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ENVIRONMENTAL SOCIOLOGY ❖ 10578

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INTRODUCTION

Available evidence indicates that human societies are having an unprecedented and dangerous impact upon the global environment (e.g. Brown 1978; Ophuls 1977; SCEP 1970; Woodwell 1978). What people are doing to the environment upon which their existence depends has aroused widespread concern, expressed in legislation such as the 1969 National Environmental Policy Act and in events such as the 1970 "Earth Day" and the 1972 United Nations Conference on the Human Environment. It has also drawn the attention of a growing number of sociologists and has led quite recently to emergence of a new sociological specialization—"environmental sociology."

The purpose of this review is to describe the emergence of environmental sociology and to delineate the essential characteristics that qualify this new specialization as a distinct area of inquiry. In order to accomplish this a number of more specific issues are addressed.

First, since sociologists were clearly not in the forefront of recent efforts to comprehend the causes and consequences of changing environmental conditions, we briefly discuss disciplinary traditions that made it difficult for sociology to recognize the importance of environmental problems and ecological constraints—to the extent that several important precursors of contemporary environmental sociology were largely ignored.

Second, we give a brief history of recent organizational developments within sociological associations that signalled the gradual emergence of environmental sociology. Implicit in these organizational developments is a

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shift from what might be termed the "sociology of environmental issues" to "environmental sociology" per se. An elaboration of the distinction between these two forms a major portion of our review.

Thus, in the third section we review a variety of efforts in the 1960s and early 1970s to apply traditional sociological perspectives in research on wildland recreation, resource management, and environmentalism (including both the "Environmental Movement" and public attitudes toward environmental issues). In retrospect it appears that such "sociology of environmental issues" research led some sociologists to appreciate the sociological salience of physical environments and thereby provided a stepping-stone to current work in environmental sociology.

Environmental sociology involves recognition of the fact that physical environments can influence (and in turn be influenced by) human societies and behavior. Thus environmental sociologists depart from the traditional sociological insistence that social facts can be explained only by other *social* facts. Indeed, its acceptance of "environmental" variables as meaningful for sociological investigation is what sets environmental sociology apart as a distinguishable field of inquiry. Therefore, in the fourth section of this review we describe an "analytical framework" that explicates the diverse range of societal-environmental interactions that interest environmental sociologists. We also briefly review several areas of current research emphasis within environmental sociology: the built environment, organizational response to environmental problems, natural hazards, social impact assessment, energy and resource scarcity, and resource allocation and carrying capacity.

We conclude by discussing the likely future of environmental sociology—including probable areas of research emphasis, relations with the larger discipline of sociology, and relations with other disciplines concerned with environmental research.

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DISCIPLINARY TRADITIONS AND NEGLECT OF PRECURSORS OF ENVIRONMENTAL SOCIOLOGY

The very recent emergence of environmental sociology, and the small number of its practitioners, attest to sociology's difficulty in coming to grips with environmental problems and ecological constraints. This difficulty can be understood by examining historical developments within sociology that have led most sociologists to use the term "environment" to mean something quite different from what it means in most disciplines and in the larger society. In nonsociological parlance "the environment" means our physical surroundings, the biosphere (or a local portion of it). In contrast, within mainstream sociology "environment" means something altogether differ-

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ent—i.e. social and cultural influences upon behavior [particularly in contradistinction to "heredity" (e.g. Swift 1965)].

The early need to disentangle "environment" from "heredity" as sources of variation in human behavior patterns (Bernard 1922:84) did not logically require that either source be dismissed from further investigation. But "anti-reductionism" had become mandatory in sociology's drive for autonomy from other disciplines, so sociologists chose not to be "hereditarian." The discipline was thus committed to (what used to be meant by) "environmentalism" (Swift 1965).

To make further conceptual progress, sociologists had to go on to distinguish social and cultural environments from physical and biological environments (Bernard 1925:325–8). Again not from logical necessity but because of a taboo against "geographical determinism," sociological recognition of the salience of physical environments became restricted and distorted (Choldin 1978a:353; Michelson 1976:8–23), while sociological attention to the ecosystem context and consequences of human life was severely limited by a similar taboo against "biologism" (Burch 1971:14–20).

These professional aversions led sociologists to misperceive or underrate important sociological precursors of recent work in environmental sociology. Neglected, for example, were a textbook chapter on "The Natural Environment" by Landis (1949) and two articles by Mukerjee (1930, 1932) who, from India, had clearly seen that *Homo sapiens* could be assured stable and lasting dominance in the web of life only by understanding and working with ecosystem forces. Underrated was Sorokin's (1942:66–67, 122, 262–64, 289) analysis of the social repercussions of famine, for it was incompatible with the pervasive belief that human society was becoming almost totally independent of bio-environmental constraints. Also undervalued was Sumner's essay on "Earth Hunger" (Keller 1913:31–64), which recognized that an environment's carrying capacity could become insufficient and that this could fundamentally undermine democratic and egalitarian institutions. Further, Cottrell's *Energy and Society* (1955:143) saw that high-energy technology does not necessarily maximize human carrying capacity, but his impact was attenuated by traditional sociologists' professional reluctance to recognize any but strictly social causes of social facts.

ORGANIZATIONAL RECOGNITION OF ENVIRONMENTAL SOCIOLOGY

Three organizational developments reflect the emergence of environmental sociology and, to some extent, the transition from the "sociology of environmental issues" to "environmental sociology."

First, in 1964, several members of the Rural Sociological Society (RSS) interested in problems associated with use of forest, water, and other natural

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resources (e.g. problems of fire prevention and competing recreational uses) formed a "Sociological Aspects of Forestry Research Committee." Renamed the "Research Committee on Sociological Aspects of Natural Resource Development" the following year, it evolved into the present "Natural Resources Research Group" (one of the largest and most active of RSS's quasi-formal "research groups").

Second, in 1972, the Society for the Study of Social Problems (SSSP) decided to add an "Environmental Problems Division." Organized in 1973, the Division's membership reflected a wide range of interests, although "environmentalism" and "environment as a social problem" were topics of particularly strong interest.

Third, at the end of 1973 the Council of the American Sociological Association (in response to a resolution from an ASA business meeting) authorized formation of a committee "to develop guidelines for sociological contributions to environmental impact statements." Appointed in early 1974, the "Ad Hoc Committee on Environmental Sociology"[1] provided impetus (particularly via its widely distributed newsletter) for the emergence of its successor—an ASA "Section on Environmental Sociology." Organized at the 1975 ASA meeting, and officially recognized in 1976, the Section appears to represent the full range of interests currently pursued by environmental sociologists.[2]

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SOCIOLOGY OF ENVIRONMENTAL ISSUES

Many sociologists were initially drawn into the study of environmental issues through an interest in traditional sociological areas such as leisure behavior, applied sociology, and social movements. Of particular importance in the historical development of contemporary environmental sociology appear to be research on wildland recreation, problems of resource management, and environmentalism.

Research on Wildland Recreation and Resource Management Problems

WILDLAND RECREATION Recreational visits to "natural" environments such as national parks, national forests, and wilderness areas boomed after World War II, reaching hundreds of millions of person-days per year (Cat-

[1]This committee will be discussed again in the section on Social Impact Assessment.

[2]Similarly, RSS's Natural Resources Research Group and SSSP's Environmental Problems Division appear to have broadened to encompass all of environmental sociology. The research interests of 263 environmental sociologists involved with these two organizations, or with the ASA Ad Hoc Committee, are described in the *Directory of Environmental Sociologists* (Dunlap 1975).

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ton 1971). Sociological study of these activities also burgeoned as a direct extension of traditional sociological investigation of leisure behavior (Cheek & Burch 1976; Johannis & Bull 1971). For a while, preoccupation with the social organization of recreational visitors (mainly as primary groups—e.g. Burch 1965; Field & O'Leary 1973) overshadowed concern with environmental characteristics of recreational areas and human pressures upon such areas.

To predict both the types of activities resource management agencies might have to provide for and the amount of use to be expected on recreation sites, researchers studied visitor attitudes and values (Clark et al 1971; Hendee et al 1971), social ties of recreation visitors (Hendee & Campbell 1969), and demographic characteristics of wildland recreationists (Hendee 1969; White 1975). Other topics studied included "user satisfaction" (e.g. Bultena & Klessig 1969), which often depended more upon recreation "experiences" than on tangible "products" extracted from the environment. Investigators thus began to recognize a distinction between "consumptive" and "nonconsumptive" uses of land and resources (Wagar 1969). But visitor activities did sometimes harm the recreation environment, and so studies of "depreciative" behavior were undertaken (Campbell 1970) and were followed by behavior modification experiments to develop techniques for curbing such behavior (Clark et al 1972).

RESOURCE MANAGEMENT PROBLEMS Some sociologists were attracted to environmental topics by an interest in the problems faced by resource management agencies. For example, Reeves & Bertrand (1970) studied problems associated with high turnover among rangers in Yellowstone National Park, and Devall (1973) examined the dilemma faced by the US Forest Service due to its commitment to provide "sustained yields" of both recreational opportunities and marketable timber. Like other federal agencies, the service often appeared insensitive to citizens' wishes, and so various techniques for obtaining citizen input—from workshops and ad hoc committees to mailed questionnaires—were analyzed (Heberlein 1976; Stankey et al 1975).

Problems of the Army Corps of Engineers and other agencies involved in water resource development have also attracted sociological attention (Field et al 1974). Issues investigated include conditions of public acceptance of the transfer of water from one river basin to another, perception of water supply and its relation to patterns of use, and acceptance of, or resistance to, social change resulting from water development (Andrews & Geertsen 1970). Sociologists have also tried to assess the impact of water projects on quality of life and social well-being and to discern bureaucratic impediments to sound assessment of such impacts (Andrews et al 1973).

Resource management agencies have been compelled by escalating numbers of recreation visits to begin restricting access into areas under their

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jurisdiction. As we shall see later, problems of "overuse" led some sociologists from studies of management problems and recreational behavior into more ecologically significant studies of an environment's carrying capacity. A traditionally oriented *sociology of* wildland recreation and resource management thus began turning into a truly *environmental* sociology. In addition, as organized groups of recreationists shifted their interests from pleasure to environmental protection, studies of recreationist organizations began turning into studies of the Environmental Movement (e.g. Faich & Gale 1971).

Research on Environmentalism: The Environmental Movement and Public Opinion

The word "environmentalism" (which used to refer to preoccupation with nonhereditary influences upon behavior) now refers to a social movement dedicated to the protection of the environment. In the past decade this movement has succeeded in arousing widespread public concern with resource consumption and polluting behavior and has stimulated passage of environmental legislation and establishment of environmental agencies at all levels of government (Albrecht 1976).

THE ENVIRONMENTAL MOVEMENT The Environmental Movement has been the subject of numerous sociological studies (see the extensive bibliography by Buttel & Morrison 1977). Sociologists have focused on the origins of the movement, with some (Harry 1974) emphasizing its continuity with the earlier "Preservationist Movement" and others (Schnaiberg 1973) emphasizing the importance of the high level of political mobilization stemming from the Civil Rights and Anti-War movements. Other factors mentioned include increased recreational contact with nature, affluence enabling Americans to focus on aesthetic matters, and publication of literature warning of ecological problems (Albrecht & Mauss 1975:587–90; Gale 1972:283–86; Harry 1974; Schnaiberg 1973:606–9).

Empirical studies have examined the membership of environmental organizations, including their socioeconomic status (Mitchell & Davies 1978; Sills 1975:26–29), reasons for affiliation and participation (Faich & Gale 1971), level of organizational commitment (Bartell & St. George 1974) and attitudes toward environmental problems and solutions (Stallings 1973).

Qualitative analyses have focused on the evolving tactics, goals, and ideology of the Environmental Movement (Morrison et al 1972; Gale 1972) and have led to the construction of typologies of "ideal types" of environmentalists (Dunlap 1976; Schnaiberg 1973). In addition, various bases of opposition to the movement have been examined—both economic and ideological (Albrecht 1972; Dunlap 1976; Morrison 1973; Sills 1975).

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ENVIRONMENTAL ATTITUDES Early studies of public attitudes toward specific environmental problems such as air pollution (DeGroot 1967) were followed by studies of attitudes toward "environmental problems" in general (e.g. Murch 1971). Many early studies simply documented levels of "environmental concern" among the public (see the tables reported in Albrecht & Mauss 1975), but studies of the correlates of environmental attitudes have increased rapidly (a recent bibliography lists nearly 300 empirical studies, over a third of them by sociologists—see Dunlap & Van Liere 1978).

Education, age, political ideology, and residence are found to be the best predictors of concern with environmental quality: High education, youth, liberalism, and urbanism are associated with environmental concern (see evidence summarized in Van Liere & Dunlap 1979). However, the correlations are typically modest, from 0.1–0.4, and multivariate analyses examining the relative and cumulative effects of these and other variables are rare. Consequently, knowledge of the social bases of environmental concern is weak and inconsistent (e.g. compare the results of Buttel & Flinn 1978 with Malkis & Grasmick 1977). In part this is due to the atheoretical nature of most of the existing research; attempts to explain environmental concern by means of well-developed theories are rare (Heberlein 1972 is an exception, but see Dunlap & Van Liere 1977).

THE FUTURE OF ENVIRONMENTALISM Public support for environmental protection, despite an expected decline from the peak of 1970 (Dunlap et al 1979), remains relatively strong, and the membership of environmental organizations continues to increase (Mitchell & Davies 1978). Yet, despite substantial efforts by environmentalists, government, and other segments of society to protect environmental quality, many observers warn that ecological problems are more serious now than before the rise of the Environmental Movement a decade ago (see Brown 1978).

No doubt interest in environmentalism has been stimulated by growing awareness of such interrelated problems as carcinogenic environmental pollutants, societally caused atmospheric changes (see Woodwell 1978), substantial soil erosion, and rapidly declining fossil fuel supplies (see Brown 1978; Ophuls 1977); future levels of environmentalism will likely be influenced by societal awareness of yet-to-be discovered ecological problems. Thus, the future of environmentalism may well depend as much upon ecological conditions as upon the social dynamics presumed to determine the "career" of a social movement (see Albrecht & Mauss 1975). That social phenomena such as social movements may be influenced by physical phenomena is an insight fundamental to environmental sociology.

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EMERGENCE OF ENVIRONMENTAL SOCIOLOGY

By the mid-1970s, study of environmental problems had begun to sensitize some sociologists to the reality of environmental problems and ecological constraints. This seemed to require reappraisal of widely held sociological-domain assumptions, such as the supposed irrelevance of physical environments for understanding social behavior (see Jeffery 1976). Following Klausner's (1971:8, 11, 25) discussion of the doctrine of human exceptionalism within sociology, the label "Human Exceptionalism Paradigm" (HEP) was applied to traditional sociology's implicit worldview (Catton & Dunlap 1978a:42–3). In contrast, from writings of various environmental sociologists (Anderson 1976; Burch 1971, 1976; Buttel 1976; Catton 1976a, b; Morrison 1976; Schnaiberg 1972, 1975) an alternative set of assumptions stressing the ecosystem-dependence of human societies was extracted and termed the "New Environmental Paradigm" or NEP [Catton & Dunlap 1978a:45; also see Buttel's (1978a) critique of the HEP-NEP distinction and Catton & Dunlap's (1978b) response].

To contrast the traditional sociological worldview more accurately with the NEP, the obsolete assumptions should probably be called the Human *Exemptionalism* Paradigm,[3] for what environmental sociologists deny is not that *Homo sapiens* is an "exceptional" species but that the exceptional characteristics of our species (culture, technology, language, elaborate social organization) somehow *exempt* humans from ecological principles and from environmental influences and constraints.

As a fundamentally ecological worldview, the NEP should probably be called the "New *Ecological* Paradigm." One thing it seems to make clear is that sociology has to take seriously a dilemma traditionally neglected—human societies necessarily exploit surrounding ecosystems in order to survive, but societies that flourish to the extent of overexploiting the ecosystem may destroy the basis of their own survival (Burch 1971:49). So real is this dilemma that it has begun to affect the writing of some nonenvironmental sociologists (e.g. contrast the HEP-oriented remarks of Horowitz 1972 with the sober awareness of resource limits in Horowitz 1977). The reality of the dilemma is also indicated by the fact that it has been affecting not just sociology but other social sciences too, including both political science (e.g. Ophuls 1977) and economics (e.g. Daly 1977). Even in anthropology, where a "total ecological viewpoint" has long been available (e.g. Thompson 1949) but where preoccupation with tribal and peasant communities (Bennett 1976:151, 306–11) delayed its macrolevel application, attempts are now being made to unify the discipline around an ecological perspective (Hardesty 1977).

[3]We are indebted to Allan Schnaiberg and Stan Albrecht for this suggestion.

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An Analytic Framework for Environmental Sociology

Study of interactions between environment and society comprises the core of environmental sociology. Such interactions are complex and varied, and consequently environmental sociologists investigate a diverse range of phenomena. To clarify the scope of the field and organize the categories of phenomena it studies, an analytical framework has recently been proposed (see Dunlap & Catton 1979). It is founded on the concept of the "ecological complex" developed from the biologists' concept of "ecosystem" by Duncan (1959:681–84, 1961) as part of his effort to apply insights from general ecology to sociological human ecology (Duncan 1961:142–49).

Biologists define an ecosystem as the interacting biotic community and its environment. Since this concept is inherently "multispecies" in its purview, Duncan (1959, 1961) developed a simplified version focused on humans and emphasizing aspects of human life not shared by other species. Specifically, human populations make considerable use of social organization and technology in adapting to their environments. Thus, Duncan's "ecological complex" focuses on the web-like interdependence among Population, Organization, Environment, and Technology (P, O, E, T); it stresses that each element is reciprocally related to every other element (Duncan 1959; 684). While the "ecological complex" is not quite synonymous with "ecosystem" (as writers have often implied—e.g. Hawley 1968:329; Choldin 1978a:355), it nonetheless offers a useful conceptual device for viewing the interactions of human societies with their environments.

Unfortunately, the ecological complex has not generally been used by human ecologists within sociology for approaching what they themselves have said was their fundamental task—namely, "understanding how a population organizes itself in adapting to a constantly changing yet restricting environment" (Berry & Kasarda 1977:12). Instead, sociological human ecologists have typically devoted their attention to social organization per se, rather than focusing on the role of organization (and technology) in *enabling populations to adapt to their environments*. Furthermore, it has seemed to environmental sociologists that sociological human ecologists have tended either to ignore the physical environment (Choldin 1978a:355) or to neglect aspects of the ecosystem that are not human or derived from human action (Dunlap & Catton 1979; Molotch & Follett 1971:15–16). Thus, "environment" in the ecological complex has been treated as a *social,* or at best *spatial,* variable—devoid of any physical substance (Michelson 1976:13–23). By giving that kind of meaning to "environment," sociological human ecologists have lacked a basis for becoming concerned with contemporary environmental problems.

In contrast to the *organizational* focus of sociological human ecology, the fundamental characteristic of environmental sociology is the importance at-

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tached to the *environment* as a factor that may influence, and in turn be influenced by, human behavior (Catton & Dunlap 1978a; Dunlap & Catton 1979; Schnaiberg 1972; Zeisel 1975). Moreover, for environmental sociologists, the "E" in the ecological complex denotes the *physical* environment rather than the social environment. The other three elements—P, T, and O—make up what Park (1936:15) called the "social complex." Thus, environmental sociology examines the relationship between the physical environment and the social complex. Just as biologists learned to see a biotic community and its environment as an ecosystem, so environmental sociologists can recognize Park's social complex together with its environment as the entity Duncan's ecological complex was designed to analyze.

The proposed framework requires some elaboration of one element of the ecological complex, namely, "organization." An understanding of all phases of human interaction with the physical environment requires consideration not only of the organizational forms of human collectivities, but also their shared cultural values and the personalities of their constituent members. Thus the sociologically familiar tripartite distinction of cultural system, social system, and personality system is substituted for the more general term social organization, or O.

Each element in the resulting expanded version of Park's social complex—population, technology, cultural system, social system, and personality system—can influence (and in turn be influenced by) the physical environment (see the diagrammatic exposition in Dunlap & Catton 1979). This leads us to define the basic task of environmental sociology as seeking to answer two kinds of questions: (*a*) How do interdependent variations in population, technology, culture, social systems, and personality systems influence the physical environment? (*b*) How do resultant changes (and other variations) in the physical environment modify population, technology, culture, social systems, and personality systems, or any of the interrelations among them?

TYPES OF ENVIRONMENT In literature written by environmental sociologists there appears to be a continuum of physical environments ranging from the totally "built" to the completely "natural" (see Dunlap & Catton 1979; Popenoe 1977:22–23).[4] In constructing an analytical framework it is useful to divide the continuum into three categories: Between "natural" environments (e.g. wilderness areas, mineral deposits, etc) and "built" environments (e.g. housing, factories, highways, etc) various "modified" environ-

[4]This is reflected in the by-laws of the ASA Section on Environmental Sociology (published in the newsletter *Environmental Sociology*, No. 6, April 1975), which state that "The term environment is understood to encompass both 'natural' and 'built environment' as they relate to social behavior and organization."

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ments can be recognized. These show various degrees of human alteration (e.g. polluted lakes, planned landscapes, eroded farms, etc)—alterations that may be intentional or unintentional, good or bad.

It has been difficult for environmental sociologists to begin serious inquiries into the sociological relevance of *any* of these forms of the physical environment because, within sociology, "environment" has acquired the altogether different meaning of "social environment" (Jeffery 1977:123; Michelson 1976:17–18).

LEVELS OF INTERACTION A further difficulty also has to be overcome by environmental sociologists. In examining interactions between humans and environments differing levels of interaction must be recognized, but disciplinary traditions inherited from G. H. Mead, W. I. Thomas, and others (see Choldin 1978a:353) predispose sociologists to recognize only the "symbolic" or "cognitive" level of interaction. At this level human beings, groups, organizations, and societies respond to *meanings* they attribute to various environmental conditions, and they behave according to their *perceptions* of their surroundings (Klausner 1971:Ch. 3; 1972:338). On another level, however, human individuals and collectivities (no less truly than other kinds of organisms) are affected even by environmental conditions they may not perceive and to which they may thus have assigned no symbolic labels nor attributed any cultural meaning (e.g. Odum 1971:17–18; Commoner 1971:49–65). Various environmental conditions or events—e.g. air and water pollution, floods, erosion of topsoil or depletion of soil nutrients on farmlands, oil field exhaustion—can have direct, *nonsymbolic* effects on human lives and social processes, in addition to their symbolic effects or effects on cognition.

While the distinction between the symbolic and nonsymbolic levels of interaction has been stressed (Dunlap & Catton 1979) in order to emphasize to sociologists the importance of the latter, a somewhat finer distinction is useful in reviewing the existing literature. Thus, one can distinguish among cognitive, behavioral, and physiological interactions between humans—individually and collectively—and their environments (for a similar scheme, see Geddes & Gutman 1977:162).

Social scientists have paid a fair amount of attention to the first two forms of interaction, cognitive and behavioral, examining the impacts of the environment on cognitions (attitudes, personality, etc) and behaviors, and vice versa [Stokols' (1978) review of recent work in environmental psychology is organized in terms of these types of interactions]. Sociologists, for example, have examined the relationship between exposure to air pollution and cognitions about it (perception of its severity, concern over its effects, etc—see DeGroot 1967) as well as between exposure and actual behavior such as residential mobility (Van Arsdol 1969). However, the growing recognition

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that environmental conditions have physiological impacts, such as the health impacts of air pollution (Lave & Seskin 1977), suggests the importance of taking physiological interactions into account.

This does not mean that sociologists should become epidemiologists; rather, it means that the results of epidemiological studies constitute sociologically relevant data (e.g. Hinkle & Loring 1977). Given the link between exposure to environmental pollutants and deleterious health consequences, sociologists should begin to pay more attention, for example, to socially structured variation in such exposure among differing segments of society. Existing evidence (Burch 1976; Kruvant 1975) suggests that particularly in urban areas there is a substantial negative relationship between socioeconomic status and exposure to air pollution; the poor and racial-ethnic minorities are more likely to be exposed to higher levels than their counterparts. Noting that ingestion of moderate levels of air pollutants may influence "one's ability to persist in the struggle for improvement of social position," Burch (1976:314) concludes that differential exposures to pollution seem to be "one mechanism by which class inequalities are reinforced." This potentially crucial phenomenon would be ignored by researchers who limited themselves to investigating only cognitive and behavioral interactions.

In short, to understand the full range of human interactions with the physical environment, environmental sociologists must consider cognitive, behavioral, and physiological interactions as well as the numerous combinations and permutations of them.[5] For example, many behavioral impacts of the physical environment will likely be mediated by cognitive factors (e.g. efforts to avoid exposure to pollution will vary depending on perception of the seriousness of such pollution), while cognitive interactions may themselves be mediated by physiological impacts (e.g. individuals who develop smog-induced respiratory illnesses may change their attitudes about air pollution). Of course, these are only two of the many possible patterns, and it should be clear that environmental sociologists will need to pay attention to a wide range of phenomena to understand the complex nature of human interactions with the physical environment (see Hinkle & Loring 1977 on the complexities of human interaction with built environments).

[5]In relating the cognitive-behavioral-physiological distinction to the earlier distinction between symbolic and nonsymbolic interactions, we would term *purely* cognitive interactions "symbolic," and *purely* behavioral or physiological interactions "nonsymbolic." In an earlier discussion (Dunlap & Catton 1979), we suggested that more complex interactions that are symbolically (or cognitively) mediated be termed "symbolic," but it seems more appropriate to label interactions involving behavioral and/or physiological changes as "nonsymbolic"—even when they are mediated by cognitions.

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Areas of Research in Environmental Sociology

As an emerging field of inquiry, environmental sociology has not yet become a fully coherent area; it comprises diverse research interests with little overlap in personnel and insufficient cross-fertilization of ideas. Lacking a long tradition of empirical research, much of the field's existing work is conceptual or speculative, and most empirical studies have yet to be replicated.[6] Nonetheless, a surprising amount of work has been undertaken by sociologists identified with environmental sociology.

Although there is considerable difference in the degree to which the work of environmental sociologists reflects the New Ecological Paradigm (e.g. research pertaining to resource scarcity typically reflects an ecological perspective more than does research on the built environment), their work is linked together by a common interest in the physical environment as a factor that may influence (or be influenced by) social behavior. Thus researchers focusing on the physical environment, whether built or natural, share in a mutual departure from the Durkheimian dictum that social facts must be explained only with other social facts.

The following sections give brief overviews of research in several subareas of environmental sociology. Space does not permit exhaustive reviews, but we try to provide insight into the types of inquiry being conducted by environmental sociologists on societal-environmental interactions. The areas into which we have organized the literature are neither exhaustive nor mutually exclusive; however, they reflect major research emphases.

THE "BUILT" ENVIRONMENT Sociological concern with the man-made or "built" environment grows out of traditional sociological interest in cities, suburbs, neighborhoods, and housing (Angrist 1975; Michelson 1977; Popenoe 1977; Zeisel 1975) and has been stimulated in the past decade or so by the collaboration of sociologists with architects and planners in the design and evaluation of housing, other types of buildings, and residential communities (Choldin 1978a; Gutman 1972, 1975; Keller 1978; Michelson 1975).[7] However, explicit and sustained concern with interaction between humans and the built environment by sociologists is a relatively recent phenomenon. It emerged as part of the interdisciplinary field of "Man-

[6]Reflecting the area's infancy is the fact that—to our knowledge—the first time the term "environmental sociology" appeared in print was in Klausner's (1971:4) *On Man in His Environment,* where he correctly suggested that it was not yet an established area of inquiry.

[7]Sociological interest in the built environment also cross-cuts interests in "proxemics" or the study of spatial behavior, including privacy, personal space, territoriality, and crowding. Since these topics have been covered in recent reviews (Baldassare 1978; Choldin 1978b; Stokols 1978:253–54) we do not discuss them here.

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Environment Relations'' or MER (Zeisel 1975). Largely dominated by architects and psychologists, this field focuses on human interactions with the ''built'' aspects of the physical environment—with primary attention being paid to the influence of built environments on humans rather than vice versa (Jenkins 1978).[8]

There is a considerable body of literature on the interaction of humans with a variety of ''scales'' of built environment, ranging from single-family dwellings and other types of housing to neighborhoods and residential areas to suburbs and communities.[9] A number of findings have been reported: The type and location of family dwellings, for example, influence the degree of interaction among family members, children's recreational activities, and amount of interaction with neighbors (see Barbey & Gelber 1974, Michelson 1976 for more extensive reviews). It has also been noted that the same environmental conditions influence different categories of people differently—particularly different age and socioeconomic groupings (Michelson 1976). For example, both Keller (1978:284–87) and Popenoe (1977: 158–63) found considerable difference in the reaction of teenagers and their parents to suburban living, while Wekerle (1975) reported higher levels of residential satisfaction and neighboring among residents of a young-adult ''singles'' complex than typically exist among residents of ''high-rise'' apartments.

Such research is important because it points out that humans are influenced by their immediate physical surroundings (Popenoe 1977:174–5), a fact given insufficient attention in traditional sociology but vital to environmental sociology. While the vast majority of this research has been limited to cognitive and behavioral influences (with the exception of research on the density-pathology relationship, which is plagued by conceptual and methodological problems—see Baldassare 1978; Choldin 1978b; Stokols 1978), the importance of also examining physiological interactions is

[8]Many sociologists interested in the built environment belong to interdisciplinary organizations such as EDRA (Environmental Design Research Association), and such ties appear stronger at present than ties to fellow environmental sociologists interested in nonbuilt aspects of the physical environment. For example, about the time the ASA Section on Environmental Sociology was formed, an informal ''Ad Hoc Committee on Housing and the Physical [i.e. ''Built''] Environment'' was organized (see Manderscheid's 1977 directory of members). According to its Summer 1978 newsletter (edited by Elizabeth Huttman, Department of Sociology, California State University, Hayward), the committee is interested in forming its own ASA section. The future relationship between this committee and the Section on Environmental Sociology promises to be an interesting development within environmental sociology.

[9]Sociological attention to the built environment has generally been focused on buildings and their spatial location. Other forms of built environment such as highways and subways have been largely ignored (for an exception see Humphrey et al 1978).

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suggested by work of certain nonsociologists. This work suggests that the impact of the built environment on mental and physical health is strongly mediated by psychological and sociological variables (see Hinkle & Loring 1977). A few sociologists (see e.g. Gutman 1972: Part 3; Geddes & Gutman 1977) have already shown an interest in such phenomena, and it is likely that the future will see increased sociological attention to physiological interactions with built environments.

Research demonstrating the influence of the built environment on human behavior is particularly important from a policy perspective, for it implies that it may be possible to alter behavior somewhat through design—an assumption exaggerated by architects (Gutman 1975; Jenkins 1978) but central to the "behavioral design" aspect of MER. Recent and provocative work suggests that appropriate environmental design can play a valuable role in crime prevention (Newman 1973; Jeffrey 1977).

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ORGANIZATIONAL, INDUSTRIAL, AND GOVERNMENTAL RESPONSE TO ENVIRONMENTAL PROBLEMS Human interaction with the physical environment occurs at various levels of social organization—e.g. industries, voluntary associations, and governmental units may both influence and be influenced by the quality of the physical environment. A small but growing number of sociological investigations focus on such interactions.

In the United States thousands of "environmental organizations"—from local to national—have formed during the past decade in response to concern with various environmental problems; they provide the core of the Environmental Movement (Mitchell & Davies 1978). In addition, however, in some communities existing voluntary associations such as service, fraternal, and church organizations have become involved with environmental issues. Patterns of such involvement have been investigated in a Midwestern community by Kronus (1977), and relations between environmental and other types of organizations have also been studied at the regional level by Capener et al (1974) and Miller (1975).

Rickson (1974) examined industrial response to pollution by studying factors associated with the adoption of water pollution control practices in a sample of 102 industrial organizations in Minnesota. Particular attention was given (Rickson 1977) to the attitudes of industrial executives toward governmental pollution control regulation and enforcement. In the agricultural sector, both Pampel & van Es (1977) and Taylor & Miller (1978) studied variables related to the adoption of soil erosion control practices among Midwestern farmers, while a similar study in the Palouse region of Washington and Idaho focused attention on possible effects of absentee ownership on use of soil conservation (Carlson et al 1977). At a more macro

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level, Buttel (1978b) examined the relation between farm size, corporate ownership, and intensity of energy use.

At the community level, Molotch (1970) detailed the reaction of local residents and officials to the 1969 Santa Barbara oil spill, highlighting the resultant "radicalization" of many citizens. Three other studies have examined community response to environmental problems with comparative data. Bridgeland & Sofranko (1975) used a sample of 124 medium-sized Illinois communities to investigate community characteristics associated with degree of "community mobilization over environmental quality," while DeLuca (1977) conducted a rather similar study of 132 communities in the Hudson River region of New York. Finally, Friedman (1977) employed nationwide data on 104 central cities to examine factors (particularly industrial influence) related to the adoption of community water-pollution control measures.

Analyses of state and federal responses to environmental problems have typically been left to political scientists (who have studied response to environmental problems by all levels of government—see Kraft 1978). However, Albrecht & Geertsen (1978) examined the relationship between constituents' views and legislators' votes on a land-use planning measure in Utah, Dunlap & Allen (1976) analyzed the impact of party membership on Congressional voting on environmental measures, and Buttel (1975) investigated variables associated with "natural area preservation" among a sample of 97 nations. Clearly there is a need for further sociological research on governmental activities on environmental issues (particularly as they influence and are influenced by industry).

NATURAL HAZARDS AND DISASTERS Hurricanes, droughts, floods, hailstorms, and earthquakes are "extreme geophysical events" that may result in death, injury, and property damage or loss. Human reactions to such natural hazards, particularly efforts to avoid disastrous encounters with them, have received considerable attention from social scientists—although more by geographers than sociologists (e.g. Burton et al 1978; White & Haas 1975). Kates (1971) has noted three general modes of adjustment used to avoid natural disasters: First, humans may modify their behavior by relocating away from flood plains, farming drought-resistant crops, constructing "earthquake-proof" buildings, etc. Second, efforts may be made to modify the natural environment—e.g. construction of flood-control dams or use of a variety of weather-modification techniques to affect rain, snow, and hail. Finally, when despite (or in the absence of) the above adjustments an extreme environmental event impacts humans, a variety of "emergency adjustments" (such as warnings and rescue and relief operations) may serve to lessen the degree of ensuing disruption.

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Sociologists have generally ignored the first type of adjustment, although Haas (who has collaborated with a geographer) represents an exception (White & Haas 1975). A few sociologists have focused on the second type of adjustment, primarily the social aspects of various forms of weather modification. For example, there have been studies of public opinion toward weather modification, decision-making processes in the adoption of weather modification, community conflict over the use of weather modification, and the distribution of costs and benefits from weather modification (see Farhar 1977; Haas 1973; and the references in each). Particularly interesting is Farhar's (1976) "fortuitous" longitudinal study of the impact of the disastrous 1972 flood in Rapid City, South Dakota (attributed by some to a cloud seeding experiment) upon residents' attitudes toward weather modification.

The bulk of sociological research has focused on the last type, "emergency adjustments." This is probably due to the fact that sociological work on "natural" (i.e. environmentally induced) disasters has been subsumed under the general field of "disaster research." There a disaster is a disaster, whether produced by natural hazards, technological events (such as chemical explosions, electrical "blackouts," transportation accidents, etc), or purely human activity such as rioting (see Quarantelli & Dynes 1977 for a review of this field). The focus of such research has been on the social impacts of disasters per se, and a consideration of physical causes (or physical consequences) has been eschewed (Quarantelli & Dynes 1977:24). While such a focus may serve to establish useful empirical generalizations about human response to "stressful situations," it has diverted sociological attention from human efforts to avoid natural disasters. Thus, a recent inventory by sociologists of findings concerning human response to (primarily) "geophysical hazards and disasters" (Mileti et al 1975) reflects the near absence of sociological concern with long-range human adjustment to physical environments.

In contrast to traditional disaster research, research by environmental sociologists will likely focus on long-range adjustments employing technologies aimed at lessening the impacts of natural hazards. *Potential* use of some technologies may pose significant policy problems, as in the case of earthquake prediction (Turner 1976), while *actual* use of other technologies often creates unintended and complex societal-environmental interactions. For example, weather modification may have unintended effects (Haas 1973), and flood control programs may induce even greater occupancy of flood plains—thus heightening the potential of an eventual catastrophe (White & Haas 1975:63–69; Burton et al 1978:passim).

SOCIAL IMPACT ASSESSMENT Work in social impact assessment is largely a result of heightened societal concern with environmental quality. The 1969

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National Environmental Policy Act (NEPA) directed federal agencies to assess the "environmental impacts" of actions falling under their purview—e.g. dam construction, strip mining, highway projects, urban renewal, etc. Certain passages in the act, and subsequent administrative, judicial, and legislative developments, have been interpreted as also requiring the assessment of "social impacts" (Wolf 1977). In recent years most federal agencies have adopted regulations specifically calling for "social impact assessments" (SIAs) to be included in their "environmental impact statements" (EISs), and many state and local governments have also adopted "little NEPAs" entailing some degree of SIA.

Such governmental actions created situations in which sociological contributions were called for, although particularly in the early years of NEPA and related legislation both social science input and SIA tended to receive short shrift in most EISs (Wilke & Cain 1977). It appears that recognition of both the potential for sociological input (involving research contracts and consulting and employment opportunities) and the limited knowledge base for such input were factors leading to the establishment of the previously mentioned ASA Ad Hoc Committee on Environmental Sociology—a committee charged with establishing guidelines for sociological contributions to EISs (i.e. guidelines for social impact assessment). Although the committee was unable in its two-year existence to develop such guidelines (see Wolf 1975a), it probably legitimated and increased (especially through its widely circulated newsletter) sociological interest in SIA.[10]

The committee's difficulty in developing guidelines is understandable; both environmental and social impact assessment are inherently difficult. Unlike evaluation research, which examines the effects of *existing* programs, environmental and social impact assessment are called upon to assess the probable impacts of *proposed* policies, programs, and projects (Wolf 1977). Thus, both EIA and SIA involve methodological problems and social and political constraints that exceed the serious ones plaguing evaluation research (Meidinger & Schnaiberg 1978; Schnaiberg 1977).

Despite these problems, sociological involvement with SIA is increasing, as reflected in the growing number of publications by sociologists on the topic—including three edited volumes (Finsterbusch & Wolf 1977; McEvoy & Dietz 1977; Wolf 1974), a special issue of a journal (Wolf 1975b), two book-length overviews prepared for government agencies (Gale 1977 for the Forest Service, and Vlachos et al 1975 for the Corps of Engineers), and a

[10]The newsletter, *Environmental Sociology,* has continued to be published as the newsletter of the ASA Section on Environmental Sociology. However, another descendant of the committee newsletter, *Social Impact Assessment,* is edited and published by C. P. Wolf (Environmental Psychology Program, City University of New York Graduate Center), who chaired the Ad Hoc Committee and edited the original newsletter.

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lengthy annotated bibliography (Shields 1974). A review of these publications reveals that sociologists have conducted SIA-related research on such diverse projects as highway construction, nuclear power plant siting, urban renewal, reservoir construction, and strip mining.

Major unresolved issues in SIA research include identification of the range of relevant variables to be examined and the most appropriate methodological strategies to be used (e.g. Finsterbusch & Wolf 1977). Despite emerging consensus that "quality of life" indicators should be studied, there is some disagreement over whether publicly available data (e.g. census data) on such indicators are adequate (e.g. Olsen & Merwin 1977) or whether first-hand reports should be obtained from residents of "impacted" areas (e.g. Freudenburg et al 1977). Similarly, the relative importance of demographic, survey, ethnographic, and other types of data remains unsettled, although studies employing a variety of appropriate methodological techniques will probably gain favor (e.g. Freudenburg 1978).

The major area of consensus is the need for more empirical work in SIA, on the general assumption that the best guide to predicting social impacts of a proposed project is knowledge of the actual effects of existing projects of a similar nature (Burdge & Johnson 1977). This can be seen in the increasing attention given to the effects of the "development" of energy resources (primarily coal) in rural areas and communities in Western States.

Several studies of "energy boomtowns" (reviewed in Cortese & Jones 1979, Freudenburg 1976; Little 1977) reveal a fairly consistent pattern of social disorganization (rise in crime, interpersonal and community conflict, deterioration of community services, etc). While much of the social disorganization is a direct result of rapid population growth, environmental degradation from energy resource development may also contribute to a deterioration in quality of life (Albrecht 1978:83–84). Further, it must be stressed that the social and environmental impacts occurring in these areas are a direct result of our nation's energy demands, thus making boomtowns ideal natural settings for the study of complex societal-environmental interactions.

IMPACTS OF ENERGY AND OTHER RESOURCE SCARCITIES After publication of Cottrell's pioneering analysis of societal dependence on energy, sociologists virtually abandoned the topic of energy for the next two decades (Duncan 1978). With few exceptions (e.g. Burch 1970), the assumption prevailed that energy supplies could be treated as a given in analyses of social systems—until the continued availability of ever-increasing quantities of energy became conspicuously problematic in 1973. Following that shock, the social significance of energy again drew sociological attention. There appeared such publications as the reports of two NSF-sponsored conferences

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(Leik & Lewis 1974; Carter & Gray 1975), several monographs (e.g. Newman & Day 1975; Cunningham & Lopreato 1977; Perlman & Warren 1977), and books of readings (e.g. Warkov 1978; Unseld et al 1979).

Not surprisingly, much of the empirical literature thus far has dealt with the degree of public awareness of energy supply problems, acceptance of energy-conserving practices, and the social correlates of such awareness or acceptance (see the annotated bibliographies in Cunninghan & Lopreato 1977: Appendix B; Frankena 1977; Olsen & Goodnight 1977). While various surveys have found some compliance with appeals for emergency reduction of energy use, most people have remained poorly informed about the national energy situation. Many have doubted the reality of energy shortages, have been reluctant to sacrifice comfort and convenience, have preferred that the burdens fall on others, and have wanted government to eradicate or alleviate energy problems but have preferred voluntary to mandatory conservation (e.g. Milstein 1978). Nevertheless, major life-style changes are expected from future energy shortfalls, and sociologists have speculated on how these will affect housing patterns, transportation, employment, recreation, etc (e.g. Klausner 1975; Martin 1973; Mulligan 1976a). The extent and abruptness of such effects may depend upon the success or failure of the segment of the Environmental Movement advocating societal adoption of "appropriate technology" and "soft energy paths" (Morrison 1978a).

The impermanent availability of fossil energy has been recognized by a number of environmental sociologists as a fact of great sociological significance (e.g. Warkov 1978). Energy was artificially cheap and abundant after World War II (Mulligan 1976b), and institutionalized definitions of "energy sources" have misled both the public and decision-makers (Mulligan 1977). It is becoming clear that the combustion of fossil fuel, which imports ancient energy into the present, may have created a temporary global carrying capacity larger than can be sustained from current photosynthetic capture of energy and nonfossil energy conversion technologies (Catton 1974).

To discover whether the United States, which uses more energy than any other nation, could reduce its energy appetite without appreciably reducing quality of life, Mazur & Rosa (1974) examined correlations between life-style indicators and measures of per capita energy use among industrialized nations. They found the correlations to be surprisingly low, suggesting that the United States could afford a reduction in energy consumption without deterioration in quality of life. Similarly, Buttel (1978c) found major variations among nations in energy efficiency, and further found that social-structural and demographic differences among nations could account for much of the variation.

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Several sociologists have considered the equity aspects of societal adjustments to energy scarcity, and scarcity of other resources as well (e.g. Morrison 1976: 1978b, c; Newman & Day 1975; Perlman & Warren 1977; Schnaiberg 1975). It has been argued that the negative impacts of scarcities (Schnaiberg 1975) and governmental policies designed to alleviate them (Morrison 1978b) are more likely to be felt among the lower socioeconomic levels. While an end to the era of abundant resources might therefore make class antagonisms more salient (Anderson 1976:28–33; Morrison 1976), a more immediate response has often been one in which lower-class minorities, working-class union members, and upper-class industrialists form a "growthist" coalition to oppose those who attempt to control or slow growth (Morrison 1973). Issues of equity have also surfaced in analyses of competition and antagonism among energy-using and energy-supplying regions of our nation (Frankena 1978a, b; Klausner 1977; Mulligan 1978).

Competition for energy and other resources will likely create tensions at the international level as well (Anderson 1976:33–39; Morrison 1976), tensions that could turn into conflict (Cottrell 1955:198: Hardesty 1977:154–55; Nelson & Honnold 1976:346–47). For example, while the "developed" nations almost doubled their extraction of energy from within their own borders between 1950 and 1973, they nearly tripled their consumption of energy during the same period (Keyfitz 1976:32), thereby making themselves increasingly dependent upon imported fuels. The story for minerals is basically similar (Catton 1976b). The resultant shortage of resources for other nations has begun making it unrealistic to hope that the fraction of the world's population rated as "middle class" might continue to triple each generation (Keyfitz 1976:32).

Given the unfulfilled aspirations of the poor (both intra- and internationally), the potential for divisiveness inherent in resource depletion may make the Vietnam War years pale in comparison (Catton 1976a; Morrison 1976:301–3; Ophuls 1977).

RESOURCE ALLOCATION AND CARRYING CAPACITY Awareness of increasing competition for natural resources has led environmental sociologists to consider both the problems associated with allocation of scarce resources and the possibility that natural resources can be overused (i.e. that the carrying capacity of environments can be exceeded).

Resource allocation problems The necessity of allocating resources is reflected by the concept of "multiple use," a concept that has become imbedded in the philosophy of forest management (Burch 1971:107–8, 132; Devall 1973). Similarly, water has multiple uses (Burch & Cheek 1974)—

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not only as a necessary substance for direct human consumption, but also as a medium of transportation, as a component of industrial production, as an indispensable basis for irrigated argiculture, and as a commodity with aesthetic value. But both in the case of water resources and forest lands, preempting a finite resource for particular uses may make it physically unavailable for other competing uses.

Physical aspects of resource use sometimes entail important social consequences. Harvesting timber from forest land, for example, often reduces the recreational value of such land (Devall 1973). Water development projects often make it physically necessary for people to relocate, and some of the effects of such relocation have been found to be highly stressful for individuals and disruptive for communities (Johnson 1974; Johnson & Burdge 1974; but also see Napier & Moody 1977). Projects designed to raise environmental limits to community growth can lead to dependence on increasingly costly measures for keeping the limits high. For example, the problem of supplying Los Angeles with water from afar (Hollis & McEvoy 1973) has been a special case of a larger problem, the dependence of human societies upon "ghost acreage"—the additional land or other internal resources needed if reliance on outside sources were not possible (Catton 1974; Wisniewski 1978).

Carrying capacity Competition for resources can lead to their overuse, as in the case of wildland recreation (Catton 1971:347–48). Federal agencies became concerned about the carrying capacity of recreational areas and needed to know how many persons could engage in specified recreational activities in a given time period in a given area without damaging the environment or diminishing the quality of each person's experience. By sponsoring a major study of river-running in the Grand Canyon, the National Park Service spurred important sociological advances in carrying-capacity analysis. There were efforts to develop methods of measuring such capacity (Heberlein & Shelby 1977) and to clarify the applicability of this concept from biology to recreational use (see Nielsen & Endo 1977; Nielsen et al 1977, and references cited therein).

It turned out to be extremely difficult to determine at precisely what volume the recreational use of an area became excessive, but it became clear that the carrying capacity concept was too vital to remain confined to recreational (or "social" or "psychological") carrying capacity. The human relevance of this concept in its full biological meaning became apparent (Wisniewski 1977; Catton 1978). If people can overuse a national park, can't they overuse a planet? Some writers (e.g. Brown 1978:37) now see that the pressure exerted by four billion inhabitants of earth, all with rising

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aspirations, upon the biological systems underlying human existence may have begun "to ask more of the earth than it can give."

Of course, technological optimists assume breakthroughs in technology can always raise carrying capacity (Catton 1978:237; Nelson & Honnold 1976:341; Ophuls 1977:119–20). But as Duncan (1964:69) has pointed out, in freeing local populations from total dependence on local resources, technology produces "greater dependence upon environmental resources of other regions." Social systems are thus not exempted by technology from ecological laws—such as the "law of the minimum," which assigns preeminent constraining effect to "the factor in least supply" (Bennet 1976:176–8; Hardesty 1977:196–97; Ophuls 1977:119–20). Indeed, technology that enlarges our resource appetite actually reduces a given environment's carrying capacity (Catton 1978:238–39).

Thus the kinds of inquiries in which some environmental sociologists are engaged have made it easier to comprehend the awful possibility that our species could overshoot the long-term carrying capacity of this planet (Brown 1978; Ophuls 1977:134) or that world population may already have done so (Anderson 1976:172; Catton 1976c:281, 1978:245–46)—just as local groups are known to have overshot local carrying capacities in the past (e.g. Bennett 1976:178–86, 196–99; Catton 1976a:263, 1976c:285). Further, by rejecting the Human Exemptionalism Paradigm, environmental sociology tends to facilitate recognition of the grave sociological implications of "crash," the inevitable sequel to overshoot (Catton 1976a, 1976c: 286–88, 1978:246–49; Laughlin & Brady 1978).

CONCLUSION

Clearly, despite its youth, environmental sociology is already a vital field of inquiry. Recent organizational developments have given this field some visibility and legitimacy; but, more important, these developments should continue to facilitate communication among environmental sociologists. Mutual exchange of findings and insights among researchers with diverse but complementary interests will be essential for maximizing our understanding of societal-environmental interactions.

We have stressed the fact that this distinctive focus of environmental sociology (the study of societal-environmental interactions) is a departure from traditional sociological thoughtways, but we noted that some sociologists became interested in such phenomena after first approaching environmental issues from traditional sociological perspectives. However, we must emphasize that the study of environmental issues from orthodox

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sociological perspectives remains a worthwhile task in its own right; it is more than just a stepping-stone to a full-blown environmental sociology. For example, theory and research from established sociological areas, particularly social psychology, have enabled several sociologists (not all of whom would consider themselves "environmental sociologists") to offer insightful critiques of government policies and proposals for abating pollution, conserving energy, etc. and useful suggestions for more effective alternative policies (Hammer 1974; Herberlein 1974; Nelson & Honnold 1976; Olsen & Goodnight 1977). Such analyses are important, as are empirical evaluations of conservation programs (e.g. Black 1978) and efforts to induce conserving behavior experimentally (e.g. Heberlein 1975). In short, while we look forward to the continued development of environmental sociology as a distinct field of inquiry, we are cognizant of the need for researchers interested in more conventional areas to devote attention to environmental issues. There will continue to be a need for both "environmental sociology" and the "sociology of environmental issues."

This may be seen by considering the idea of a "steady-state" or "sustainable" society (Pirages 1977), a form of societal organization many ecologically informed scholars believe must be achieved in the near future if humans are to avoid tragic consequences of overshooting the earth's carrying capacity (Anderson 1976; Brown 1978; Daly 1977; Ophuls 1977). Not only must environmental sociologists begin to consider the social organizational requirements of such a society—ranging from energy efficient housing patterns to zero population growth—but they must also ask how existing societies might be changed to meet such requirements. Knowledge of interactions among the elements of the social complex (population, technology, and cultural, social, and personality systems) and the physical environment will be vital in addressing these issues, but knowledge from traditional areas such as social change, deviant behavior, stratification, demography, and social psychology will likewise be necessary.

In sum, awareness that biological and physical facts may help explain social facts has often led environmental sociologists to cross disciplinary boundaries and is likely to continue to do so (Burch 1971: 14–20; Catton 1976b; Mulligan 1976b; Schnaiberg 1975); however, many of the issues that concern environmental sociologists will just as truly require similar excursions into other sociological areas.

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