like EDF and NRDC (to name just two) they were de-emphasized, perhaps because such groups are in the business of making difficult political change happen. More recently, according to pro GCCH claims-makers, the growth of a movement to counter the GCCH has emerged as an obstacle to doing something about the problem. In the minds of environmentalists, this movement functions both to directly influence policy and more importantly to spread confusion and uncertainty about the scientific basis of GCC claims.

Other benefits of solving the problem

In typifying GCC as "that familiar nemesis, the energy crises, returning in a new guise" (Sierra Club, 1989. P.29) and in calling for solutions to the problem that involve shifts in the pattern of energy consumption, claims-makers have been able to create linkages between climate change and a host of other environmental and social concerns. Indeed, as the following examples show, the existence of GCC itself is not a necessary pre-condition for implementing the sorts of ameliorative programs discussed in this section.

> ...global warming can be stopped, and in ways environmentalists have long advocated: by making radical improvements in energy efficiency, by switching from fossil fuels to renewable energy sources and by reforesting large areas. The greenhouse threat lends urgency to these sensible strategies and challenges citizens and governments to find new ways to bring them into reality (Union of Concerned Scientists, 1989).

> Woodwell, Schneider and other prominent scientists agree that we should begin by taking steps that make sense for their own sake—things we wouldn't regret even if global warming doesn't occur. 'There are certain initiatives we can take that will buy us some planetary insurance and that will have other ancillary benefits as well,' Schneider says (Sierra Club, 1989, p.28).

These ancillary benefits include reductions in air pollution, acid rain, water pollution, damage from oil spills, personal energy costs, oil dependency, military expenditures (as they relate to oil dependency), a range of problems associated with automobile use, suburban sprawl, and the U.S. balance of trade (Atmospheric Alliance, 1992a; Environmental Action, 1984; Natural Resources Defense Council, 1988; Union of Concerned Scientists, 1989; Union of Concerned Scientists, 1990b; Union of Concerned Scientists, Undated Pamphlet 1). At the same time reducing energy consumption will help to foster personal health, vegetarianism, economic competitiveness (through the development of markets for high technology U.S. solar energy products), wildlife preservation, cultural preservation, and local community life (the last three of which are said to be disrupted by existing modes of energy production) (Atmospheric Alliance, 1992a; Environmental Defense Fund, 1989a; Union of Concerned Scientists, 1990b).

By presenting GCC solutions as solutions to other culturally defined problems, claims-makers are able to establish a wider relevance for the programs they advocate. Solve GCC they say, and a whole host of problems will be solved along with it. At the same time, discussion of this aspect of solutions serves to insulate claims-makers from critiques that characterize these strategies as inappropriate given GCC's uncertainty. As was the case for impact linkages this strategy in turn expands the potential audience for their message by making it more widely relevant. In a sense these linkages say 'if you are

interested in species extinction (or whatever specific issue) you ought to get interested in GCC since it will make things even worse.' At the same time, the links claims-makers establish enable them to piggy-back issues already in their portfolios with public interest in GCC. A spell of unusually warm weather becomes an opportunity to discuss species extinction or the need for energy conservation. This is not to say that claims-makers are cynical in their concern about GCC but rather to point out how the issue may function as a part of the larger project of the environmental movement.

An Alternative Account of Climate Change

The accounts of climate change I have discussed so far make up the mainstream view of the environmental movement at least as it is expressed in its published materials. Another, quieter discourse has also emerged outside of the mainstream which views GCC more broadly, as a condition emblematic of larger environmental and social failures. There are two parts to this discourse. The first is represented by Bill McKibben's book *The End of Nature* (1989) and has to do with the meaning of climate change beyond its practical impacts on human activity and biological productivity. The second, represented in Albert Gore's book *Earth in the Balance: Ecology and the Human Spirit* (1992)and earlier in the Conservation Foundation report on CO2 and climate (Eichhorn, 1963), has to do with the root causes of the problem. I include a discussion of these alternative approaches first because they were and remain important and widely read treatments of GCC and also because the discussion offered by mainstream environmental organizations failed to convince me that, as a practical problem, GCC was something about which I ought to be concerned. It seemed to me in other words that there had to be another dimension to the problem of global climate change which environmental movement claims-makers were unable, or for some reason unwilling, to articulate. One can only speculate however about whether this other dimension exists, whether it

is captured by what Gore and McKibben offer, and whether it underlies the environmental movement's interest in GCC.

McKibben's discussion of the meaning of global climate change centers around the realization that human activity now has the power to fundamentally alter basic geophysical and biological processes on a planetary scale. This realization, as I mentioned in Chapter 2, stems from order-of-magnitude improvements in the ability of scientists to monitor the global environment[58] and from their interest in seeing how the chemistry and physics they had finally mastered after three centuries of laboratory study applied to macro scale questions. Emerging as it did around the same time as findings about reductions in stratospheric ozone and threats to genetic diversity, a few in the environmental movement experienced a paradigm shift in their thinking about the human impact on the environment. Prior to these discoveries, pollution, as serious it might be, was seen as something attached to particular places. The scale could be local as it is in many instances of toxics pollution— only a few square blocks in the Love Canal case— or regional as is the case with certain types of water pollution. It could even be extra regional as the release of radioactive material at Chernobyl certainly was. But in each instance, and McKibben makes this point very clearly, *there was always someplace else to go.* With ozone depletion and global warming there was no place else to go and this was what was so different. Early on in *The End of Nature* he writes:

> *We have substantially altered the Earth's atmosphere.* This is not like local pollution, not like the smog over Los Angeles. This is the Earth's entire atmosphere. If you'd climbed some remote mountain in 1960 and sealed up a bottle at its peak, and did the same thing this year, the two samples would be substantially different. Their basic chemistry would have changed...The air around us, even where it is clean, and smells like spring, and is filled with birds, is *different*, significantly changed [all italics in the original] (McKibben, 1989, p. 18).

[58] This is in turn related to the development of space technology, the discovery of methods with which to assay pre-industrial environments, for example through the analysis of ice cores, and more generally the internationalization of science.

In the chapter that gives the book its title, McKibben deals with what this shift means in more philosophical terms.

> Now that we have changed the most basic forces around us, the sound of the chain saw will always be in the woods... The temperature and rainfall are no longer the work of some separate, uncivilizable force, but instead in part a product of our habits, our economies, our ways of life... Quite by accident it turned out... we could alter the power of the sun (McKibben, 1989, p.48).

McKibben is again quite clear on the point that regardless of the actual changes in what nature *does*— how hard the rain falls, how hot or cold it may get— global environmental change has altered what nature *means*. By extension, although this point is not McKibben's, this leads towards a concomitant change in what our own humanity means to the extent that we see it in relation to the rest of life on Earth.

McKibben is not the only one thinking in these terms. In fact, remarks by then Representative Albert Gore during Congressional hearings on the CO2 question precede McKibben's by nearly a decade. As an indicator of broader social currents, they may be more important given the venue in which they occurred and the subsequent rise to prominence of their author. In introducing the topic of the hearings Gore noted that:

> Ironically, though the Greeks might call it the result of our civilization's hubris, it appears that this [greenhouse] affect is caused by the flowering our industrial society. In a very direct way we may be heading for a clash between human desires and the forces of nature, a clash that will finally require us to come to grips with the interaction between ourselves and the environment (House Science and Technology Committee, 1982, p. 2).

These sentiments are echoed and expanded upon in Gore's 1992 book on climate change and the global environment *Earth in Balance: Ecology and the Human Spirit.* Although it touches other global environmental problems— water, genetic diversity, solid waste, soil erosion— climate change and to a lesser extent ozone depletion organize the work. Like McKibben's book, *Earth in the Balance* is more than simply a book on the science of global change or the policy options available to deal with the problem. It too addresses the ways in which changes in the human-

environment relationship under industrialism have given human beings the ability to alter the Earth's basic ecology. Gore lays blame for the problems associated with these changes on well known failures of the 'free' market economy including its emphasis on narrowly defined notions of economic growth and its inability to deal with non-monetizable goods; and more interestingly, on a breakdown in the political system. With respect to the latter, he offers a deeply felt critique of the technology of political manipulation and its effects on public cynicism and the democratic process. In a sense Gore sees the breakdown in the political system and the global environmental crises as stemming from the same thing— a lack of stewardship (the chapter on politics is titled "Self-Stewardship"). Both failures he suggests, stem from an underlying alienation; in the first case from politics, for all the reasons he cites; and in the second from nature. For Gore, nature like labor has been commodified, something we see in terms of its use value. Both alienations arise from the same source— technology's ability to distance us from materiality and the creative process. He writes:

> ...we have constructed in our civilization a false world of plastic flowers and Astroturf, air conditioning and florescent lights, windows that don't open and background music that never stops, days when we don't know whether it has rained or not, nights when the sky never stops glowing, Walkman and Watchman, entertainment cocoons, frozen food in the microwave oven, sleepy hearts jump started with caffeine, alcohol, drugs and illusions. In our frenzied destruction of the natural world and our apparent obsession with inauthentic substitutes for direct experience with real life, we are playing out a script passed to us by our forebearers (Gore, 1992, p. 232).

But this gets us only part way into what Gore is ultimately trying to say.

At its core *Earth in the Balance* presents a critique not only of technology and the ideology of mass consumption but of modernity and scientific rationality as it was formulated three and a half centuries ago by the likes of Francis Bacon or Rene Descartes. These are the forebearers Gore is talking about in the passage above. Ultimately it

is the separation of subject from object, of feeling from thinking, and of being from knowing that for him is at the root of the environmental crises.

> If robotic chain saws finally destroy all the rainforests on earth, and all the people that set them in motion are far enough not to hear the crash of trees on the naked forest floor, does it matter? This rational, detached, scientific intellect, observing the world of which it is no longer a part, is too often arrogant, unfeeling uncaring. And its consequences can be monstrous. The strange absence of emotion, the banal face of evil so often manifested by mass technological assaults on the global environment, is surely a consequence of the belief in the underlying separation of intellect from the physical world. At the root of this belief lies a heretical misunderstanding of humankind's place in the world as old as Plato, as seductive as the mystical appeal of Gnosticism, a compelling as the Cartesian promise of Promethean power– and it has led to tragic results. We have misunderstood who we are, how we relate to our place within creation, and why our very existence assigns us a duty of moral alertness to the consequences of what we do (Gore, 1992, p 258).

It is of course astonishing to see a distinguished Senator, now the Vice President of the United States, putting forth this sort of critique of the society he is trying to have a hand in shaping but my point with this is a different one. Regardless of who the author is (although more to the point because of who he is), what we have in this passage is exactly the sort of more fundamental social critique which may underlie all claims about global change. For Gore, and for others within the environmental movement, GCC is but one manifestation of a much more disturbing crisis in our culture's relationship with technology. He says as much and demonstrates it throughout the book by folding everything from the anomie of the urban underclass to the dysfunctional modern family into his problematic. All these stories and subplots ultimately flow together into a single narrative about where we are as a civilization. The real question is indeed about how we relate to our place within creation.

Summary

In this section, I discussed claims-makers' attempts to establish the causes of GCC, and flowing directly from that, the types of solutions they view as appropriate. As I noted, the accounts of GCC

created by groups in the mainstream environmental movement are essentially practical in nature. Climate change is portrayed in the first instance as the result of the role played by a particular gas in blocking the exit of excess thermal radiation. Claims-makers go on to fill out this story with reference to the anthropogenic causes of rising CO2 levels and the impact of fossil fuel use in facilitating them, but there is a sense, at least on one level, that they view GCC as the result of an unfortunate physical relationship. Constructed in these terms, GCC becomes essentially a question of the chemistry of fossil fuel combustion and by extension of fossil fuel use. As I noted earlier, it all boils down to "that familiar nemesis the energy crisis" (Sierra Club, 1989, p. 29).

From such a technical account of GCC flows a set solutions to the problem based on measures designed to reduce energy use. These involve improvements in energy efficiency and the development of alternative energy technologies. Responding to those who portray such solutions as too costly, claims-makers point out both the cost effectiveness of their proposals and the degree to which they contribute to the resolution of other environmental and economic problems. They are, in other words, said to be worth doing regardless of whether or not climate change actually occurs. In addition to these sorts of energy policy issues, claims-makers also discuss how individual consumption choices impact climate change calling for an effort to 'act locally' (individually is what they mean) to help solve the problem. These sorts of appeals serve to construct GCC as a solvable problem and to overcome any sense of helplessness that its enormity may bring about.

Despite their emphasis on the practicality of the solutions they propose, claims-makers devote a portion of their accounts to the obstacles that exist to their implementation. These obstacles typically revolve around state intervention in energy markets, through, for example, the subsidies provided for fossil fuel production and consumption. Somewhat related to these obstacles is the short term

focus many businesses employ when making decisions about energy spending. Both of these discourses of course enjoyed widespread currency in the 1980s as explanations for a variety of social problems. On the individual side, claims-makers noted difficulties inherent in portraying GCC in a way that could motivate an appreciation of the seriousness of the problem. One group went so far as to tie public apathy towards the problem to human genetic wiring which they typified as never designed to comprehend a problem as vast as GCC.

This section concluded with a brief analysis of an alternative account of GCC which adopts a more broadly critical position. In the final analysis this discussion locates GCC in the western relationship with nature and the reductionist tendencies of Cartesian science. The implications of this relationship as they are played out in the case of GCC are nothing less than 'an end of nature.' Borrowing from the ancient Greeks, claims-makers who adopt this line of argument locate GCC in the hubris of modern industrial civilization. Beyond simply an environmental problem, such an analysis portrays GCC as another example of the larger failure of contemporary (and not so contemporary) economic, political and intellectual culture to meet basic human needs. In this regard it is related to such things as the breakdown of community and family and to the various alienations social critics have been discussing since Marx and Durkheim. For claims-makers who adopt this sort of account, environmental problems are merely the outcroppings of a larger and deeper problematic.

Discussion

In concluding this chapter, I want to offer a discussion of the implications of the mainstream environmental movement's narrative strategy, as it was laid out in my analysis of their published materials. My aim here is to account for what this change means in terms of the alternative discourses it forestalls. In the concluding

chapter of this work, I offer an explanation of why these discourses may have developed as they did.

Clearly, by emphasizing the sorts of efficiency themes they do (both technical and market efficiency), the accounts claims-makers offer allow little space for more fundamental political, social or cultural analysis of the causes of the problem. Many observers from both inside and outside the movement have commented on this conservative politics which has been variously linked to the movement's class composition, its reliance on corporate sponsorship and more generally the ideological constraints facing reformist organizations that desire a seat at the contemporary policy table[59]. All of these explanations are reasonable to the extent that the evidence supporting them is sound. Given the absence of fundamental social critique in any sphere of public discourse, however, it should come as no surprise. Our political economic system is one which survives by quickly converting challenges to its hegemony into new forms of consumerism. As long as this transformative mechanism continues to function, we can expect little in the way of sustained critical discourse outside the margins.

This said, let me point to the few places where more fundamental change has been discussed as a cure for global warming. While one article in Environmental Action mentioned a switch to vegetarianism[60] as an ameliorative strategy, only the grassroots group Atmospheric Alliance continues to offer social change as a solution to GCC and other associated environmental problems. In a special article in their newsletter *No Sweat News*, they write: "without an economic vision...our heroic efforts to protect the integrity of the Biosphere are doomed" (Atmospheric Alliance, 1993g, p. 12). The sorts of changes advocated

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[59] These constraints are by no means unique to contemporary environmentalism. As I noted in Chapter 3, even John Muir's efforts to save the Hetch Hetchy valley were couched in utilitarian terms for much the same reason.

[60] Vegetarianism uses fewer energy and land resources than current food regimes. Freed up land could be turned into CO2 absorbing forest" (Environmental Action, 1984, p. 16)

by this group center around calls for local production and control of energy, intensive recycling and plant-matter based production which, in the group's view, will foster conservation and strengthen local economies. These sorts of ideas about local self reliance share at least a few themes with recently ascendant conservative ideologies which offer nostalgic reproductions of localism, self sufficiency and long departed forms of social organization and political economy. Given the degree to which such appeals connect with the increasing sense of powerlessness people report in the face of corporate restructuring and global economic change, it is surprising that this sort of discourse appears exclusively at the margins of the environmental movement.

Except perhaps for a few in the environmental justice movement, even groups at the margins like the Atmospheric Alliance are not comfortable with social critiques that go beyond calls for locally based appropriate technology to challenge the prevailing political economy. An excellent example of this appears in a paragraph introducing a guest column in their newsletter. In accounting for the rise of a discourse counter to the GCCH (the 'confusionists' mentioned earlier), the author of this column, "Hothead Harold" states that the

> "tactics employed by the corporate ruling class are meant to sow seeds of doubt in the minds of mainstream americans [sic]...How can this happen in a society that is supposed to be the model of democracy for the entire world? The answer is quite simple; we don't live in a democracy at all... american [sic] political economy is more akin to feudalism than anything else, albeit a highly sophisticated, insidious feudalism" (Atmospheric Alliance, 1992b, p. 34)

In introducing the piece however the editors of *No Sweat News* distance themselves from its sentiments describing its author as:

> "an old friend whom time has contorted into an unbridled cynic and brazen polemicist... [whose] caustic, off the wall, irreverent statements [should not] be taken too seriously, or considered to reflect the actual reality we face in our times" (Atmospheric Alliance, 1992b, p. 34)

From this short prelude, we learn that as far as the editors of *No Sweat News* are concerned the larger political economy is not the

problem. Probably because they fear losing touch with their constituents, even groups at the margins do not want to go on record with a political critique distant from mainstream social discourses. The field of understandings and perceptions, and therefore the field of possible solutions is limited even for those located the furthest from its center. After two issues of the newsletter, Hothead Harold was gone.

What is so interesting here and so relevant to a study which seeks to read culture from the content of environmental texts is that claims-makers subsume ethical or political (or even environmental) arguments in favor of technical and economistic ones. Even environmental activists see nature primarily as a factor in the production of a standard of living. More than what they actually do say, the absence of this sort of moral discourse speaks volumes about this culture's ultimately utilitarian relationship with the Earth, the inescapability of marketplace logic and the degree to which this logic has been able to force social criticism into predictable and ultimately ineffectual channels.

Concluding Discussion

Throughout this study of the history and social construction of global climate change, my aim has been to show how the discourse surrounding claims about anthropogenic increases in CO2 developed, what that discourse has consisted of and where in the larger socio-cultural context it fit. Chapter 2 traced the origins of GCC claims-making to scientific interest in questions about element cycling and the radiative properties of the atmosphere. Chapter 3 looked at the early history of environmentalism in the United States and focused on the development of two distinct strains of concern, preservationism and conservationism. As I noted at the end of that chapter, both strains are reproduced in more contemporary environmental discourses and in the discourses created around GCC. Chapter 4 offered a more detailed and up-to-date discussion of American environmentalism since the mid 1960s covering issues such as the professionalization of the movement and the changing political climate within which it operated. Chapter 5 presented an analysis of materials produced by environmental organizations on the subject of climate change. In it I discussed the problems claims-makers face in defining GCC as a social concern, showed some of the ways they addressed these problems, and offered a thematic interpretation of the typifications they employed to make their case.

My aim in this chapter is to return to the sorts of theoretical concerns raised in the beginning of this work. Using the material presented in each of the previous four chapters, I hope to demonstrate the benefits of an approach to the social construction of social problems that is at once 1) historical and contextual; 2) sensitive to

the particularistic dynamics of the social movement organizations that 'sponsor' them; and, 3) concerned with how the salient aspects of a condition constrain and enable the types of discourses claims-makers develop about it. In what follows, I attempt to integrate the findings presented thus far on the social construction of GCC in a way that presents a more fully contextualized understanding of the social construction of a social problem than is usually offered by constructionists. In so doing, I hope to fulfill the goals set forth in the introductory chapter of this work. Before moving on to these questions however, I would like to revisit the main points of each of the preceding chapters with an eye towards drawing out material of theoretical interest.

GCC Science

Although the issue of CO2 induced global climate change did not emerge as a public concern until the late 1980s, scientific work on CO2 and climate has a history that can be traced back at least to the mid 1950s when research was undertaken to develop an understanding of the radiative properties of various atmospheric gases and the cycling of elements through the atmosphere, biosphere, lithosphere and oceans. While this later question had some relation to military interest in the distribution of fallout from nuclear testing, studies of CO2's place in the atmosphere were motivated primarily by the desire to develop an understanding of basic terrestrial processes. Interest in atmospheric CO2 in other words was purely theoretical and had little or no connection to anything other than the advancement of knowledge in geophysics. Far from a threat, the great geophysical experiment Revelle wrote about in his famous 1957 article was viewed as an opportunity to learn about the earth as a tightly coupled system. Concern about the impacts of CO2 induced alterations in climate was, at least initially, entirely non-existent.

Given the degree to which later environmental movement claims-making around the issue of GCC is traceable back to the production of scientific knowledge in the 1950s and early 1960s, it is worth examining the factors that contributed to the development of that knowledge. This is especially so since speculations about the impact of anthropogenic increases in CO2 on climate can be found much earlier in nineteenth century scientific literature. What accounts for the growth of sustained research on the CO2/climate connection that began in the 1950s? Part of the answer relates to intellectual, technical and institutional advances in science itself. The first of these includes such things as developments in theoretical meteorology and fluid mechanics and, more fundamentally, a shift in belief about the temporal uniformity of large scale terrestrial processes[61]. Technically of course, the ability to quantify the infrared absorptivity of CO2 was equally important as was the growth of interest in computer modeling and the development of computational capacity. More subtle perhaps was the impact of nuclear weapons technology. Related both to worries about the dispersion of radioactive fallout from nuclear testing— a popular concern throughout the 1950s, and a profound realization of the awesome destructive power of atomic weapons, people, particularly those who were well educated, may have come to understand how far reaching human activity had become in terms of its ability to alter long standing global equilibria.

Even into the 1960s and early 1970s there is little evidence that scientists doing CO2 related research were motivated primarily by concerns about the impacts of an enhanced greenhouse effect or that they framed the relationship between CO2 and climate as a problem. As I pointed out in Chapter 2 for example, Suruhyro Manabe's and Richard Wetherhald's work with CO2 in their 1967 GCM was intended not to test

[61] Prior to the 1950s, geophysicists believed that terrestrial conditions varied only over geological time. Conditions over shorter periods were thought to be relatively uniform.

any hypotheses about anthropogenic climate change but rather to see how the system of equations they created responded to small perturbations in its inputs. This said, it is clear that by the middle of the 1960s at least some scientists were publicly expressing concern about CO2 induced warming. Few people however were listening. Despite occasional coverage of the issue in the popular press, public concern was never mobilized and climatological knowledge was not yet perceived as relevant to state policy.

As I pointed out in Chapter 2, this began to change in the mid 1970s when a series of resource crises (and the somewhat earlier development of various 'limits to growth' discourses) made climatology suddenly pertinent to the development of geopolitical strategy. Again, let me point out that at least until the later years of the 1970s, CO2 was not the issue policymakers called climatologists in to talk about. Indeed, as I noted, policymakers had to be led to it by scientists usually called in for some other reason. This however is not to say that climatologists became suddenly alarmed about CO2 because of some new finding or theoretical advance. Indeed as several scholars have pointed out, there has never been a single stunning breakthrough in GCC science; instead it has advanced mainly through a process of gradual certification and refinement of findings.

What then accounts for the efforts of particular scientists to move specifically GCC discourse forward? Hart and Victor (1993) point out that rather than acting to manufacture a crises, but at the same time not simply responding to one, climatologists presented their findings about GCC when they sensed that policy makers would be open to them. Put differently, it was not the science itself that drove the insertion of GCC into public discourse nor was it the scientists. Rather it was a change in the socio-political context within which they both operated. This idea will be developed more fully at the conclusion to this chapter.

Geopolitical worries were not the only historical development propelling state interest in GCC however. With the founding of groups like the Union of Concerned Scientists and the Environmental Defense Fund, scientists began to question their role as servants to the military-industrial complex and developed a willingness to bring their expertise and highly legitimized social position to social and political questions. It would be wrong therefore to suggest that climatologists and other scientists were motivated mainly out of self interest (for funding, prestige and legitimacy). The re-emergence of the iconoclast scientist as a cultural type, surely part of the anti-authoritarian sensibility of the 1960s, had a part to play as well.

History & Position of Environmental Movement

Chapter 3 offered a brief overview of American environmentalism as it developed from the early nineteenth century through the progressive period. In it, I pointed to the emergence of two parallel environmental discourses, preservationism, which was committed to the maintenance of nature for its intrinsic value, and conservationism, which stood for the rational exploitation of nature. Both these discourses, still sometimes in conflict with one another, continue to frame environmental rhetoric. Chapter 4 provided a more detailed picture of recent environmentalism as it has developed since the early 1960s. For some scholars (Hays, 1987), the contemporary interest in environmental issues has its roots in post-war affluence and represents the expression of a desire for publicly provided amenities and increased levels of health. In the chapter, I presented an alternative view which focused less on environmentalism as a mass movement (which, with some reservations, Hays' work may best explain) than on environmental claims-making by movement leaders and other intellectuals. From this focus I developed an argument that linked the re-emergence of environmentalism to the broader cultural critique of contemporary society that characterized the 1960s.

To my mind, environmentalism represents more than a social movement; it is instead an enduring worldview which addresses, in a modern context, a philosophical question about the human relationship to nature. For this reason, although earlier environmentalisms are not perfectly mapable onto the contemporary scene, the project of linking them is a worthwhile one. Nineteen-sixties environmentalism, as I have described it, clearly bears many similarities to preservationism. Read as a movement oriented towards the acquisition of recreational or health amenities for example, it is easy to find in the likes of Olmsted and other nineteenth and early twentieth century writers, themes that bear a striking resemblance to 1960s environmental discourse to the extent that both view nature as restorative. Along these same lines, both preservationism and 1960s 'amenity' environmentalism were informed by what I would call an aesthetic sensibility.

More importantly however, both are understandable as movements seeking to establish 'rights'[62] for nature and underlying this were distinguished by a concern for maintaining the integrity of nature on the grounds of its intrinsic value. Finally, both environmentalisms represented a critique of the dominant culture's urbanity, materialism, and to some degree, its underlying system of political economy. As rights movements and as critiques of their respective societies, both possessed a deeply moral dimension.

There were of course differences between preservationism and 1960s environmentalism. First, preservationism, was rooted intellectually in the formal philosophy of transcendentalism. Nineteen-sixties environmentalism on the other hand had its intellectual roots in the science of ecology which located the unity (and from this the rights) of nature in science. Related to this, nineteen-sixties environmentalism was connected to concerns about human health and more

[62] Both have been associated with other contemporaneous rights movements such as the abolitionist and civil rights movements.

specifically, environmentally caused illnesses. Although concerns about what might now be called 'wellness' formed a part of preservationist claims-making, the earlier discourse never viewed pollution as an acute threat to physical health. Finally, while contemporary environmentalism was characterized by a concern for the American landscape, it never attempted to connect that landscape to the formation of the American character. With twentieth century American ascendancy, other national myths (interestingly those related to the success of American capitalism) had arisen to take the place of the frontier. Conservationism, which was established in the wake of preservationism, is probably a discourse more suited to the new industrial myth.

Similarities between progressive era conservationism and more contemporary environmentalisms are somewhat more subtle. As I showed in the last two chapters, much of the environmental discourse that has developed in the last two decades has been centered around resource issues. Although this time the scope of concern was global, the rationale behind it (particularly in terms of state interest) remained economic. Interestingly, in both instances, this rationale replaced the sorts of 'intrinsic value of nature' discourses at the core of the prior preservationist discourse. Moreover, both contemporary and progressive era conservationism stress the efficient exploitation of resources and are thus bound to capitalism as an economic system. Unlike preservationism, both possess a corporatist orientation to the extent that they are about managing the human exploitation of nature for the common good. Preservationism, both in its original and its contemporary forms, are more about the individual confrontation with nature.

Perhaps the biggest difference between the two conservationisms lies in the fact that the earlier one originated in the state, whereas contemporary conservationism is a hybrid of state and environmental movement organization (EMO) influences. Making matters more complex, a

number of these EMOs began in the prior counter-culture period and therefore were at least somewhat sympathetic to the sorts of intrinsic value discourses developed during that period. Even federal environmental activity was shaped by 1960s environmentalism to the extent that it shaped the legal framework within which the federal government acted (this framework was the result of legislation and precedent set during the period) and because it influenced the attitudes environmental managers brought to their jobs. For these reasons, it is doubtful that contemporary conservationists, whether located within the state or within environmental movement organizations could have expressed a sentiment similar to Gifford Pinchot's when he stated that Yellowstone Park represented a waste of good lumber.

The dual nature of contemporary conservationism— its roots in 1960s social criticism and intrinsic value discourses and its current economistic or resource orientation— makes an interpretation of the movement in the 1970s and 80s difficult. Although a number of the issues the movement has taken on follow the concerns of progressive era conservationism, it is the way in which the contemporary movement frames issues that bears closest resemblance to the earlier movement. Did the EMOs that came to prominence in the 1970s and 80s really represent a break from 1960s environmentalism or did the discourses that developed merely indicate a strategic shift in rhetoric designed to make the environmental message more palatable in the new, more conservative era? If the latter, did this re-orientation inadvertently alter the frames within which environmental issues were discussed thereby giving rise to the market oriented rhetoric discussed in the last chapter? Did a strategic shift, in other words, simply get out of hand and become a new paradigm?

Suffice it to say here that both factors internal to the movement and changes in the political climate played a role in creating the environmental discourse of the 1980s. The remainder of this section explores the former. The latter is picked up in a subsequent section.

Specifically, I argue here that the growth of professionalism within environmental movement organizations and the growth of interest in international issues were both key to the development of GCC discourse in the 1980s. Before going on however, let me emphasize that the rise of the issue and the discourse associated with it was the outcome of sometimes opposing events and circumstances. The unfolding of the this discourse was always highly contingent and never certain.

The new professionalism

The single most important feature of contemporary environmentalism leading up the movement's adoption of GCC was the culture of professionalism that evolved in the 1970s. The history of this development is sketched out in Chapter 4 but how did it influence the social construction of GCC? First, there is some question as to whether the issue would have surfaced, or at any rate been taken seriously by the movement, without the existence of staff scientists connected through professional networks to colleagues in research institutes and academia. EDF's involvement in the issue for example, originated with Michael Oppenheimer, a Ph.D. level atmospheric scientist hired to work on acid rain issues in the mid 1980s. Similarly, The World Wildlife Federation became involved in the issue when a staffer with a background in conservation biology brought the issue to the organization's attention (Markham, 1995). Despite the holistic sensibility that so characterized 1960s environmental discourse (which, as I have noted, lends itself to a problem like GCC), it is doubtful that even with a new global zeitgeist, 1960s style environmentalism could have managed an issue like CO2 induced climate change. Even today, only one grassroots group, the Atmospheric Alliance, has taken on climate change as an issue. Indeed other such groups, such as those concerned with toxic pollution, have criticized the mainstream movement for pursuing concerns so distant from the immediate threats to health posed by chemical and radioactive contamination. These groups question the wisdom of initiating

campaigns centered on global issues when so many unresolved environmental issues remain at home (Borelli, 1987). Given the complexity of GCC and the degree to which policy making understandings require expert knowledge and expert credibility, the role of scientific professionalism should be clear.

The importance of the new professionalism extends beyond whatever part it may have played in bringing the issue to the surface and rendering it intelligible to movement claims-makers. It gets at the heart of the process through which issues are selected. From the standpoint of movement culture, career staff persons were increasingly able to take on less tangible and less immediate issues simply as a consequence of the outlook long term residence in Washington engenders. The major national EMOs remember were, by the early to middle years of the 1980s, very much 'going concerns' with stable sources of funding and the necessary institutional structure to 'make' issues rather than merely respond to them. Coupled with the domestic stalemate brought about first by their inability to move the regulatory process forward in the late 1970s, and furthered by the advent of Reaganism, this increased distance from grassroots concerns was significant. Such a tendency may have been further propelled by the formation of the Group of Ten which served to focus the movement's attention increasingly on events in the nation's capital rather than out in the hinterlands. Along with concerns about stratospheric ozone depletion, GCC after all existed primarily in the research papers, scientific panels, government studies and Congressional testimony produced inside the Beltway.

International Issues

The gradual development of interest in international resource issues is also significant since it allowed the sort of global outlook concern for GCC requires. As I noted in Chapters 4 and 5, the growth of interest in international issues is related to several factors. These include the neo-Malthusian discourses that developed in the late

sixties and early 1970s (c.f., Meadows, 1972; Erhlich, 1968; Hardin, 1968); the development of interest in issues like whaling, oil spills and later the arms race, all of which required an international strategy, and; the Stockholm conference. This last item is particularly important since it advanced the notion that environmental problems were global in nature. More importantly, Stockholm formally re-introduced the issue of resource conservation to an environmental movement which, since the 1960s, had been focused primarily on pollution and wildlife issues. Along with the publication of the books just mentioned, Stockholm, made the resource crises of the 1970s a concern for the environmental movement. With the publication of the *Global 2000* report in 1980, they were institutionalized.

The simultaneous development of issues such as bio-diversity, tropical deforestation, ozone depletion and to some extent acid rain, in the early 1980s offers further evidence of the new interest in international issues. Beyond the shifting zeitgeist, interest in global issues probably represented the movement's response to a stalemate on the domestic scene as well. Despite an outpouring of public support for the defense of past victories, hopes of future domestic victories were gloomy and the movement was, for all intents and purposes, moribund. In a sense the development of these international concerns opened up the possibility of a second front. If success in this new arena was not imminent, it was at least conceivable.

More than those images of the Earth in space ever could, the development of an internationalized environmental movement (a process begun at the Stockholm Conference), coupled with the further integration of the world economy, underscored the notion of "only one earth" central to the development of a discourse about global climate change. Whatever direct effect on interest in GCC this evolution of international concern had, there is little doubt that without it, the

idea of a global environmental problem would have been difficult to establish, let alone turn into a campaign.

GCC Discourse

In the introductory chapter I noted that the social constructionist approach to social problems focuses on claims as definitions about conditions but rejects consideration of their objective status. With such a focus one might expect that constructionists would be primarily interested in the content of claims and in the processes through which they are established and managed. By and large, this has not been the case. Although ostensibly interested in definitions, constructionists have, for the most part, neglected discussing claims as rhetoric or narrative. Perhaps because they usually have so little to say about the social context within which claims arise, and therefore have no basis for connecting claims to larger issues, their emphasis is usually on process[63].

This research viewed such an emphasis critically and instead offered an approach focusing on claims as historical discourse rather than on claims-making as an activity– the constructionist position. My basic argument throughout this dissertation has been that the social construction of a social problem is best understood in terms of the affordances offered claims-makers by the historical circumstances within which they operate (both their specific position within those circumstances and the position of those they are trying to influence) and by the particular properties of the condition in question[64]. Put differently, claims are constructed from the definitional possibilities offered by conditions and the moment in history within which they emerge. Neither of these are well addressed in the constructionist

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[63] Peter Ibarra and John Kitsuse's (1993) restatement of the constructionist project returns the focus to rhetoric although like earlier formulations neglects any discussion of the importance of social context. Their work is discussed in more detail below.

[64] These properties are themselves historically contingent to the extent that claims-makers and publics are likely to 'notice' different aspects of a condition at different times.

literature and to the best of my knowledge have not appeared in any empirical studies produced by its adherents.

Constructing the truthfulness of claims

In my own discussion of GCC discourse, I divided GCC claims-making into two parts. The first dealt with the strategies claims-makers employed to establish the truth of their claims about warming, while the second had to do with the ways in which they characterized GCC– the sort of problem they said its was. As I hope to show, both are closely related to the historical period in which GCC arose and to specific properties of the condition which compel the development of certain types of narratives and not others. In terms of this first issue– constructing GCC as real, I pointed out that claims-makers most often rely on references to the scientific authority of their claims. Although they make some effort to spell out the geophysical relationships producing climate change and their effects on global ecology, most of the work of establishing the veracity of GCC relies upon an assumption that audiences will appreciate the credibility of expert scientists. For a campaign led by, and directed at predominantly well educated people, this is perhaps a perennial strategy[65]. Further underscoring and ensuring such appreciation, a good deal of effort is expended to demonstrate the prestige of the scientists and the institutions they represent and to point out the degree to which they adhere to the highest scientific standards. As a discourse developed to counter the arguments of GCC claims-makers, it

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[65] Interestingly, a claims-making approach based on scientific authority is not likely to have much impact on those involved in local pollution issues. In many such cases scientists, particularly those with the greatest 'official' credibility, are viewed more with suspicion than with trust since they are typically brought in to a conflict to dispute the veracity of local knowledge. In these instances they play essentially the same role as they do in climate change discourse; they describe a world not given to the senses. In effect the role scientists play in both climate change discourse and certain toxic chemical discourses is to de-legitimate direct experience of the material world and to offer, in its place, talk about a hidden world access to which requires the special knowledge of science.

too typified its claims as based on science and a situation has developed in which each side struggles to impugn the other's findings and scientists.

Part of the reason claims-makers rely so much on a rhetoric of scientific authority relates to the difficulty people have in coming to grips with a condition so distant from everyday experience. GCC claims after all require people to put aside their practical knowledge of the environment and adopt understandings which run counter to what they already know (for example, that a 3 or 4 degree increase in temperature has any sort of realistic significance). Put differently, climate change discourse calls into question the practical epistemology of everyday experience. Consider first the fact that the temperature changes predicted under GCC will be global, long lasting, and though relatively small in magnitude, significant in their effect on human life. How does this simple prediction contradict common sense knowledge? First of all weather, in particular bad weather, is generally experienced as spatially and temporally localized[66]. The weather may have been bad here today, or in the country last weekend but it is almost never understood as consistently bad over significantly long periods of time or great distances. If we don't like the weather in one location or during one season we can get away from it because from the standpoint of our experience, it is something that is attached to particular places and particular times. The objective properties of GCC however contradict this simple belief since in the future there will be no getting away from the weather— it will be a problem, claims-makers say, no matter where one is[67]. Second, the

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[66] Although weather and climate are not the same thing (weather refers state of the atmosphere at a given time and place whereas climate refers to characteristic conditions) I would argue that unless they have a particular concern for overall conditions, people in advanced societies experience climate as weather and therefore make no practical distinction between them even though cognitively they may recognize a distinction.

[67] In point of fact the weather will actually be "better" in some areas. Northern regions for example are expected to benefit from a warmer

magnitude of the anticipated changes, even in the most pessimistic GCC scenarios, is less than what we experience over the course of a typical day. Here, claims-makers asks us to accept that these normally trivial temperature variations are significant and indeed dire. Worse still from the standpoint of establishing and sustaining GCC claims, they are as yet completely imperceptible.

As Ross (1991) points out, weather exists as part of the routine background of everyday life and is not something people, for the most part, trouble about very seriously. Where weather is responsible for disruptions to social life these are understood as random and essentially purposeless events originating outside the domain of human responsibility. In terms of our everyday understandings of it, weather is something that happens rather than something that is caused. But GCC claims suggest just the opposite. They require that we believe weather is caused and moreover that it is caused by purposeful (if perhaps unintentional) human action. They ask us to believe in other words that the condition of the atmosphere is meaningful and indeed that it has moral significance (to the extent that it becomes a condition we "ought" to do something about). Yet there is little in our experience which enables us to apprehend this and for these reasons, efforts to establish the truth of GCC have focused less on making it understandable and more on making it believable.

The properties of the issue are however not the only force driving this reliance on scientific authority. Obviously, the fact that concerns about GCC originated in the work of scientists is significant. More than that, scientists have taken nearly all responsibility for managing the issue and representing it to the state— they were, in other words, at the center of it. But beyond such apparent explanations, other influences are at play. As I pointed out in Chapter

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climate and in some instances more abundant moisture. The wheat producing regions of Canada are an example here. Although they sometimes point this out, claims-makers mostly tend to focus on problematic conditions.

4 and elsewhere, environmental problems in the 1960s and early 1970s were typically discussed as moral issues. Environmentalism represented a form of social criticism embedded within the larger critical discourse that characterized the period. Within this context, the attractiveness of an environmental claim inhered within its status as social critique. One accepted the truth of a statement about a condition on the basis of whether or not one could accept the social critique it contained. If a simple declaration about conditions was not enough to establish verisimilitude, in most cases a straight forward account of causes and effects was all claims-makers needed to offer. Official sanction, certification by a long list of Nobel laureates was not previously a requirement. Ideology of course, still counts for something, but so much the better if a claim can be shown to have scientific legitimacy as well.

At its deepest level the ascendance of scientific discourse within environmental claims-making probably owes a good deal to the substitution of instrumental rationality for moral argument in political discourse since the end of the 1960s. If there are more competing truths today than in times past, it may be that claims-makers believe scientific authority is needed more than before to help sort them out. At the same time, prior to the late 1960s and early 1970s, there were few mechanisms through which scientific authority could enter environmental movement claims-making— scientists were simply not organized in ways that afforded entrée. Indeed until recently, that authority was usually employed to quash the movement's claims— for example about the debate over nuclear energy production. Again, as I brought out in Chapter 4, the environmental movement is increasingly playing on a field established by its adversaries and as such must marshal the sorts of discourses that are the least vulnerable to attack on that field. Like the economistic typifications of GCC discussed in the next section, the scientific certification of claims works on that

field dominated as it is by the often bizarre rationality of the marketplace.

Typifying global climate change

Once the task of establishing (however tentatively) the veracity of their claims has been completed, GCC activists move on to the work of typifying the condition, or put differently, deploying an argument about the sort of problem GCC is. This includes establishing its seriousness, enumerating its likely effects and, significantly, laying out the factors said to be responsible for it. This last component of typifictory discourse includes solutions claims-makers propose to the extent that by definition, solutions represent the removal of a problem's cause. As I noted in Chapter 5, the typifications claims-makers develop indicate who and what they think audiences will view as vulnerable, what they believe audiences are able to see as threatening and the range of possible social actions audiences are likely to find acceptable. If one goal of this research is to read larger social and political currents from a study of one particular issue, then an analysis of typifications is essential.

As I pointed out in Chapter 5, claims-makers have had difficulty constructing a set of typifications about GCC that make the condition appear particularly threatening. While frequently mentioning the seriousness of the problem for example, claims-makers typically fail to develop a set of convincing arguments with which to spell out how the condition will affect the lives of those they are attempting to influence. For example, although they often characterized GCC as a very serious problem, their discussion of its effects emphasizes the vulnerability of people in developing countries. While noting some of the impacts occurring closer to home, claims-makers convey little sense of crises and certainly no sense of impending (or even future) catastrophe. Where local impacts are discussed, they are likely to seem either far fetched— food shortages for instance, or to be centered

outside people's practical interests, such as impacts on wildlife (something with great currency for the environmental movement but mostly tangential for the public at large) or the geopolitical balance. Perhaps summer afternoons will be a bit warmer, perhaps the fall colors in New England will be somewhat less spectacular, perhaps even the price of a loaf of bread may go up; but beyond these things, they present little evidence that the conditions which govern everyday existence in North America will change very much. To what extent can North Americans (so far from the work of 'making a living' close to the ground) even conceive that something as mundane as the weather might impact their lives anyway? For us, food riots, famine, and social collapse happen elsewhere, in places that are less technologically advanced, less wealthy and perhaps less favored by God.

Although I encountered this rather attenuated enumeration of vulnerabilities in nearly all the materials I studied, by far the greatest emphasis was on the causes of GCC and, closely related to that, on the solutions available to deal with it. As I demonstrated in Chapter 5, claims-makers, if they did not locate GCC in first principles (e.g., the thermal properties of CO2) they tended to link it to the production and consumption of energy and to society's reliance on fossil fuels. More specifically, claims-makers emphasize the particular *economy* of energy consumption and production stressing the degree to which its use is managed sub-optimally by businesses and the state. Put simply, GCC is said to represent a problem related largely to state interference in the marketplace, which, if left to itself, would generate energy efficiency rather than externalities like excess CO2 production. This interference includes such things as policies favoring fossil fuel consumption at the expense of alternative energy sources as well as those that support energy waste. Not surprisingly, the sorts of solutions claims-makers propose, wind up being based upon strategies to eliminate these technical and market inefficiencies.

Beyond there effects on the climate situation, claims-makers have been quick to point out the wide range of benefits that might be realized if efficiency measures and alternative energy strategies were adopted. These benefits they argue, make improvements in energy efficiency worthwhile regardless of the ultimate trajectory of global temperatures. The degree to which these ancillary benefits were emphasized in materials on GCC produced by the Union of Concerned Scientists led me wonder whether or not climate was in fact that organization's primary concern. In many instances it appeared as if GCC was an issue on which to hang an a priori, but now popularly irrelevant, discourse about energy efficiency. While expanding the rationale for action (and thus broadening interest in the question), these ancillary benefits support an argument about the relatively low cost of reducing emissions of greenhouse gases. Such an argument of course was required for any program introduced during the Reagan years and also serves to counter persistent claims from the opposition that the costs of a solution to the problem are too high for the economy to bear. Related to this, although constructed independently from it, claims-makers typify solutions as easy to implement especially when deployed via market mechanisms. On this, GCC claims-makers were clear, there was no requirement for new taxes or new government regulation.

As I pointed out in Chapter 5, the sort of account GCC claims-makers offered in the 1980s resonated very well with other social and political discourses enjoying currency during the Reagan years. By positioning GCC as they did, claims-makers made the problem acceptable, and more than that, understandable in the political idiom of the time. Significantly, claims-makers made a decision to stay close to the discursive framework available rather than attempt to criticize it or create an alternative vision. Only groups politically distant from the increasingly buttoned-up mainstream environmental organizations in Washington, only the most already marginal ones in other words, were able put together a critical account of the condition. In the final

analysis however, even their accounts ultimately rejected a thoroughgoing indictment of the system as a whole[58].

Accounting for these Accounts

Although this research is not meant to provide an overall evaluation of the effectiveness of GCC discourse, it may be useful to offer a personal assessment of the content of these materials. My purpose in doing so is to show what influence they may have on someone otherwise sympathetic to the environmental cause. To what extent in other words do they succeed in motivating an interest in climate change and a desire to act publicly on the issue. While not denying the relationship between CO2 and the earth's temperature I have to say that after reading much of what the environmental movement has written about GCC I remain unconvinced. By this I mean that the materials produced by GCC claims-makers have not persuaded me that climate change is something about which I should be concerned. As I have pointed out, the movement has failed to present a powerful argument that climate change will have a noticeable impact on the daily lives of people living in the developed world. Instead, its presentation makes it appear distant and diffuse, something affecting only those in the international victim classes who inhabit marginal and distant lands.

The features of the condition

At the same time, and perhaps paradoxically, the global nature of the problem, the degree to which it is said to effect *everything* and *everyone*, serves to dilute its effects on any one individual or group. Not only does the problem's pervasiveness make it all the more incomprehensible, it means that whatever occurs under the new climatic order, no one individual or class of individuals will bear the entire burden of dislocation or adaptation. Unlike most environmental conditions we are all (at least in advanced societies) in it together.

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[58] This is not necessarily to say that such a wholesale indictment (such as that offered by the radical ecologists) would be the correct or most effective way to account for GCC.

More than altering anyone's particular circumstances, GCC will change the environmental context of everyday life and because of this, even if the largest predicted increases in temperature occur, few will likely notice.

The degree to which the costs and benefits of GCC are distributed apparently without human agency also serves to eliminate the sorts of equity considerations which may underlie more typical environmental concerns. In hazardous facility siting decisions for example, specific localities are called upon to bear the costs of projects designed to benefit others. In the case of GCC on the other hand, benefits and costs are said to be distributed randomly and without an a priori bias based on race or social class. As claims-makers present the situation, no one group will be specifically called upon to bear the brunt of the dislocations that result from the new climatic regime. The personal control issue, so central to debates about the siting of hazardous facilities or even exposure to ambient pollutants, is therefore absent. This characterization of the problem effectively removed it from the normative sphere and provided one less reason to take the problem seriously. I develop these ideas further in a subsequent section, especially the degree to which they fit the political and social context of the early 1980s when GCC first emerged as an issue.

The practical nature of the solutions claims-makers propose— alterations in the pattern of energy consumption— also fail to inspire particularly passionate interest. If greenhouse warming can be so readily prevented (or attenuated) then perhaps our concern is better directed at more intractable problems. More importantly, the grand scale of the problem and the degree to which the predicted changes have already been set in motion, raises a question about how even significant reductions in CO2 output could possibly have much impact on conditions into the foreseeable future. More seriously, it was difficult to see, at least through the late 1980s, what the environmental movement was doing or even could do about the situation.

Beyond general appeals for greater efforts at energy conservation, the public saw little of the sorts of activities usually associated with environmental campaigns such as litigation or lobbying.

The focus on the practical

Why is it then that this discourse ends up being so uninspiring? I would argue that the failure of GCC claims to arouse much interest is tied to claims-makers attempts, failed attempts as I pointed out, to adopt a utilitarian orientation towards the problem. In creating claims that emphasize the ways in which climate change will affect and is affected by the mundane and practical activities of everyday life, GCC claims-makers take on the burden of establishing a link between climate and practical experience. They take on, in other words, the task of making climate relevant. But doing so requires lengthy discussions of agricultural production, resource management, geopolitics and the economics of energy production— all things North Americans, as rule, do not worry about in the absence of an immanent crises. Making GCC matter in this way requires the development of the sort of a consciousness that can accept, as a practical fact about the world, Paul Ehrlich's attempt to link bovine flatulence in Indonesia to the price of beef in Chicago noted in the last chapter. Whatever inroads an increasingly globalized economy may have had on opening people up to connections of this sort, it is unlikely that we are yet at a point were such linkages are as taken for granted as, say, April showers or wind chill reports in January.

Claims-makers' reliance on practical discussion can be traced to GCC's origins in, and continued association with, techno-science. As I have pointed out, the movement's presentation of GCC emphasizes, at every turn, the scientific credibility of its statements about climate change. Even groups quite distant from the mainstream, the Atmospheric Alliance for example, adopt such a focus. This association however, also directs the discussion of the problem towards technical matters,

privileging them over political and ethical discourses. Here it may be instructive to consider the conflicts that frequently arise in discussions of risk and risk assessment. As many analysts have pointed out, a frequent critique of the role of experts in hazardous facility siting decisions relates precisely to the degree to which their presence removes risk discourse from the political realm. By focusing on scientific explanations, claims-makers have fallen into precisely the same situation as political and corporate leaders except from the opposite side. For the same reasons that people fear the sorts of risks that scientists tell them are marginal, they reject GCC when scientists tell them it poses a significant threat.

The problem is that the strategy claims-makers have adopted is at odds with the properties of the issue they seek to represent. They have taken on the nearly impossible task of attempting to make practical and immediate a condition which is inherently abstract and distant. By focusing on the practical of course, claims-makers frame the issue in terms that have salience for policy makers who as a rule are interested mainly in technical problems with pragmatic solutions. But motivating these policy makers requires the mobilization of public pressure, which in the absence of a palpable threat, necessitates the creation of a moral or ideological discourse. Given their defensive position in the 1980s, their own conservatism, and the degree to which their role in the policy process necessitated 'reasoned' argument, this was something GCC claims-makers were loath to do. Of course it remains an open question whether or not such a moral discourse would have had any purchase on the public conscience given, as I pointed out earlier, the overall decline of such discourses over the last two or three decades. Clearly however the practical approach has not worked if the metric for success is significant policy change.

Seen this way then, a good deal of the difficulty associated with creating claims about GCC stems from the problem of simultaneously maintaining official credibility while generating public interest. To

the extent that official credibility and efforts to stimulate public enthusiasm require different styles of action and the use of different languages, the two may simply be incompatible (this is of course not unique to environmental discourses). When environmental discourses stood outside official domains, the problem of competing audiences was much less of an issue. In the contemporary context however, it is clear which audience claims-makers in mainstream environmental movement organizations have felt compelled to privilege. But by addressing their claims primarily to those in power, the movement has diminished its ability to stimulate broad public interest. In the long run, such interest, to the extent that it translates into grass roots pressure, may be more responsible for credibility within the political sphere than the current generation of environmental leaders is aware.

Whether or not the mainstream environmental movement would have been able to sustain a moral campaign is, of course, an open question. As McCloskey (1991) has argued, like many professional organizations, it has been largely unable to produce (or even accept) the kind of charismatic leadership necessary for such a campaign. Whether or not a different approach to claims-making or a different set of historical conditions would have resulted in increased levels of public concern about GCC is of course impossible to know. Constrained by their own position and historical trajectory, claims-makers after all, created discourses for the historical moment within which they operated.

Environmentalism, Politics and Climate Change

I have written so far about the ways in which the position of the movement and the historical circumstances within which it operated may have influenced the content and tone of GCC discourse. Before moving on to a re-assessment of constructionist theory, I would like to offer some discussion of the factors that may have led the environmental movement to take on GCC as an issue. As I made clear in Chapter 2, environmentalists were late in developing a GCC program even though a

number of movement leaders were aware of the issue in the late 1960s and descriptions of it began to appear in the movement's literature in the late 1970s. It is of course impossible to account for events that did not occur, but a close look at the issue itself and the position of the movement in the late 1970s and early 1980s can suggest how the political climate at the time afforded the development of an active interest in the issue.

I have already outlined the role the movement's professionalization may have played in affording the development of a discourse about GCC and in shaping its content. At the same time, there were other more immediate factors contributing to the development of interest in GCC. These had to do with the specific political situation the movement faced in the early 1980s and the way in which the properties of the issue articulated with that situation. As environmentalism became increasingly legitimized through the 1970s, as the groups that constituted the mainstream movement became players in the national policy process, the critical edge that so characterized environmental activism in the 1960s was replaced with a substantially blunted discourse which came to emphasize the degree to which the movement's agenda fit in with the extant economic regime. This new ethos, which developed further during the Reagan years, included a belief in the importance of property rights, productive and market efficiency, technological innovation, the sanctity of the market as an arbiter of value and geopolitical stability.

While largely self induced, these new values were also enforced from the outside through mechanisms like the litigation review committees at EDF and NRDC and the influence of increasingly conservative boards of directors which assured that the positions taken by these organizations did not stray too far from mainstream political values. The corporate counter attack against environmental protection re-enforced this trend to the extent that it required the movement to position its discourse in ways that protected it from rhetoric which typified it as radical or

extremist. The advent of Reaganism furthered this tendency both through the Group of Ten process and through the increasingly accomodationist posture the movement adopted. With the overall ascendance of the sort of radical marketism that characterized the Reagan era, it is little wonder that environmental movement organizations continued their rightward drift.

What sorts of discourses did GCC afford that made it particularly appropriate for this new conservatism? First, it is a condition the causes of which can be typified as broadly systemic. For this reason, a discourse could be created around it that avoided antagonizing any particular community of actors. While most environmental conditions can in principle be constructed in this way, traditional legislative and legal strategies have made the identification of the agents of environmental harm a central part of the claims-making process for the more usual environmental problems (both litigation and regulation emphasize the identification and control of discrete sources of pollution). GCC, to the extent that it represented a wholly new class of problem, was not bound by these precedents. By constructing GCC as a systemic problem, claims-makers were able to prescribe solutions which seemingly required only minor changes in technology and behavior implemented across a wide array of sites and practices via the market mechanism. In this way, GCC became a problem that could be addressed outside of the usual regulatory process. Conceived as a problem without a specific point source, there was nothing and no one to specifically regulate. Given the movement's inability to move issues forward in the regulatory arena during the late 1970s, a shift to market based strategies may not be all that surprising. With the advent of Reaganism, it had no other choice.

This is not to say that GCC is necessarily best typified as a systemic problem. While the sources of anthropogenic CO2 production are widely dispersed, the decision to adopt particular technologies (and therefore particular levels of CO2 emissions) are centralized and,

at least in capitalist countries, in private hands. In this sense, GCC therefore may not be best viewed as a systemic problem. It is General Motors after all that decides what the fuel efficiency (and therefore CO2 output) of an automobile will be. Without substantial pressure from the state or the marketplace it is unlikely to change its production system on its own. Yet the state is hamstrung by ideology and politics, while the marketplace, as environmentalists point out, has proven unable to include the price of environmental damage into the cost of goods sold. That this failure is due largely to inherent contradictions in the market mechanism, specifically the degree to which the parameters within which it operates are controlled by powerful political forces, is something few environmentalists seem able to grasp.

Another aspect of GCC claims-making that may be related to the political and social context of the early 1980s is the degree to which it has been able to de-emphasize the distribution of climatic vulnerabilities. As I noted earlier, claims-makers offer little discussion about who will bear the costs and benefits of a warmer world. In part, their inability to detail these distributional effects was the result of incomplete scientific knowledge about the ways in which the effects of warming will play out across the globe. At the same time however, claims-makers (in both the scientific and environmental movement spheres) have demonstrated an awareness that people living at the margins in less developed countries are more vulnerable to the effects of a changed climate than those more favorably situated along a continuum of wealth. Their inability to follow this same logic domestically is curious and relates, one can guess, to a certain blindness towards issues of social class in the United States. The degree to which GCC can be presented as a threat to everyone, regardless of their social position, may have some relation to its appearance during the Reagan years when issues of class were

submerged in order to legitimate attacks on upon the poor[69]. Rather than resist such attacks as those in the emerging environmental justice movement did, the mainstream movement chose to avoid them by discussing issues in ways that were blind to their distributional effects.

Finally, GCC's pedigree in the physical sciences, the years of study that went into establishing the truth of claims about the impact of anthropogenic CO2, also fit into the movement's new conservatism. In the mid 1980s when the issue was first taken on by environmental movement claims-makers, the science of climate change could be presented with little controversy. At least through the late 1980s, it had few vocal critics and certainly less of the entrenched opposition faced by issues like toxic chemical pollution and acid rain. Moreover, given its provenance, it was a quintessentially unemotional issue— no one could typify it (as was often the case with claims of toxic pollution) as 'housewifes'' science. As environmentalists pushed the GCC story however, it came under increasing attack from sectors that stood to lose if fundamental changes to the production/consumption regime were instituted. Critiques of the science developed from putatively scientific sources and a broadly based opposition emerged from those economic sectors which would have been most affected by efforts to reduce fossil fuel consumption— notably the coal, oil, electric power and transportation sectors. But these events take us past the late 1980s and are therefore beyond the scope of this research.

Reading Culture from Environmental Discourse

My purpose in this dissertation has been to trace how GCC discourse may resonate with the broader cultural themes in existence during the period in which it developed. In so doing, my hope was to place it in a larger discursive context which, as I stated in the first chapter, is often absent from research conducted within the social constructionist

[69] The rich of course will be able to move to places with more agreeable climates.

paradigm. What I have tried to offer in other words, is an understanding of the field within which GCC claims-making activity took place. Beyond this however, my intention has been to 'read' the tenor of the environmental and political discourses extant during the period in question through the rhetoric created around GCC. In a sense, this project is similar to that of Clifford Geertz, who, in his essay *Deep Play: Notes on the Balinese Cockfight* (1973) used an analysis of a single social activity to elucidate the larger features of culture and social relations in Bali (Swidler, 1996). Rather than *serving* Balinese culture in the functional sense of that word, Geertz argues that cockfighting is best thought of as a way of representing it. Cockfighting, for Geertz, makes Balinese culture comprehensible both to the Balinese themselves and to anyone else who might care to look.

Unlike cockfighting of course, GCC discourse represents not so much a culturally central social activity, as a text about an obscure relationship between an invisible substance in the atmosphere and climate. Still, it is possible to look within this text towards what larger themes it may illuminate. The thinness of GCC's reality, and the degree to which it fails to make a physical impression, offers claims-makers a certain degree of freedom with which to develop a story. GCC as a novel and ambiguous phenomena is more open to interpretation than something like cockfighting, which has historical meanings behind it. GCC's openness is of course shared by all sorts of environmental (and other) conditions; there is always a range of possible accounts for invisible danger. With GCC however, this is even more so. Since Climate change carries so little pre-existing meaning, claims-makers can pour a wide range issues into it. Like a Rorshac image, it is open to all sorts of interpretations.

What kinds of 'other issues' does GCC discourse carry? There are several. Mary Douglas and Arron Wildavsky (1982) write that ideas about pollution are the product of "an ongoing political debate about the ideal society" (p.36). This is certainly the case with a number of

the discourses that have developed around GCC, most clearly those expressed by Al Gore in *Earth in the Balance* or Bill McKibben in *The End of Nature*. Explicitly in the former and implicitly in the later, both books come down to being about the necessity of developing a different way of life. A good portion of the writing in the Atmospheric Alliance's *No Sweat News* is in the same vein although it offers more detail about what this future world might be like.

Even the mainstream groups offer a social vision, although not one all that different than conditions as they currently exist. This vision holds out the possibility of a high tech corporatist future in which a smoothly functioning market allocates environmental goods efficiently and in ways that require little interference from the state (or even EMOs themselves). Admittedly closer to the ruling 'ideal' it is no less a utopian vision since even the most modest proposals offered by mainstream EMOs— for example the establishment of an international emissions trading system— were quite far from reality when they were first proposed. Interestingly, Patrick Michaels, (1992) a well known and staunch opponent of the GCCH described proposals for a carbon tax with horror as the greatest centrally planned social engineering experiment in history. Although colored by their typical paranoia, those on the political right saw these discourses as fundamentally about social futures.

Despite differences in their respective views of the social future, the discourses that environmentalists created around GCC all failed to recognize the political dimensions of their proposals. For the mainstream groups, politics was an almost non-existent part of the history of the problem and its contemporary status. For all claims-makers, political discourse was absent from the envisioned future. I have noted in several places, the diminution of moral discourses in environmental movement claims-making. A corollary is the elimination of political discourse in the post-Watergate, post-1960s era. Again, to a great extent, this turn away from politics owes itself to the

ability of the corporate sector to mount effective political opposition to environmental programs and to the rise of Reaganism, which sharply limited access to the political process for even the most conservative environmental groups. Yet this shift was part of a larger trend away from political/ethical argumentation (particularly on the left) and towards more seemingly 'neutral' market/rational discourses. One finds it not only from environmental claims-makers but also from claims-makers involved in civil rights, social welfare and even military policy. In all these spheres, claims-makers are increasingly abandoning rhetorics of ideology and principle in their discussion of social issues and substituting in their place rhetorics of scientific rationality, social or economic efficiency and cost/benefit analysis[70]. Interestingly, it is now largely the political right which argues from an ideological/moral position; indeed, its rejection of scientific argumentation is nowhere seen more clearly than in its refusal to accept the findings of the vast majority of scientists working on GCC. Liberalism on the other hand has come full circle; its meaning now follows more closely a nineteenth century definition of that term than one from the progressive or counter-culture eras. Increasingly it is about the primacy of efficient markets.

If the first bit of cultural interpretation this research can offer relates to the unmentionability of the political dimension of social change, surely the second relates to the geopolitical narratives that get played out in GCC discourse. As I pointed out in Chapter Two and elsewhere, GCC first entered political discourse in the early 1970s when questions of climate became relevant to the development of global resource strategy. This interest in the factors that contribute to resource productivity resulted from concerns about resource availability in the newly independent states where many of the raw

[70] Only the various victims movements continue to rely primarily on moral suasion; but they seek not so much improvements in the social order as individual rights.

materials of Western industrial production were extracted. It was not so much the direct impacts of climate on the production of these materials that were the concern, but rather the ways in which climate induced famine might, for example, destabilize governments friendly to the West leading to disruptions in resource production. The State Department's involvement in the Global 2000 report some years later illustrates the same thing— in the chessboard world of cold war geopolitics every country counted and anything that might affect its stability was a concern of the U.S. government.

Vulnerability and Blame

Finally, I come to the question of the social construction of vulnerability and blame. As I noted, very little of the discourse I studied presents GCC as a direct threat to people in advanced societies. Where dangers to human beings are mentioned at all, they are forecast to occur primarily in less developed countries. Threats to wildlife or to particular ecosystems are occasionally mentioned but are not a focus of GCC claims. Putting aside my argument that the issue fit so well within the tenor of the times, why did claims-makers become so concerned about GCC if the dangers are so distant and abstract and indeed, in many ways so unreal?

One answer of course, relates to the functional requirements of long term success for any social movement— the necessity for continually presenting novel threats to take the place of those that have either been addressed or have faded away due to changes in the social or political environment or because of their seeming insolubility. Given the degree to which the social context within which the environmental movement operated had changed around the time it discovered GCC, this explanation for the rise of the issue remains a tenable one— GCC served the movement's practical interest. Yet regardless of what the movement's critics on the right (and some on the left) may say, environmental organizations, because they tap a reservoir of ecological

feeling that exists within the culture (even as they are implicated in the creation and maintenance of that feeling), do not exist simply as self-perpetuating entities which function only to sustain themselves. This realization seems to me to beg a deeper question about the place of GCC in environmental discourse beyond the sort of functional role I have discussed so far. With the task of answering this question in mind, let me return to my discussion of threats.

I argued in Chapter 4 that the essential characteristic of the environmental discourse that emerged in the 1960s was its concern for the vulnerability of natural systems to human disruption. More than anything, this is what made the environmentalism that developed throughout the decade different from that of earlier periods. While in many ways similar to nineteenth and early twentieth century preservationism and conservationism in terms of the social critique it offered, environmentalism during the counter culture years was noted for the degree to which it reached beyond wilderness preservation to call for the sanctification of all nature. The reasons for this shift include the unprecedented penetration of human technology and its residues into every corner of the natural world (Commonor, 1966) and the growth in knowledge of there effects on human health. Underlying both of these phenomena however was the development of the science of ecology which extended the appreciation of nature from wild picturesque locales to the more mundane environments people encounter in everyday life. Putting aside the social critique it offered, it was this sense of vulnerability about the local that defined environmentalism during the counter culture years.

In part due to of the emergence of GCC as an environmental problem, but also because of the development of other similar issues and the rise of new environmental ideologies, the scale of environmental concern underwent a marked shift in the 1980s. In one sense, contemporary environmentalism reversed the changes seen in counter-culture environmental discourses to the extent that like nineteenth and

early twentieth century environmentalism, it emphasized 'large' natures as opposed to local ones. Along with the claims that developed around issues such as tropical de-forestation and bio-diversity however, GCC discourse was firmly rooted in an ecological conceptualization of nature as opposed to the sorts of aesthetic understandings which characterized earlier periods. Perhaps the most interesting component of the new focus has to do with the spread of the so called Gaia hypothesis. Developed by British geo-chemist James Lovelock (1987), the Gaian principle conceives of the Earth as a homeostatic system possessing both biotic and non-biotic elements. Conceived of in this way, the planet is taken to be one gigantic, and very much alive, organism.

The Earth organism's capacity to self regulate of course implies an ability to re-configure its internal componentry when threatened by a change in internal or external conditions. These reconfigurations Lovelock argues, have occurred in the past and are characterized by a shift in the organism's equilibrium state. The important point to take away from Lovelock's thesis is that it views human beings as entirely subordinate to the larger planetary body. This view is very different from previous conceptualizations not because it emphasizes human frailty in the face of nature but rather because it is able to do so without relying on a human/nature dualism. Earlier frailty rhetorics at least accorded human beings a certain ontological independence from nature; under Lovelock's hypothesis however, we are reduced to the status of a collection of kidney cells. Significantly these kidney cells have run amok since the advent of industrial, perhaps even civilized society. They have become in other words a cancer which threatens the integrity of the planetary body.

Such a conceptualization has much in common with more localized rhetorics about the integrity of individual bodies in the face of various toxic onslaughts although in these instances the body in question is less resilient to insidious industrial threats. Putting

aside this resilience and the promise it holds for other species waiting for the chance to assume terrestrial dominance, embedded within Gaian discourse is a view of the Earth that emphasizes its vulnerability. Lovelock's hypothesis really adds nothing new to modern thinking about the long term prospects for the Earth itself. Since Darwin we have known that life existed before the arrival of our species and will no doubt flourish if and when, we depart. The important thing about the Gaian hypothesis is that by constructing the Earth as a living body it emphasizes the planet's delicate and precarious nature and its vulnerability to perturbation. It is little wonder that Gaia was a goddess.

The granting of organismic status to the planet as whole (and the concomitant reduction in human status) is interesting in its own right but important to my argument here to the extent that it enables the Gaians and other Deep Ecologists to construct even the most basic activities of human society as an insidious threat to the body that encloses it. In a literal sense it makes the claim: We are not destroying the Earth, we are destroying our place in it. Human alienation from nature represents not merely alienation from other but alienation from self. Such a conceptualization is wholly novel and possible only with the coupling of ecological theory and global systems theory. These ideas were rarely discussed explicitly in the materials I explored although they may ultimately become the cultural legacy of climate change discourse.

Interpreted with these larger questions in mind, GCC texts, as texts about a social "problem" give insight into the sorts of things the society producing them views as vulnerable, the range of institutions it is capable of seeing as responsible for that vulnerability, and the scope of action possible for addressing it. All of these things in turn constrain and enable the production of particular types of social problems discourse. What I am trying to do is elucidate larger cultural themes from a study of GCC texts while at the same time

exploring the ways in which these themes frame social problems discourse. Like a single point on a holographic plate, these texts contain information for reconstituting the entire picture. Ultimately, that is why they are worth studying.

Revisiting SCSP Theory

In addition to offering an analysis of the discourse that arose around the question of human induced climate change, this dissertation was intended as a critique of the constructionist paradigm in social problems research. My intent from the beginning was to provide an example of the application of the constructionist approach which maintains fidelity to Malcomb Spector and John Kitsuse's (1987) original outline while showing the utility of inserting some reference to objective (i.e., experienced) conditions and social context into the analysis of social problems definitions. As I noted in Chapter 1, a discussion of objective conditions need not result in the sort of analysis, criticized by Woolgar and Pawluch (1985), that seeks to compare definitions with objectively 'real' conditions. As these authors point out, such a position represents the hidden insertion of 'objective reality' since it carries with it an assumption that conditions have some sort of consistent ontological status (they either 'really' exist or 'really' don't exist).

The present study does view GCC as consistent although not in such a way that grants or refutes its reality. Instead, I argue that GCC's ontological status has never been fully established as media, public, and official acceptance of claims about it have oscillated in multiple directions over time. GCC in other words has been consistently *ambiguous*; it surfaces as 'real' only in certain ways and under certain circumstances. The goal of this work has been to discuss these circumstances and the definitions they have spawned and to show how everyday experience, the unfolding of history, and the constraints and

opportunities of culture have shaped them. As I stated at the outset, this is the only aspect of a condition like GCC that social scientists can legitimately hope to address. In specifying the role of conditions in this way, I hope on the one hand to allow a place for them within constructionism while at the same time avoiding the sort of ontological gerrymandering Woolgar and Pawluch correctly critique. In what follows, I address the importance of practical experience and social context theoretically, using this dissertation as a source for illustrative examples.

Claims-making and local knowledge

It should be clear from all I have said about the constructionist approach that its single defining feature is its focus on the activities of claims-makers as they engage in the task of establishing problem definitions— social problems 'work,' if you will. Concomitant with this and at the center of their critique of earlier discussions of social problems is a rejection of any reference to or assessment of the objective status of the conditions around which definitions are created. This refusal to consider conditions is manifest in both Spector and Kitsuse's original development of the approach and in more recent discussions of it by strict constructionists such as Woolgar and Pawluch. Unfortunately, despite the importance of their peculiar orientation towards objective conditions, constructionists have failed to offer much guidance on exactly what they mean by objective conditions. In some instances, Spector and Kitsuse (1987) refer to putative (alleged) conditions although in more recent formulations they reject the earlier terminology as misleading and instead substitute the term "condition categories" which is meant to "highlight the symbol- and language-bound character of claims-making as well as *how* members' facility with certain discursive strategies... initiate and constitute the social problems process" (Ibarra & Kitsuse, 1993, p. 31 italics in the original).

Given the degree to which constructionists avoid evaluating the truth status of definitions or even considering the role of conditions in the definitional process, examining exactly what they mean when they talk about objective conditions may enable a reassessment of the taboo against their mention. Any reading of their literature makes it clear that what constructionists reject are references to 'conditions as they *actually* are.' The definition of objective conditions they employ (and critique) mirrors the notion of the object world supported by logical positivism. This rather conservative view of conditions is unfortunate since it implicitly rejects the sort of phenomenological understanding which would emphasize the unity of experience, discourse and understanding. Such an approach to the social construction of social problems would suspend consideration of the 'actuality' of conditions while allowing for a discussion of how people experience— and if in fact they do experience— the situations claims-makers define as problematic. Experience here need not be taken to mean only direct confrontation with conditions. In some sense, it may occur vicariously through the accounts of others (including those in the mass media). Direct experience and vicarious experience are of course shaped by definitional processes, but that is exactly the point of the sort of analysis I am proposing. It starts neither with language nor with experience but seeks rather to explore how the two create one another.

As Gubrium (1993) points out, social constructionist research has tended to privilege claims-making directed at the public at large. Constructionists in other words have focused on tellings and tellers and viewed audiences as passive processors of opposing rhetorics. Conceived in this way, conditions can perhaps be omitted from an analysis since they come to be known only through the discourses generated by public claims-makers. This dissertation has taken a different view. While it accepts the importance of widely disseminated

messages about conditions, it holds that members'[71] own experiences, and claims-makers' anticipations of those experiences, are also a part of the process of social construction. In a sense, such an approach blurs the distinction between rhetoric and experience and allows the former to be thought of as a category of the latter. How does this play out in terms of the social construction of global climate change?

Given their representation of GCC as a condition in the physical world, claims-makers face significant difficulty in their attempts to present the problem as a pressing one in the absence of sensible evidence[72]. Indeed, a key issue in the construction of GCC has been claims-makers' ability to leverage the small amount of sensible evidence that has been available (e.g., the hot summer of 1988) and, more interestingly, the strategies they have employed to establish alternative forms of evidence (e.g., the Mauna Loa CO2 curve) as substitutes for direct perceptible experience. The question to ask about conditions then concerns not the degree to which they may actually exist, but rather whether and how members of a social group (and claims-makers) actually experience them and how that experience may constrain and enable the development of social problem definitions. How, in other words, does experience, or perhaps potential experience affect the story that gets told?

The question of experienced conditions is particularly important to environmental problems not only because people may have expectations that such problems will have sensible impacts but also because of the sort of work claims-makers do to establish their empirical reality.

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[71] This term is commonly used in ethnomedological research as short hand for 'members of a social unit.' It avoids the passivity suggested by the term audiences and the voluntarism suggested by the term actor. More than anything this term emphasizes the conjoint nature of social life and meaning construction.

[72] It may be the case that such evidence is particularly important to establishing environmental problem definitions given the possibility of common sense expectations about them. Whether or not such common sense expectations exist is an interesting empirical question. Answering it would be a step in the direction of creating a situationally based theory of social problems.

Interestingly, most constructionist studies devote little ink to the processes through which conditions are established as real. Instead, they have tended to focus on claims-makers' efforts to characterize conditions or to interpret their meaning for audiences. While such an effort is evident in the present study, I realized early on that a large and significant part of GCC discourse had to do with rhetoric aimed at persuading audiences that GCC was indeed a fact. Unlike most constructionist studies therefore, this research has spent a good deal of time discussing evidentiary discourse. Moreover, as I noted in Chapter 5, an equally significant portion was related to proposals to solve the problem. Coupled with the emphasis on its scientific status, that is to say its basis in the domain of the 'rational,' claims-makers have been compelled to emphasize GCC's practical dimensions. Strict constructionists of course would characterize claims-makers' emphasis on the scientific verifiability of GCC and on the practical nature of the solutions to conquer it as claims themselves. I have no argument with such a position. What I want to point out however is that such typifications compel claims-makers to provide certain types of warrants, for example, evidence derived from everyday practical experience. This in turn directs analysts to focus on whether and how such a practical orientation plays with audiences; how, in other words audiences come to understand claims-makers' discourse. I take it as axiomatic that audiences come to understand discourses that emphasize the unfolding of conditions in the 'real world,' with at least some reference to personal experience.

Prior claims and discourses

Related to all of this is an idea I introduced earlier that members bring to environmental concerns the expectation that they possess an experiential and/or practical and/or rational dimension. As the brief chapter on the early history of environmentalism demonstrates, I do not mean to argue that such an orientation is inherent in members' understandings of an environmental issue. Put differently, there is

nothing natural about nature's practicality nor anything that places it 'naturally' within the domain of science . Yet the conjoint constitution of environmental conditions over time, may have oriented members' perceptions to see nature in these ways and with that to bring certain expectations to new environmental problem discourses. Environmental movement claims-makers of course are implicated in these definitions/placements because it is in part their earlier discourses which have helped create the rhetorical space in which contemporary claims about GCC are constructed (and then lived with). Indeed, the inter-connections between claims are resources used by claims-makers to develop the rhetoric through which to make their presentations. Claims-making, in other words, is related to prior claims-making. Unfortunately constructionist researchers typically neglect the relationships between claims tending instead to view them as 'free standing.'

The fact that claims about a particular condition are related to prior claims put forth by the same or a similar group of claims-makers creates an interesting problem for the present study and indeed for the entire constructionist project. This problem has to do with the unit of analysis of a claim or, put differently, the question of where claims end and social movements begin. Are the two in fact separable? While it is possible to think of the discourse created by the environmental movement about global climate change as a claim, it may, in certain circumstances, be better to think of such discourse as simply another outcropping of a larger claim about environmental degradation in general. The issue is especially relevant for the environmental movement given its level of organization and the degree to which it simultaneously manages a multitude of claims. Indeed, there was a good deal of evidence presented in Chapter 5 that claims-makers nest a wide range of claims (e.g., tropical deforestation, urban air pollution) within their claims about GCC. Within a particular claims-making movement in other words, sub-claims can be morphed into

other sub-claims or can serve as tacit umbrella claims under which other claims will fall. In some instances, they can even be used to explicitly express the underlying principles of the social movement that generated them. Here they serve to reinvigorate the underlying ideology to which the movement in question subscribes. Gore's *Earth in the Balance* and Mickibben's *The End of Nature*, surely belong in this category of discourse.

It remains an open question whether or not all claims-making can be thought of in this way. Clearly, some claims are deeply embedded within the movements that sponsor them (e.g., environmentalism) whereas others arise outside of well organized and ideologized movements (e.g., the movement to reduce drunk driving). Others may be tied, but only loosely, to sponsoring movements which themselves vary with respect to their level of internal organization and integration (e.g., the pro-choice/feminist and pro-life/Christian conservative movements). This is not however, the place to offer comparisons across a range of claims and claims-making organizations since such an effort would require an analysis of discourse across claims and social movements. Instead, what I want to suggest is that researchers adopting the constructionist perspective become sensitive to the linkages between the claims they propose to study and prior instances of claims-making around the same or a similar issue. Useful in its own right to the extent that it uncovers the rhetorical expectations claims-makers and their audiences bring to new social problems definitions, such an analysis will eventually allow an exploration of the relationship between the characteristics of social movements and the claims they sponsor.

Social movements and social contexts

In addition to the failure to consider the ways in which claims may be nested together by claims-makers, constructionist research and theory also fails to consider the role of social movements in the creation of social problems claims. This omission is unfortunate since

as I showed in Chapters 4 and 5 of this work, the types of definitions environmental claims-makers produced about GCC were related to the position of the movement at the time claims were created. For example, the success of the movement in the 1960s and early 1970s led to the development of an effective counter-movement while at the same time facilitating a greater institutionalization of environmental concern. Both in turn led to the development of the sort of professionalized movement culture which favored the creation of rationalized discourses emphasizing the technical nature of environmental problems. The role of scientists within the movement was instrumental as well. Who the claims-makers are in other words, along with the nature of the environment within which they operated was, for this study, highly relevant to the sorts of discourses they created and to the logics those discourses were required to follow.

This de-emphasis of the role of internal social movement organization dynamics has also led to a failure to discuss a claim's origins. Perhaps out of concern that any such discussion will inevitably lead back to conditions, social constructionists have tended to focus almost entirely on the public career of a claim. Such an orientation is unfortunate since it over emphasizes the agency of claims-makers and suggests that social problem definitions arise only after they have publicized their own well engineered texts about a problem (Gubrium, 1993). Again, the omission of a detailed historical account of a claim's development removes yet another independent variable that might be employed to account for the types of discourses created to typify an allegedly problematic situation. Despite the concern that any discussion of a claim's genesis might return the focus to conditions, this research demonstrated the value of a longer view of a claim's history. As I showed in Chapter 3 for example, the early work of geophysicists and other scientists and the subsequent role of state officials was crucial not only in bringing GCC claims along to the point where they emerged as well publicized social problems but

also to the characteristics of the definitions that were developed. Coupled with the forces propelling the environmental movement towards increasingly rationalized discourses, this early geophysical pedigree placed global change squarely within the domain of the scientific.

These two issues, the internal dynamics of the social movements creating claims as well as the characteristics and position of the claims-makers who express them, can be thought of as one part of the social context within which claims arise. Yet the context of claims-making is larger than just these two issues. It also includes the broader structure of feeling characterizing the period in which a claim arises and the often arbitrary unfolding of history. Both are implicated in the development of social problems definitions to the extent that they constrain and enable the development of certain types of discourses. The numerous illustrations provided in the present chapter and indeed throughout this entire work should obviate any necessity for rehearsing this point again with more examples. Instead, I would like to consider three ways in which social context may affect the creation and management of claims.

On the most mundane level, the social context within which a claim arises can be thought of as providing the material conditions about which definitions are created. Such a view of course holds that conditions are prior to definitional activity; in other words it suggests that conditions *cause* claims. Because it foregrounds conditions, such a view can be considered only a marginally constructionist position. Closer to constructionism as it is presently constituted, is a view of context which holds that the characteristics of a particular historical milieu engenders the range of moral universes within which claims-makers develop specific social problems claims. In this view claims-making activity represents the specification or perhaps concretization of how those dangers are played out on the ground. Abortion is opposed because it particularizes concern for the 'protection of innocent lives'; it is supported because

it particularizes concern for 'individual freedom of choice and the right to privacy.' Social problems claims in other words function to enliven the social values available within a particular moment in history.

While I like the idea that social problems discourses actualize more abstract moral values, I am not satisfied with the notion, implicit in the preceding discussion, that values exist prior to social problems claims. Such a position falls too close to the value-conflict orientation towards social problems criticized by Spector and Kitsuse (1987) in their early specification of the constructionist approach. Moreover, a reliance on values places analytical work precariously close to vernacular conceptualizations and in any case is too loose a category for serious theorizing. Starting instead from a position which holds that claims-makers create social problems rhetorics with the aim of acquiring and extending their own discursive power, that is to say their ability to create definitions of a situation, a more fluid model of the relationship between values, contexts and claims may be in order. Such a model sees the construction of moral universes as the goal of claims-making activity while at the same time viewing values (the content of such universes) as a resource in the construction process. Claims-making is thereby seen to require the enunciation of values while at the same time it re-creates, extends and transforms them. The process is limited to the extent that historical contingencies determine which re-creations, extensions and transformations will be intelligible and acceptable to members.

Rhetorical Idioms and Moral Discourse

In concluding this reassessment of social constructionism, I would like to return Ibarra and Kitsuse's 1993 re-statement of the approach. As I noted in the introductory chapter, this re-statement was meant as a response both to Woolgar and Pawluch's (1985) ontological gerrymandering critique and to the empirical research undertaken under

the constructionist banner, which, in the authors' view failed, to correctly embrace the potential of the paradigm. Ibarra and Kitsuse's restatement of the constructionist approach makes clear their interest in claims as texts and shares with the present work an interest in relating the creation of social problems rhetorics to the vernacular resources employed in their construction. They write:

> In sum, social problems discourse is open-ended, its 'aboutness' being contingent upon the courses taken by members' practical theorizing on moral order, including one another's claims-making activities.... If pressed for a summary description of the phenomena in need of identification and theoretical reconstruction, we would name those 'vernacular resources' drawn upon in claims-making activities. Vernacular resources are the conventional means by which members can realize the signifying processes called claims. Thus they can refer to forms of talk, frames of interpretation, and contexts of articulation inasmuch as these effectively organize and circumscribe members' social problems discourse (Ibarra & Kitsuse, 1993, p.33).

Specifically, Ibarra and Kitsuse are interested in uncovering the rhetorical idioms, counter rhetorics, motifs, settings and claims-making styles claims-makers deploy as they go about the task of defining and characterizing social problems. In the scheme, rhetorical idioms refer to the "definitional complexes" (p. 34) that situate claims within moral universes. It is through the application of rhetorical idioms that a condition acquires status as a social problem. Ibarra and Kitsuse outline a number of such idioms. For example, the rhetoric of loss calls forth symbols of purity and innocence. While it may carry with it a certain aestheticism, it is fundamentally about the responsibility to protect that which is pure and in some sense sacred. To employ it is to consecrate the object of loss as pure and sacred. The rhetoric of unreason relies upon images of conspiracy and manipulation. In Ibarra and Kitsuse words it "posits an idealized relationship between the self and the state of knowing, and then locates an instance where that proper relationship is being distorted, undermined, and even destroyed" (Ibarra & Kitsuse, 1993, p. 40). It suggests that without the presence of some pernicious influence the

normal functioning of one's cognitive powers would prevent the harm from occurring.

Ibarra and Kitsuse propose a number of other rhetorical idioms, describe the images and values they contain and suggest the sorts of issues they to which they may be applicable. These idioms represent claims-makers efforts to connect particular claims to larger social values. They all make the statement, 'this situation is really an example of a threat to this larger value.' As such, they are used across the political spectrum to promote a wide range of sometimes contradictory claims. While they make conditions morally intelligible to audiences, they also warrant claims-makers' sincerity and inoculate them against charges that their definitional activity is self interested.

Counter-rhetorics refer to discourses designed to oppose claims by interfering with claims-makers' attempts to deploy particular rhetorical idioms. They represent not so much an attempt to offer alternative rhetorical idioms (although such a strategy may be employed by opponents of a claim) but rather an effort to deny the typifications employed by claims-makers. Ibarra and Kitsuse note that some counter rhetorics begin with claims of sympathy towards the values allegedly threatened in particular claims but attempt to circumvent the proposed solutions through reference to their impracticality or, sometimes, to the hopelessness of the situation. Other sympathetic counter rhetorics are based on discourse about the higher values that would be threatened if the proposed solutions were put into practice. Again, the authors provide a number of examples of how counter-rhetorics may be employed to oppose the claims and remedies proposed in rhetorical idioms.

Rhetorical motifs refer to the "recurrent thematic elements and figures of speech that encapsulate or highlight some aspect of a social problem" (Ibarra & Kitsuse, 1993, p. 47). As I understand Ibarra and Kitsuse use of the terms, motifs are the discursive elements that make

up rhetorical idioms. Essentially the motifs are the specific language claims-makers employ in describing the problem, its causes, the victims and those responsible. They refer to the recurrent vocabulary claims-makers employ in typifying conditions. For example, does the problem represent an epidemic, a menace, a crisis, the tip of the iceberg, or a scandal. Ibarra and Kitsuse's interest in these motifs is directed towards "how morally imbued metaphors and phrases can be intelligibly applied in claims-making" (Ibarra & Kitsuse, 1993, p. 47). Claims-making settings refer to sites in which claims-making activity occurs. Such sites include the mass media, the legal-political sphere (both the courts and the legislative arena), and the academy. One reason for this focus on settings derives from an interest in how their formal qualities structure the assembly and delivery of claims.

Claims-making styles refer to claims-makers' bearing, tenor, sensibility and membership category— for audiences, they answer a question about a claims-maker's identity which in turn serves to warrant what such a claims-maker has to say. Styles here can also be taken to mean the tone of the claim itself, divorced from any consideration of its carrier. Ibarra and Kitsuse discuss in particular the 'scientific' style with its 'disinterested,' 'precise' and technical demeanor. The point of this style, they note is to appear styleless, perhaps even anonymous to members so as to emphasize 'objectivity' of a claim. The authors note that a scientific style can be adopted by claims-makers on both sides of an issue. Although the present work only touched on the discourse produced by claims-makers opposing the GCCH there is little doubt that such is the case in this situation. Other styles the authors mention include the comic style which emphasizes the absurdity of a particular condition, the theatrical style (the authors cite groups such as ACT-UP), the civic styles which is characterized by an emphasis on the sincerity and honesty of claims-makers (e.g. *Mr. Smith Goes to Washington*) and

finally the sub-cultural style which develops locally unique languages for commenting on the larger world.

Although the present work was not initially informed by Ibarra and Kitsuse's re-statement of social constructionism[73], a number of its findings fit well into the conceptual categories developed by these two authors. Their theoretical statements about the structure of social problems discourse in other words, have been partially validated by the research presented here. On the issue of rhetorical styles for example, the present project demonstrated the ways in which the consistent application of a scientific voice shaped not only the presentation of GCC discourse but also its content. As they suggest, this study examined up close the types of utterances that construct this voice and the implications it has for audiences' understandings of the discourses to which they are exposed. The issue of rhetorical settings was also partially addressed in my discussion of the early role of congressional hearings and later, the creation of rather academic sounding reports such as those produced by the President's Council on Environmental Quality and the various environmental 'think tanks' that have published literature about GCC. Both settings required the creation of highly rationalized discourses and as I showed, this was exactly what claims-makers produced.

Particular rhetorical idioms or motifs were considerably harder to discern in the texts I examined if by these terms the authors refer to the sorts of moral discourses that have to do with notions of justice, entitlement or protection— the examples they offer. Although sometimes constructed as a calamity (and certainly functioning as a sort of overarching problem with links to a great number of other problems— one of the features of calamity discourse mentioned by the authors) or in terms of a rhetoric of loss (the purity theme runs through some of the discourse produced at the margins of the movement), there was little in

[73] Work on the project began prior to the 1993 publication of their work.

what I found that could match the idioms and motifs Ibarra and Kitsuse mention. GCC discourse was presented within a rhetoric of efficiency and rationality which, at least in terms of its manifest content, represented the moral universe within which the problem was placed. The 'good' that efficiency represented however was entirely implicit and taken for granted.

I say here that claims were *placed* within this universe to be clear that it is impossible to state that GCC was represented as a challenge to efficiency or rationality. Unlike abortion which is often constructed as a threat to 'individual life' or restriction on abortion which is often constructed as a threat to 'privacy,' the discourse I examined failed to refer to GCC as seriously threatening anything, least of all some underlying set of values. Indeed, the whole point of my assessment of GCC discourse is that moral threats were omitted by claims-makers either for strategic reasons, because they are taken as tacitly understood by audiences, or simply because they were edged out by non-ideological discourses. Perhaps even better than the examples offered by Ibarra and Kitsuse, GCC was constructed *within* the rhetorical idioms claims-makers employed to moralize about it. GCC discourse in other words, did not move audiences towards a greater appreciation of efficiency or husbandry or engender a fear that they were threatened so much as it was problematized through beliefs about efficiency and husbandry.

Finally, this dissertation demonstrated the ways in which the vernacular resources discussed by Ibarra and Kitsuse work together to create a definition of the situation. Although their work points in this direction, it does not explicitly call for it because they wish to de-emphasize research which attempts to account for specific social problems discourses in favor of work aimed at a general theory of such discourse. Such a project, they argue, will result in the development of an understanding of the vernacular constituents of social problems discourse and avoid the problem of ontological gerrymandering to which

the field has become so sensitized (Ibarra & Kitsuse, 1993, p.33). For the same reason, Ibarra and Kitsuse have also failed to direct empirical researchers towards any consideration of why particular vernacular resources emerge when and where they do. For example, they neglect the reasons claims-makers choose to present their discourses in one setting as opposed to another, why they choose one style over another, or indeed how particular rhetorical idioms develop. In the final analysis, these theoretical objects are treated in the same taken-for-granted manner as conditions.

Returning to a theme I developed earlier, this dissertation offered not only the deconstruction of a social problem claim— in Ibarra and Kitsuse's terms an exploration of the vernacular resources used to present it— but also a deconstruction of those resources themselves and an attempt to historicize them. It is my hope that this effort succeeded without a falling away from what I take to be the most important precept of the constructionist paradigm— its emphasis on discourse and its concomitant backgrounding of experience. Again, I say backgrounding here to emphasize that conditions should not be eliminated altogether as many constructionists advocate. Instead, they are best treated, along with social context, as resources that influence the types of rhetorics claims-makers deploy. These more abstract rhetorics and closer to the ground social problems claims exist in a mutually creative and re-enforcing relationship. Although it may move them somewhat outside of their primary area of focus, constructionists need to address this relationship more fully in their work.

Epilogue- The Kyoto Conference

This research was designed from the beginning to explore the *emergence* of climate change discourse. It was, in other words, intended to offer an explanation for the establishment of GCC as a legitimate and pressing social concern. Although I studied a number of documents produced by the environmental movement in the 1990s, my discussion of the social construction of GCC ended in the late 1980s, after the hot summer of 1988 and the testimony by James Hansen inserted the issue into the U.S. public conscience. In this section, I would like to briefly discuss how the issue has faired in subsequent years and offer some comments on its likely direction in the future.

The Road to Rio

With the return to cooler temperatures in the early 1990s (ostensibly brought about by the eruption of Mount Pinatubo in the Philippines), the advent of the Gulf War and the recession, and a concerted campaign to discredit the science upon which warming scenarios were based, public interest in global climate change had withered. Environmental movement efforts on the issue however did not go away although the activities of movement claims-makers shifted from the mostly typificatory activity that characterized their work in the 1980s towards the development of a nuts and bolts GCC policy. Whether it was due to the anticipated practical difficulties of pursuing the issue through a traditional regulatory strategy or the realization that a significant lessening in the threat of greenhouse warming could only occur if other countries reduced their output of greenhouse gases, movement activity on GCC began to center around the creation of an

international convention on greenhouse emissions similar to that adopted to combat CFC related ozone depletion. The first attempt at the establishment of such a convention occurred at the 1992 Earth Summit in Rio de Janeiro.

Similar in some ways to the Stockholm conference twenty years earlier, the Rio conference was, from the outset, meant to address a number of environmental and development issues including bio-diversity and de-forestation. Central to the meeting however was the issue of CO2 induced warming. Still very much enamoured with market oriented discourses, a number of activists in the environmental movement hoped that the business sector would see the issues of global warming as an opportunity to develop new products and new markets. Mindful of the ways in which commercial threats from Japan play in the U.S. for example, a number of environmental groups highlighted a Japanese initiative to become the dominant country in the production of eco-friendly technologies. In the absence of much public opinion on the question however, the Bush Administration remained unimpressed with these sorts of arguments siding with business interests who sought to maintain the status quo. Again, the movement failed to recognize that without a compelling public discourse and associated with that, a measure of public pressure, 'rational' argument was not likely to sway the political process.

The shear size of the meeting (it was attended by over 100 heads of state), the breadth of its agenda, and the notion that in a post Cold War world countries could be persuaded to look beyond their own national interests, led the environmental movement to hope that the Rio conference would represent a watershed event for the international environmental agenda it had adopted. Unlike earlier environmental problems, the issues brought to the Rio meeting were thought of as systemic. They represented almost a paradigm shift for the movement which had since the late 1970s encountered difficulty achieving success

with its traditional pollutant by pollutant approach to environmental improvement.

For these reasons it was essential to movement activists that Bush attend the Rio conference. On one level his attendance would provide the sort of media exposure necessary to place this new systemic approach before leaders and the public. Bush however was reluctant to attend the conference (in retrospect this reluctance was well founded) and ultimately only did so in response to a good deal of election year pressure engineered by environmental claims-makers. While the content of the final accords ratified in Rio fell far short of the goals envisioned by movement activitists, the conference succeeded in establishing the international arena as the place within which global environmental problems were to be addressed. Though many in the movement were disappointed by the failure to adopt a meaningful environmental agreement, the meeting did serve to legitimize the issues to which the movement had committed itself. A framework, in other words, had been established which enabled the environmental claims-makers to continue to move their agenda forward.

The failure to reach an accord in Rio was also significant for the political damage it did to the Bush Administration and to environmental conservatives. Tactically, the conference represented a major public relations loss for the president who was subjected to a good deal of criticism domestically and internationally for the failure of U.S. leadership. Strategically, Bush's performance in Rio removed all pretence about his environmental record and it became clear that within the White House, the old Reagan agenda (embodied by Bush's chief of staff John Sununu and budget director Richard Darman) prevailed. More important, the public receptivity to criticism levied against the president both before and after the meeting may very well have galvanized the activist community and played a significant role in the more aggressive strategy it deployed in subsequent years.

The Road to Kyoto

Despite its initial enthusiasm for the Clinton Administration, the environmental movement was often critical of the relatively weak stand it took on climate change. While there was a perception that Clinton failed to adequately understand the issue, many in the movement concluded that the Administration failed to act decisively on climate because of the absence of significant public pressure (Sierra Club, 1994; Sierra Club, 1998). For movement leaders, public reticence about GCC was tied to a well funded industry campaign designed to portray the science behind warming predictions as uncertain (Natural Resources Defense Council, 1993) and the media's propensity to grant equal time to even the most marginal GCC skeptics (Sierra Club, 1996). In the years following the Rio conference, a good deal of effort was directed at debunking these debunkers. In addition to presenting authoritative scientific explanations for climate change (very much along the lines sketched out in Chapter 5) however, the movement developed a much more aggressive discourse which attacked the specific companies and industries behind the dis-information campaign. In sharp contrast to the sorts of presentations created in the 1980s, the new discourse was quite specific in portraying big oil, big auto and big power as the source of efforts to distort the story (c.f. Earth Island Institute, 1998b). No longer unmentionables, they were all described as adversaries.

In the lead up to the Kyoto Conference, a number of pieces appeared in the advocacy press critical of a major public relations effort launched by the fossil fuel industry to prevent or weaken any accord the conference might produce. John Adams, NRDC's CEO, wrote in one of many pre-conference articles that appeared in Amicus (the group's serial): "If you don't know what environmentalists are up against in the global warming fight, then let me tell you something about money and hypocrisy" (Natural Resources Defense Council, 1998d). The article itself was entitled *Selling the Planet*. While there is nothing

particularly harsh in this language, it stands in sharp contrast to earlier mainstream discourses which were unable to locate blame for the failure to take action at all. Perhaps a bit more pointed, the article went on to state that:

> This public declaration of war on the Kyoto talks shows up the industry PR campaign for what it is. It is a bald-faced attempt to destroy an international effort to save the environment. In the face of an environmental threat like nothing any of us has ever seen before, these companies have decided that their own profit margins are more important. Rather than invest in alternative energy sources, they have decided to sell the planet (Natural Resources Defense Council, 1998d, p. 2).

This kind of language is all the more important because it was written not by an NRDC staffer, but by the president of the organization himself. In a similar vein, the Sierra Club described George Bush as "the imposter currently resident in the White House" and endorsed Bill Clinton in 1992 noting that "a real environmental president must turn a deaf ear to the apostles of greed" (Sierra Club, 1992, p. 46).

This new more aggressive language was associated with a new message about the seriousness of climate change. Whereas earlier discourses were reluctant to state that GCC would have significant impacts in the United States, more recent claims have emphasized local effects. In many instances, claims-makers pointed to recent bouts of anomalous weather— flooding in the mid-west, unusually severe storms in the Atlantic, the heat wave in Chicago— to illustrate the sorts of disruptions that GCC will bring about. Such events are used to make the point that climate change will not simply mean that average temperatures will be a few degrees warmer but rather that weather extremes will become more commonplace. Along with reports that long term global average temperatures are increasing, such events were also used to suggest that the warming trend predicted in the 1980s is already underway (National Wildlife Federation, 1995; Natural Resources Defense Council, 1996).

The range of effects of climate change were also expanded, again with particular focus on impacts in North America. In light of recent

studies published in the scientific literature for example, a number of groups have started to spread concern about the direct effect of warming on the distribution of disease vectors notably those associated with Malaria and Dengu Fever. One article appearing in Sierra (Sierra Club, 1997) traced several 1993 Hanta virus fatalities in New Mexico through a cascade of climatic and ecological anomalies which produced conditions favorable for the species of mouse said to be the disease's primary host. If claims-makers are able to continue to portray GCC as threatening to the body, particularly the North American body, it is likely that public interest in the issue will continue to grow. There is, after all, an ominous cultural message in the prospect that climate change will bring tropical ecologies to our doorstep. If disease can creep northward what about other exposures?

Kyoto and the Road Beyond

While not quite on the same scale as the Earth Summit in Rio de Janeiro, the Kyoto conference represented the first time since 1992 that a high level diplomatic meeting was convened to discuss anthropogenic climate change and to create a series of protocols aimed at reducing the threat it posed. With a President in Washington at least somewhat favorable towards their concerns, many in the environmental movement must have viewed Kyoto as a chance to achieve the sort of watershed agreement on climate change that had eluded them in Rio. NRDC made the conference its top priority for 1997 (Natural Resources Defense Council, 1998c) and extensive coverage in the popular press assured that the issue would generate a good deal of discussion. Like Rio, Kyoto presented the movement with an opportunity to establish the definition of the GCC situation that would prevail. It was as much about establishing official recognition for GCC claims as about the passage of specific emissions mandates. Ultimately the conference had to do with the movement's desire to have the issue taken seriously.

Outcomes

In the terms of the actual accords themselves, the Kyoto meeting was a disappointment to many in the U.S. environmental movement (Sierra Club, 1998; World Watch Institute, 1998a). The small reductions agreed to— a cut to 93% percent of 1990 greenhouse gas emissions by 2012— the passage of language to allow international trading in emissions credits[74], the adoption of a plan for so called joint implementation agreements whereby one country could offset its own emissions by reducing another country's emissions (for example by funding its re-forestation efforts), the high ratification threshold and the scant attention played to enforcement and sanctions for countries failing to meet the goals led many activists to view the Kyoto agreements as a failure. In terms of the institutionalization of the climate change as an issue 'on the table' however it was at least a partial success. Despite the weaknesses of the treaty it did represent the first time that mandatory CO2 reductions were put in place. More than that, the accords were passed with intense U.S. Congressional opposition to any treaty that exempted the developing world from participation and in the face of a $13 million domestic public relations blitz[75] (Zengerle, 1998) by businesses opposed to the treaty.

What makes these developments significant is the fact that in the months following the conference, those opposed to the Accords have been forced to shift their strategy from one that emphasized the uncertainty of the science to one which emphasizes the costs of reducing CO2 emissions. Before Kyoto, even the existence of the problem was questioned. Now, primarily due to an effort to establish their own credibility, industries opposed to reductions in CO2 have been forced

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[74] Only EDF remains supportive of emissions trading schemes. Other EMOs, NRDC and Sierra for example, oppose them primarily on ideological grounds. Their discussion of such schemes centers around the inherent unfairness of allowing wealthy companies to buy their way out of their global environmental responsibilities.

[75] Some observers (Natural Resources Defense Council, 1998c) estimated that the PR campaign cost twice this figure.

to concede that the basic science is sound[75]. An oil industry executive, in describing his company's decision to opt out of the Western Fuels Association, a staunch opponent of action on GCC noted that "We didn't want to fall into the same trap as the tobacco companies who have become trapped in all their lies" (World Watch Institute, 1998b, p. 36). A utility company's decision to quit the Global Climate Coalition, another industry front group, said much the same thing calling GCC a serious problem about which something ought to be done. British Petroleum and Royal Dutch Shell, two companies with a large American presence, have also come to accept the Kyoto accords, the former plans to speed up production in its solar energy subsidiary.

Although hardly a defining moment in terms of GCC policy, the Kyoto meeting succeeded in granting broad political legitimacy to the climate change issue. In the months that followed the conference there began to appear articles in the advocacy press that were critical of the very modest 'no regrets' approach[77] to CO2 reductions called for in the accords. Even before the Kyoto accord had been signed, some in the movement were talking about the necessity of much more drastic reductions in greenhouse gas production— on the order of 60 or 70% of current levels (Earth Island Institute, 1998a; Natural Resources Defense Council, 1998b). NRDC even contemplated an end to the $2 trillion-a-year fossil fuel industry in a piece appearing in *Amicus* (Natural Resources Defense Council, 1998a). In all my research into GCC claims-making, I noted nothing that called for reductions of any where near 60 -70% and indeed since Rio, the first occasion in which a specific GCC policy was actually discussed, only reductions to 1990 levels have been contemplated. Perhaps more than anything, this new aggressiveness is the most significant outcome of the Kyoto meeting.

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[76] Some of these concessions occurred in the year prior to the conference itself.

[77] This term refers to the sorts of energy efficiency measures that would be environmentally and economically beneficial even if climate change does not occur.

Appendix 1- Summary of Events in the Construction of GCC

This research argues that each of the following events contributed to the discovery of global climate change and its definition as a social problem by environmental claims-makers.

1. Changes in the geophysical sciences (cold war interest in element cycling, ability to measure IR absorption spectrum of C02, development of computer modeling).
2. The growth of scientific entrepreneurship.
3. 1970s resource crises.
4. The corporate counter attack.
5. Development of advocacy science (penetration of science into environmental discourse, development of groups like EDF, UCS).
6. The professionalization of the environmental movement.
7. The shift towards practical discourses as opposed to moral ones.
8. The shift towards market oriented discourses engendered by the conservative tenor of the Reagan years and the perceived failure of regulatory approaches to environmental problems.
9. The properties of GCC (distant and abstract nature, requirement that discourse break through everyday sense of security about nature and the weather, distance from the details of resource production).
10. The inability to move on other fronts during the Reagan years (regulatory stalemate).

Appendix 2- Chronology of GCC Events

Year	Event
1824	Fourier described the action of gases in the atmosphere as being similar to what takes place in a hothouse. This was the first paper to qualitatively describe the greenhouse effect. Compares the effect of the atmosphere on earth to that of a pane of glass covering a bowl. Paper described the greenhouse effect but did not link human induced CO2 to it.
1861	The notion that CO2 level effects climate was noted by the British physicist John Tyndall. Still no relation to the anthropogenic CO2.
1896	Swedish scientist Svante A. Arhenius calculated how changes in carbon dioxide content would affect the temperature at the earth's surface.
1897-1899	Series of theses put forward by Chamberlin and Tollman (who worked closely together) about the relationship between CO2 and climate. But there does not appear to be anything about anthropogenic influences. Chamberlin's interest in CO2 stemmed from a theory he was developing about the effects of vulcanism in the earth's early history on climate. His work on CO2 and paleoclimate may not have been pursued since his name was associated with a theory of Earth's origin (The Chamberlin-Moulton Hypothesis) which was rejected.
1903, 1908	Arhenius notes that burning of fossil fuels will increase CO2 and warm the earth. He believes however that oceans will absorb most of the anthropogenic CO2. Warming, he suggests may be desirable.
1938	Notion of GCC introduced by G. Callendar in the Quarterly Journal of the Royal Meteorological Society V64 1938. He attributes the climatic optimum, the slight warming of northern hemisphere temps between 1850 and 1940 could have been due to CO2. He publishes two other pieces on the CO2-climate connection through 1949 (PSAC report). H&R 92 state that this is the first work to quantitatively discuss CO2 induced anthropogenic climate change.

1955	Von Neuman presents idea that technological development may lead to GCC in Fortune article "Can we survive technology". Article discusses the possibilities and dangers of technological advances. Notes that many technologies now have effects that transcend national boundaries. Article also notes the possible military implications of climate warfare.
1956	Plass uses a computer to determine the change in atmospheric radiation balance with changes in CO2. A doubling of CO2 causes a 3.6 degree K warming. Plass' results are used to revive the theory that change in CO2 levels are responsible for changes in climate. Plass uses his model to estimate climatic effects of anthropogenic CO2 increases and to explain a fifty year trend towards warmer temps. Victor and Clark (1990) note that, this work was based on new data about the infra-red absorption of CO2 and was used to reinstate the theory of CO2 induced climate change. Moller (1963) and Kaplan (1962) dealt with deficiencies in Plass' calculations that centered around their failure to include the effects of changed temperatures on cloudiness and atmospheric moisture.
1957	Roger Revelle, former director of the Scripts Institution, states that humans were carrying out an immense geophysical experiment by burning fossil fuels.
1957	International Geophysical Year scientists began collecting climatic data. Revelle, along with colleague Hans Suess and his student Charles Keeling begin collecting this data. Revelle lobbies for and receives funding for these observations from the U.S. Congress which provided the money through the NSF. This lobbying effort took place ion 1955 in anticipation of the 1957 International Geophysical Year.
1957	Measuring devices placed on the Mauna Loa climate observatory in Hawaii. The data they collected revealed a systematic increase in atmospheric CO2. These observations were verified at the South Pole and at other locations around the world. From 1880 to 1989 an increase of 20% has occurred. CO2 measurements had been going on in the Scandinavian countries but that these took place at altitudes that were too low to eliminate the possibility of local contamination. Keeling also observed CO2 from airplanes and from ships.
1957	Around the same time (actually a few years earlier) John von Neumann and other scientists at the Center for Advanced Study began to make attempts at modeling atmospheric processes on digital computers.
1958	NYT discusses research pointing to signs that the Earth has warmed about 5 degrees over the last 50 years and has been warming for several hundred years. Record shows nothing about CO2.
1959	NYT reports on research linking atmospheric CO2 increases to fossil fuel use.

1959	NYT reports on findings in polar regions that back theory that global temps are rising. No link to CO2 in abstract.
1959	NYT reports on findings of Soviet researchers in agreement with US scientists that northern hemisphere areas have been warming. Again no reference to CO2.
1960	Construction of GCMs begin at the GFDL (which opened at Princeton with funding from NOAA) and NCAR (with funding from NSF).
1960	NYT reports on findings which sees possibility that increasing amounts of CO2 may cause rise in temperatures around the world.
1961	NYT reports on research from Mauna Loa observatory showing atmospheric CO2 level rising 1 ppm per year.
1961	American Meteorological Society Conference sponsors debate on theories of climate change.
1961	US Weather Bureau scientist reports that winters through out the world have become steadily cooler since 1940. States data indicates reversal of trend that began in 1881.
1962	NYT reports announcement of proposal to spend $5 billion on a 10 year program for studying weather and climate.
1962	Rachel Carson's *Silent Spring* is published. It remains on the NYT bestseller list for 31 weeks and prompts the creation of a presidential panel on pesticides.
1963	Von Neumann's work on weather and climate become institutionalized at Princeton as the Geophysical Fluid Dynamics Laboratory.
1963	Conservation Foundation holds scientific conference on GCC. Very brief document that the CF published outlines the basics of the CO2 climate connection and is not very different from more contemporary treatments.
1965	Revelle organizes a symposium on climate change at the American Meteorological Society meeting in Boulder.
1965	Report of the President's Science Advisory Committee contained the first reference in a government document that human activities could produce climate change. This section of the PSAC report was authored by Roger Revelle and according to Hart and Victor it appeared the following year in the annual report of the NSF.
1966	GFDL makes one of the earliest predictions of the effects of increase in CO2 on climate.
1966	GCC studies by the National Research (NRC)
1967	In late 1967 the International Council of Scientific Unions (ICSU) acting jointing with the World Meteorological Organization (WMO) proposed the creation of a Global Atmospheric Research Program (GARP) to accomplish the objectives stated in UN resolution 1721 which called for a program to advance the state of atmospheric sciences.

1967	Manabe and Wetherhald develop a one dimensional (vertical) model of CO2 effects on heat balance. Predicts 2.3 degree Kelvin rise in temps for a doubling of CO2. This the first of the radiative-convective models that holds up to modern scrutiny and it heralded the beginning of GCM studies of CO2. Significantly, this research was not related to any sort of global warming debate since such debate did not exist at the time. Rather it was part of a broader project in basic science.
1968	Drought in the Sahel.
1968	United Nations holds its Biosphere Conference. The conference mostly dealt with the scientific aspects of environmental degradation and the majority of recommendations that came out of it dealt with the need for better research McCormick (1989) sees this conference as a necessary prelude to Stockholm.
1969	Atomic Energy Commission chairman says that while efforts to cut SO2 content of power plant gases may be effective, there is no known way to eliminate CO2 that results from the combustion process. Notes that nuclear power however adds no pollutants to the atmosphere.
1969	NYT reports on research warning that "man has only a few decades to solve the problem of global warming caused by pollution." American Geophysical Union warms that warming may result in further melting of ice caps.
1970	Seventy scientists hold meeting sponsored by MIT as a prelude to Stockholm Conference. Meeting produces a volume entitled "Man's Impact On the Global Environment: Report of the Study of Critical Environmental Problems. Report notes CO2 induced climate change is a global problem although they state explicitly that "The existence of a global problem does not imply the necessity of a global solution." Conference mostly called for better international research coordination.
1970	National Academy of Science (NAS) says man's activities already exert an influence on climate but that it is too small to be dominant.
1970	US and European scientists report study indicating that increases in CO2 have resulted in little climate change so far this century.
1971	*Inadvertent Climate Modification: Report of the Study of Man's Impact on the Climate* results from on a landmark conference held prior to Stockholm Conference. Report deals with anthropogennic change, climate theory, modeling and on human influences.
1971	UN conference on environment reports that man is unintentionally altering elements in the world climate including its chemical and particulate composition. Changes are result of fossil fuel use.
1972	Soviet winter wheat crop fails.
1972	United Nations Stockholm conference introduces the notion of the "global environment."

1972	Scientists call for stepped up study of climate changes past present and future. Particular interest in the causes of ice ages. Calls current climate transitory. All kinds of climate change theories are mentioned.
1972	"Supercomputer" built by Texas Instruments for the Geophysical Fluid Dynamics Laboratory at Princeton. Running for 60 hours it can simulate a years worth of weather.
1972	NYT reports on NOAA scientist who predicts that continued use of fossil fuels will mean 20% rise in CO2 emissions by year 2000. This could raise global temps by 1 degree F by the end of the century.
1972	Delegates at UN Stockholm Conference on Human Environment meeting agree to set up global climate and pollution monitoring system. CO2 and atmospheric dust among the elements to be monitored.
1974	Rowland and Molina publish their theory about CFCs and ozone depletion in *Nature*.
1975	Syuhuro Manabe and Richard Wetherald model calculated a doubling of atmospheric CO2 would produce a warming of about five degrees F over the surface of the earth. This was the first study to represent the atmosphere in three dimensions. Its results have been verified by other labs and has not changed much. Again the CO2 perturbations 'run' on the model were not the result of policy interest but rather were meant to test the overall sensitivity of the models to changes in their parameters.
1975	NRC publishes "Understanding climate change: A program for action" Study represents mostly an outline of the types of research the panel that created it sees as necessary in order to understand the physical basis of climate. Authors clearly seem to be concerned about climate change (CO2 or otherwise) as a problem effecting the welfare of the country.
1975	Report by NASA's Global Atmospheric Research Program notes that many scientists expect a major cooling as a result of anthropogenic pollution.
1975	NYT reports on research by V Ramanathan of NASA which claims that fluorocarbon aerosol sprays could contribute to greenhouse effect in the same way as CO2.
1975	NYT reports warning by group of scientists who state that man's output of heat will raise global temps enough to melt polar ice caps resulting in coastal flooding. Within 80 years human activity will add as much as 1% of the heat the sun does to earth.

1976	NYT reports on study commissioned by CIA warning of global political and economic upheavals "Almost beyond comprehension" if predicted changes in climate are as extreme as previous climatic alterations. Report states that world has entered a period of adverse climate which will last for at least the next 40 years possibly longer. Result will be famine and starvation. Study holds that climate change is already upon us and that the US, as well as other countries are locked in short-sighted policies and are out of step with the realities of population growth and on the disruptions caused by anomalous weather. Mentioned yet again in JL14 NYT (3:4). This time with reference to the severe winter of that year. Report states that Americans live in an "air conditioned dreamworld."
1977	Changing Climate (1983) report notes 1977 publication of "Energy and Climate" under NAS auspices. This report was the result of a panel chaired by Revelle and it called for an intensified research program on CO2.
1977	NRC/NAS Climate Research Board appoints Robert White as full time chair. Fleagle (1992) notes he was central in moving climate onto the national agenda.
1977	Assistant Administrator at the Energy Research and Development Administration warns that large increases in coal combustion would raise CO2 levels during House Interior Subcommittee hearings. Increases could have "far reaching global consequences."
1977	William Nordhaus of the President's Council of Economic Advisors warned that it may ultimately be necessary to restrict burning of coal and other fossil fuels to avoid accumulation of CO2 and the associated climate change. Statement is part of a speech at a meeting of the American Geophysical Union.
1977	Scientists reporting to NAS warn of 10 degree rise in global temperatures by end of twenty second century if coal use continues to grow. Warming even higher in higher latitudes.
1977	DOE is designated lead agency for CO2 research.
1977	Carter directs the CEQ and Department of State (DOS) to study probable changes in global population, natural resources and the environment to the end of the century. Global 2000 was the outcome of this effort.
1978	Congress passes the National Climate Act of 1978. Later amended in 1982 and 1986. The Act establishes National Climate Program Office to provide a focal point for the growing interest in climate and climate change and to coordinate the activities of agencies involved in climate research.
1978	Chemical and Engineering News (October 17th issue) reports that to date over 500 scientific papers about GCC have been published.
1979	DOE sets up a GCC research program.
1979	DOE sponsors workshop on social impacts of GCC held in Annapolis. Workshop brought together 85 experts from around the world and led to the creation of the Interim report mentioned below.

1979	GCC studies by the NRC. William Kellogg (1987) calls this report a "Blue Ribbon Study" commissioned by NAS to independently evaluate the extant climate models. It's primary author, Jule Charrney was head of the MIT meteorology department and had not, up to then, been involved in the GCC controversy.
1979	WMO in conjunction with a number of agencies of the UN launched the world climate program with the object of determining the extent that human activities can influence the climate. By 1981 a network of 109 monitoring stations had been setup in 71 countries.
1979	First World Climate Conference urges all nations to address the threat of CO2 induced climate change. Kellogg (1987) notes the importance of this conference since it pointed up the urgency of the threat. It stated that noticeable changes in climate, might be observable before the end of this century.
1979	Carter address to environmental leaders states that CO2 is one of the most serious environmental threats we face.
1979	CEQ urges Carter admin to consider effects of fossil fuel use on weather in formulating energy policy.
1979	Senate Governmental Affairs Committee warns that effort to produce synthetic fuels will contribute to increased levels of CO2 in the atmosphere, possibly leading to global change.
1980	World Climate Program officially inaugurated by WMO in cooperation with the ICSU and United Nations Environment Program (UNEP). An important objective was to define CO2s influence on the climate and the impacts of global change.
1980	Energy Security Act of 1980 calls upon the Office of Scientific and Technology policy and the NAS to carry out a comprehensive 3-year study of the implications of an increase in CO2.
1980	Manabe and Wetherald update their 1975 GCM. Michaels notes the flaws in their work but is quick to point out that they are honest scientists.
1980	William Nordhaus, former economic advisor to Carter warns that continued use of fossil fuels in the next century could bring about dramatic changes in climate such as melting of polar ice cap. Proposes "soot tax" on fossil fuel use to reduce emissions.
1981	Global Tomorrow Coalition, an offshoot of the group involved with the preparation of the Global 2000 report, is formed.
1982	NRC publishes Carbon Dioxide and Climate: A Second Assessment. This report was put together by a panel chaired by Smagorinski as requested by the NAS's Climate Research Committee and Climate Research Board.
1982	Conservation Foundation's 1982 *State of the Environment* report mentions GCC as a possible "serious threat" but concern is fairly low key. They note their desire to deal with issues concerning the global environment in the future.

1982	James Hanssen of NASA forecasts warming trend in the 1980s at the annual meeting of the American Association for the Advancement of Science.
1983	West German Green Party sends 27 representatives to the German Bundestag
1983	PBS broadcast of NOVA discusses climate change.
1983	EPA report: Can We Delay A Greenhouse Warming?, concludes that global temps will rise by 2° even with major CO2 reductions.
1983	EPA is inundated with over 500 requests for their GCC report.
1983	Publication of "Social science research and climate change". Elizabeth Boulding and Steven Schneider are editors. This is one of the first volumes on climate change from a social scientific perspective. Volume contains chapters on social responses, climate and history, political institutions and climate change, legal implications, and psychological dimensions.
1984	World Resources Institute (WRI) sponsors conference on "The Global Possible." Conference stresses the importance of international cooperation on GCC and is attended by elites from scientific community, business and government. Conference was apparently a belated response to Global 2000 report meant to explore solutions to some of the issues raised in that report.
1985	DOE releases four volume set on GCC science to date.
1985	Conference in Vilach, Austria under the auspices of WMO and UNEP and ICSU clearly establishes GCC as an international concern.
1986	NSF establishes Global Geosciences Research Initiative. Grants under this program serve to bring the non-governmental research community into the national GCC program.
1986	NYT reports on draft of international report by 150 scientists coordinated by NASA which says human activity is changing earth's atmosphere and too little is known about long term consequences. Suggests they will be far reaching to economy and society.
1986	Scientists present evidence to Senate Environmental Pollution Committee that rise in CO2 and other gases will have earlier and more pronounced impact on global temperatures than previously expected.
1986	EPA administrator Lee Thomas says government must address buildup of man-made gases in atmosphere; says scientific studies seem to confirm that buildup will lead to dangerous increase in the Earth's temperature.
1987	GCC studies by the NRC
1987	Climate Protection Act of 1987 directs EPA to study GCC and to report on its impacts.
1987	Senator Chafee holds hearings on the issue with Dr. James Hansen. He predicts that significant warming may occur in the next fifteen years.

1987	Workshop held in Villach and Bellagio on potential regional impacts of climate change in the next century and the technical, financial and institutional option for limiting and adapting to changes.
1987	EDF sponsors two meeting to discuss GCC with international network of scientists.
1987	Joint U.S./ Soviet Summit statement calls for cooperation on GCC.
1988	James Hanssen's testimony before Congressional Committee makes front page of NYT.
1988	Numerous reactions to Hansen. Richard Lindzen of MIT and Jerome Namias of Scripps wrote to Bush urging him not to act. Several members of the NAS joined in a report calling into question the scientific basis of policy changes.
1988	National Energy Policy Act has statement about GCC
1988	Conference in Toronto on climate change "The Changing Atmosphere: Implications for Global Security."
1988	EDF trustees launch $5 million campaign to solve global problems. Goal is to build scientific and legal resources to address global environ problems.
1988	Representatives of 35 countries including US meet in Geneva to begin UN sponsored effort to evaluate global climate trends and map out policies to cope with drastic consequences warming would have on human life.
1988	Stafford-Bacus and Wirth-Johnston bills in the Senate and Schneider bill in the House are introduced in Congress. All mandate a number of steps to be taken to limit GCC. Wirth-Johnston earmarks $500 million to develop new nuclear plants.
1989	James Baker calls for international political action to counter threat of global warming. Baker does not want to wait until all the data to be in since by then it will be too late.
1989	EPA issues report to Congress entitled "Policy Options for Stabilizing Global Climate"
1989	EPA issues report proposing "bold actions for the next decade to delay and lessen expected warming of the earth from industrial gases." These include sharp increases in fuel efficiency standards and fees on oil, coal and natural gas.
1989	American and Soviet scientists, environmentalists, policy makers, industry leaders and artists meet in Sundance, UT and urge Bush and Gorbechov to form security alliance to reverse what they fear could be catastrophic warming.
1989	Delegates attend world energy conference in Montreal say that cure for GCC is huge shift to nuclear power.
1990	NOAA establishes its Laboratory of Global Change Research.
1990	Survey by WMO and UNEP found that climatologists world-wide predicted an average change 3 degrees Celsius by the end of the next century if CO2 emissions were not reduced. If they were radically reduced they expected a 1° change.

1990	EDF presses for an international agreement to reduce greenhouse gas emissions similar to the 1987 Montreal ozone accords.
1990	EDF receives $1 million gift from the William Bigham Foundation to expand its global atmosphere program.
1990	Climate experts meeting in Geneva urge western nations to cut emissions of CO2 by the end of the decade.
1990	United Nations publishes report entitled "Scientific Assessment of Global Change" or IPCC report. Michaels notes that this report is cited by pro GCCH persons as representing consensus understanding among scientists of GCC.

Appendix 3- List of abbreviations used

AAAS	American Academy for the Advancement of Science
CEQ	Council for Environmental Quality
DOE	Department of Energy
EDF	Environmental Defense Fund
EIS	Environmental Impact Statement
EMO	Environmental Movement Organization
EPA	Environmental Protection Agency
FOE	Friends of the Earth
GCC	Global Climate Change
GCCH	Global Climate Change Hypothesis
GCM	General Circulation Model (e.g. Global Climate Model)
GFDL	Geophysical Fluid Dynamics Laboratory
LDC	Less Developed Country
NAS	National Academy of Science
NCAR	National Center for Atmospheric Research
NEPA	National Environmental Policy Act
NOAA	National Oceanographic and Atmospheric Administration
NRC	National Research Chouncil
NRDC	Natural Resources Defense Fund

NSF	National Science Foundation
NWF	National Wildlife Federation
NYT	New York Times
PSAC	President's Science Advisory Council
SCEP	Study of Critical Environmental Problems
SMIC	Study of Man's Impact on Climate
TEH	The Environmental Handbook
TVA	Tennessee Valley Authority
UCS	Union of Concerned Scientists

References

All of the primary source documentary material cited in this study are assumed to have corporate rather than individual authorship. In many instances, environmental movement serials do not specify individual authors anyway; but where they do, I have substituted for the individual author's name, the name of the organization for which he or she is writing. I though such an approach would make following the development of the movement's rhetoric more straight forward in the text since it would emphasize the *organization* advocating a particular position. I hope this approach does not make it more difficult for readers seeking to independently locate these materials from this bibliography.

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IMAGE EVALUATION
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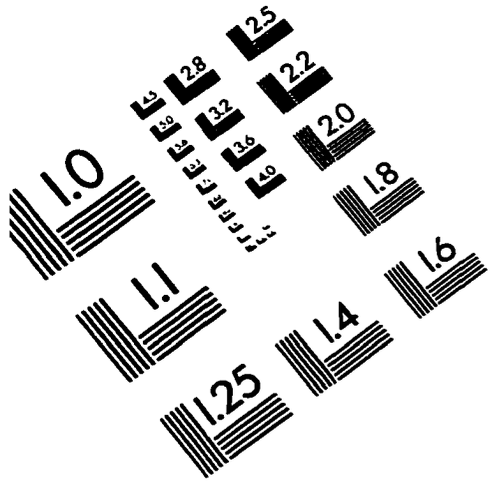

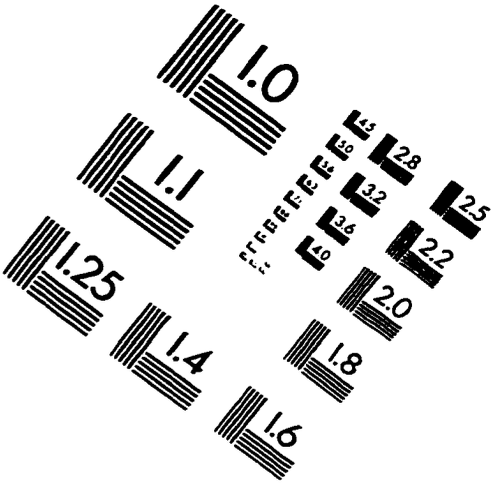

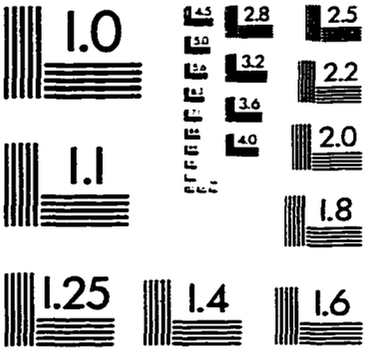

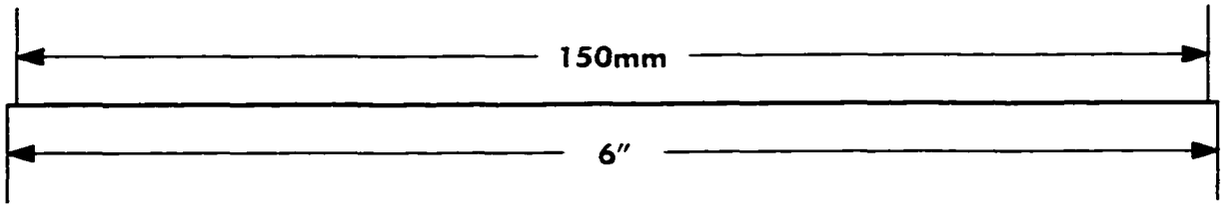

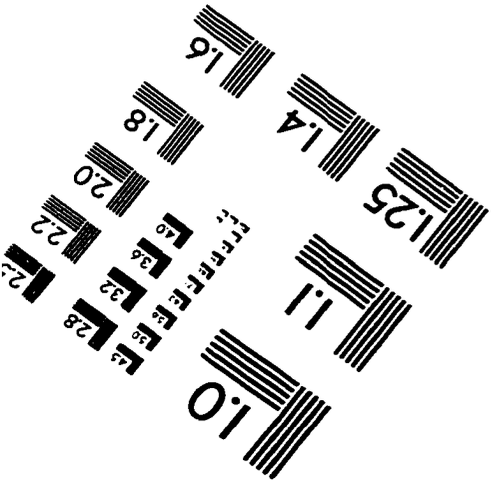

APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989