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SOCIAL ECOLOGY: AN EMERGING MULTIDISCIPLINE

ARNOLD BINDER, DANIEL STOKOLS, AND RALPH CATALANO

The multidiscipline of social ecology has evolved from the same combination of social and intellectual forces that has produced the significant recent efforts to make the university enterprise more sensitive to non-academic needs and difficulties. The universities' sensitivity to the inner city and the disadvantaged has resulted in human service curricula. *When the sensitivity has been in terms of the phenomenon of environmental deterioration in such forms as pollution and resource depletion, the response has been in the form of environmental studies curricula. These are, however, not mutually exclusive since several proposed and adopted curricula have encompassed features stemming from both these directions. The program in Social Ecology at the University of California—Irvine is one.*

It was both the social and the environmental forces that led the National Academy of Sciences and the Social Science Research Council jointly to appoint the Behavioral and Social Sciences Survey (BASS) Committee "to explore some of the ways these sciences could be developed and supported so that their potential usefulness to society can be realized." (1969, p. 2)

To dramatize the influence of both sensitivities (or forces) we find the following statement in the introduction to the Committee's report:

We are living in social crisis. There have been riots in our cities and in our universities. An unwanted war defies efforts to end it. Population expansion threatens to overwhelm our social institutions. Our advanced technology can destroy natural beauty and pollute the environment if we do not control its development and thus its effects. Even while scientific progress in biology and medicine helps to relieve pain and prolong life, it raises the new problems relating to organ transplants, drugs that alter behavior, and the voluntary control of genetic inheritance. (p. 6)

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One of the key recommendations of the Committee was that universities consider establishing educational and research units in the form of a Graduate School of Applied Behavioral Science. The School's characteristics, according to the recommendation, should include: administrative arrangement that is independent of other academic units, multi-disciplinary faculty (including scholars from areas other than the behavioral and social sciences), research effort that encompasses theory construction and model building as well as attempts to solve persistent social and environmental problems, departmentalization where necessary by problem area (e.g., man-environment interactions or transportation flow) and not by discipline, and affiliation with community agencies for internship training as well as problem focus.

Hilgard (1973) expanded the BASS Committee's recommendation for the Graduate School of Applied Behavioral Science and suggested that the effort might eventually lead to the new profession of social-problem broker. The role would be similar to that of a practicing physician who brings basic biological research to bear on medical problems, and a practicing engineer who is broker between the basic physical sciences and a range of community problems.

While Weidner (1974) uses the expression "environmental education" rather than "education for solution of social problems," his overall stress is quite similar to that of the BASS Committee. Perhaps he differs most in that his examples of problems are more frequently environmental than social, while the reverse is strongly the case in the BASS Report. In addition, his focus is broader. Thus, he states:

Today the needs are for a university that is more fully a part of society, even while it retains its autonomy and academic freedom. The needs are for a university that has a sense of social responsibility; that has a problem orientation to its curriculum; that is concerned with future time; and that seeks the integration of knowledge. Let us examine each of the four elements of a university academic plan based on truly environmental education. (p. 3)

His four elements are: a) "given the environmental crisis that is engulfing the world, there is a need for universities with academic plans based upon a philosophy of social responsibility" (p. 4), b) education and research must be problem oriented, c) solutions to environmental and social problems require a future, rather than past orientation, and d) knowledge must be integrated over all pertinent disciplines.

In a recent essay, the humanist Marx (1974) placed the case for interdisciplinary, problem-oriented education and research in an extraordinarily threatening framework. He pointed out that advancing technology was accompanied by increasing centralization of power and decision making, and argued that universities can contribute to the resistance to totalitarianism by using that problem-oriented approach. His recommended approach involves assembling teams of scholars for a given programmatic thrust. For example, a program might focus on a new approach to mass transit. The team could involve ecologists and engineers, for study of the biological and physical environment; historians and sociologists, for examination of the effects of a transportation mode on architectural design, social mores, and interpersonal characteristics; and psychologists, for study of personal needs satisfied by the automobile. Courses and seminars would bring the focus on research into the undergraduate and graduate educational realm.

He contrasts his model with Kerr's (1963) multiversity model and the traditional liberal-arts model. The former aims at satisfying the needs of the corporate system for managers and technicians; the latter is based upon the relatively autonomous advancement of knowl-

edge within established disciplines. The Marx model stresses close interaction between scholarship and the decisive problems of society; but the interaction need not coincide with the functioning and demands of the managerial and bureaucratic system.

The world-wide importance of the move toward multidisciplinary, problem-oriented education and research is apparent in the recent reports of the Centre for Educational Research and Innovation of the Organization for Economic Cooperation and Development (O.E.C.D.). The reports are based upon meetings in Tours, France in 1971, and in Rungsted, Denmark in 1974, where exemplary curricula and programs in environmental education were presented (including social ecology, see Binder, 1974). Certain similarities of approach are apparent, despite the fact that the curricula came from countries as diverse as Australia, England, France, Italy, Sweden, and Ulster. Most programs emphasized community involvement on the part of faculty and students, strongly multidisciplinary research and teaching, and a broad definition of "environmental studies" to include social and interpersonal processes as well as the biological and physical environment.

The Intellectual Antecedents

While growing community concern over social and environmental dilemmas created a supportive atmosphere for the innovation of interdisciplinary, problem-oriented programs, intellectual developments within various academic disciplines provided a theoretical basis on which researchers from disparate areas could collaborate in an effort to apply scientific methodology to the analysis and resolution of societal problems. Specifically, increasing application of the ecological paradigm in fields such as biology, sociology, psychology, and architecture led to the elaboration of an analytic framework in which problems of pollution, resource depletion, overpopulation, and crime could be approached systematically, both at macro (e.g., demographic, sociological) and micro (e.g., psychological, architectural) levels of analysis.

In this section, the basic features of the ecological paradigm are outlined, and the development of this perspective within the context of different disciplines is traced.

The Ecological Paradigm: Biological and Sociological Perspectives

In recent years the term "ecological" has been used to describe anti-litter campaigns, political movements, curious moral systems, and prescriptions for known problems based on extrapolations from anecdotal descriptions of animal behavior. Such overextension of the term has obscured its more traditional use to refer to the longitudinal naturalistic research methods arising from the study of natural selection and adaptation (Bruhn, 1974). These methods were grounded in the assumption that organisms function as parts of complex systems which include other organic and inorganic components.

Guided by the systems construct, naturalistically-oriented scientists interested in adaptation designed their investigations in a fashion quite different from their experimentally-oriented colleagues in the biological and social sciences. Unlike the latter who used controlled experiments conducted in laboratories, the former assumed that the morphology, spatial location, and behavior of organisms could be predicted most parsimoniously through unobtrusive observation of species in their natural settings over extended periods of time.

The ecological method progressed as the systems construct was refined to the concept of ecosystem. The term refers to a real space dominated by a definable association of plant and animal species. An ecosystem has "abiotic" elements such as soil, sunshine, moisture, temperature, and climatic conditions which determine the member, type, and

spatial arrangement of plants and animals or "biotic" elements found there (Boughey, 1971). The local abiotic elements are affected by the larger dynamics of geology and climate. Any shift in topography or climate precipitates the spatial rearrangement, the change in mean characteristics, the eradication or introduction of species in an ecosystem. Assumed in the ecosystem concept are the complex relationships among predator and prey, host and parasite, and symbiotic partners, the sum of which Darwin characterized as the "web of life." This interdependence means that while a change in abiotic elements may immediately affect only one species, it will eventually affect all.

The ecosystem concept assumes that if the abiotic elements remain relatively constant, the biotic elements will reach the population size, mix, and arrangement which most efficiently uses the energy present in the ecosystem. In such equilibrium states, the behavior of biotic elements becomes regular and predictable by season and life cycle. Through observation, the ecologist "models" the ecosystem and, as long as the abiotic elements remain constant, can predict the size, mix, and arrangement of the biotic elements.

When abiotic elements change, however, the modeling procedure becomes more difficult. There may be disruption of food webs or patterns of interacting, and the attendant need for adaptive measures. Stress reaction, or the physical and behavioral manifestation of adaptation, becomes more common. Predicting how great a stress reaction will be precipitated among species and individuals by varying rates and types of abiotic change requires precise measurement, considerable data collection, and prolonged observation. The product of these often tedious investigations, however, is the ability to predict the impact of specific types of natural or man-made events on the ecosystem.

The first attempt at using ecological analysis to study the human community was that made by the sociologists Robert Park, Ernest Burgess, and Roderick McKenzie (1925) at the University of Chicago. The "Chicago School" sociologists assumed that the human ecosystem was the city and its agricultural hinterland. They claimed that the "economic base," in terms of the larger regional or national system of production and distribution, is a critical determining factor in human interactions. Thus, the early human ecologists, as they became known, posited a balancing relationship between economic base and population size. Feedback describing economic conditions of cities is sought, they claimed, by populations desiring to increase income and consumer choices. As the economic base of a community increases, that is, as its economic role in the larger economy brings more currency into the local economy, the population size grows through in-migration. If the base shrinks, the displaced workers will look elsewhere for work, and the population will decrease. If the base remains the same in terms of total employees, but shifts in character, those skilled in the defunct trades will leave, while those with skills demanded by the new base will in-migrate.

The early human ecologists believed that the systemic relationship between economic base and demographic characteristics is the key to understanding human behavior at the sociological level (McKenzie, 1925). Behavior, they claimed, is guided by three variables. The first is the set of formal norms embodied in public law and in religious mores. These formal norms exist to maintain the "trophic," or sustenance-providing, organization of collection, production, and distribution in which each must play a functional role to assure his continued existence.

The second behavior-controlling variable, according to the human ecologists, is the behavior expectation peculiar to functional role. A lumberjack must, for example, exhibit a particular behavior (cutting trees) in order to keep his job. Of course, function, or "trophic"

role, also determines much behavior that is not essential to maintaining role, but is highly associated with it. For example, lumberjacks as a class have behavioral characteristics quite different from preachers.

The third variable is place. The early ecologists believed that the immediate physical environment of an individual would determine much of his behavior. Over time, they reasoned, a person becomes familiar enough with his environment to avoid or control threats and to feel secure. If, however, that environment should change in character, or the person should change environments, he might feel threatened and become preoccupied with protective measures and adaptive efforts.

Behavior, the ecologists theorized, is normal or acceptable when congruent with the above constraints. When an individual acts in a fashion incongruous with place or role, he could be called eccentric or mad, depending upon how maladaptive his actions are perceived to be. If he acts incongruously with laws and mores, he could be branded criminal or immoral.

The incidence of abnormal behavior is highest, claimed the ecologists, among groups experiencing "stress" precipitated by a shifting economic base. An increasing base brings in-migrants from rural areas. They suffer disorganization due to the shift from a community where norms were reinforced by peer and primary group reward or punishment, to urban areas where obedience to norms was motivated by the impersonal concept of social contract (Thomas and Znaniecki, 1920). This sudden lifting of immediate pressure to conform, according to the ecologists, leads either to a state of incongruous behavior or indulgence in behavior formerly proscribed.

In-migrants attracted by an increasing base also lose the behavior directives provided by trophic role, for the switch from rural laborer, to unemployed, to industrial worker, leaves the individual with little role-generated behavior guidance.

The environmental change experienced by in-migrants also, supposedly, increases behavior-distorting stress. Expanding on the work of George Simmel (1893), the ecologists posited that the shift from "natural" cyclic rhythms of rural stimuli to the cacophony, complexity, and seeming incoherency of urban stimuli produces a withdrawal which hinders normal socialization.

An increase in a metropolitan area's economic base can also stress segments of the indigenous population. As the local economy expands, upward mobility accelerates, creating a population stressed by new functional roles, changes in residence, and the necessity of adapting to the norms and mores of a new peer group. A shrinking base, on the other hand, produces a population at risk by putting men out of work, thereby robbing them of trophic role, and eventually forcing them to change locus. Normlessness also increases because previous trophic role had been lost despite earlier conformance or because need overrides respect for the social contract. An economic base remaining constant in size but changing in make-up generates stress, claimed the ecologists, through both attracting in-migrants and displacing workers who must migrate.

These writers did not consider incongruous behavior generally to be chronic or pathological. Rather they believed that for most individuals the stress syndrome was temporary, and passed as one adjusted to new trophic role and locus. Therefore, while some incongruous behavior will always be present due to the dynamism of industrial economies, the groups manifesting incongruous behavior will change.

The influence of the Chicago School of ecology is evident in several recent writings. For example, while preferring purely sociological to biological constructs, Rex and Moore (1967) have used the general approach of the human ecologist in studying the city of Birmingham (England). They argued that the processes of invasion, dominance, and succession as delin-

eated by Park and Burgess are actually descriptions of struggles for social control. Lambert (1970) used the Rex and Moore modification of human ecology in relating crime to race relations. Finally, Lyman and Scott (1970) have described urban society in terms of socio-economic space and territoriality. Four types of territories are specified: public, home, interactional, and body. Appropriate behavior within territories is determined by loose rules, and integrity is maintained by interpersonal expectations and sanctions.

The Ecological Paradigm: Psychological and Architectural Perspectives

Ecological analyses of environment-behavior relationships, as outlined above, were first articulated by biologists who emphasized the interdependence of plant and animal groups occupying the same habitat (cf., Clements, 1905; Haeckel, 1968), and later elaborated upon by sociologists (e.g., McKenzie, 1925; Park, 1936) seeking to develop a comprehensive model of human ecology, or "the study of the form and development of the human community" (Hawley, 1950, p. 68). In the fields of biology and sociology, the emphasis of ecological research was on the correlation between features of the molar environment (e. g., conditions within a biome or census tract) and aggregate indices of group behavior (e. g., rates of mobility, crime within a population).

Barker's (1968) research in the area of *ecological psychology* represents an extension of ecological principles from the macro or community level of analysis to a consideration of micro-social phenomena. This shift of emphasis is evident in Barker's concept of "behavior setting," an environment-behavioral unit characterized by cyclical patterns of activity which occur within specific time intervals and spatial boundaries. Examples of behavior settings are dormitory lounges, restaurants, and baseball games. Within Barker's framework, the ecology of the total community remains an important issue, but is approached in terms of the dynamics of multiple behavior settings which, together, comprise the larger environment.

Ecological analysis of behavior settings involves certain methodological departures from the research strategies of human ecology. First, behavior settings are typically smaller in scale than the environmental units examined by human ecologists. One census tract, for example, would subsume a wide variety of behavior settings. Second, behavior settings are defined not only in terms of their spatial boundaries, but also their social, cultural, and temporal properties. Thus, a given area might serve as a behavior setting only when certain people gather to perform particular activities at specified times. This conceptualization of environment is explicitly multidimensional, as compared to one which focuses primarily upon the physical attributes of a given area. Third, ecological psychologists are more concerned with the impact of the environment on small groups than on large-scale populations. Thus, demographic methods of analysis are replaced by fine-grained observation of interpersonal behavior and the collection of individualized, subjective-report data.

Through a series of longitudinal, naturalistic comparisons among diverse behavior settings, Barker and his colleagues have developed a theory of undermanning (cf., Barker, 1960; Barker and Gump, 1964; Barker and Wright, 1955). A central assumption of this theory is that all behavior settings have essential tasks or functions which are associated with specific personnel requirements. To the extent that a particular setting is understaffed, systemic pressures should arise which place demands on available personnel for more intensive participation in its activities. Thus, for undermanned settings, in which there are fewer participants than the number of available roles, maintenance pressures should induce members to take on a greater variety of tasks, work longer hours, and

assume greater responsibility than they would under conditions of optimal manning (i.e., where the number of participants and available roles are matched). These predictions have received support in a variety of studies involving the comparison of large and small schools (cf., Baird, 1969; Barker and Gump, 1964; Wicker, 1968; Wicker, 1969a; Willems, 1967), churches (Wicker, 1969b; Wicker and Mehler, 1971), and whole communities (cf., Barker and Schoggen, 1973).

As an extension of Barker's theory, Wicker, McGrath, and Armstrong developed the construct of overmanning. Overmanned settings were defined as those in which the number of eligible participants exceeds the personnel capacity of the system. As in the case of undermanning, overmanning was viewed as an unstable condition which would generate forces toward adequate or optimal manning. These forces would be manifested as pressures to increase the setting capacity, or decrease membership by raising eligibility standards and discouraging potential applicants. In support of these predictions, Hanson and Wicker (1973) found that members of overmanned groups felt significantly less needed, less important, and less valuable to the group than those working under adequate-manning conditions.

The research of Barker and his associates represents the first major attempt to develop an ecological perspective within the context of American psychology. It is particularly significant in that it extends earlier macro-ecological approaches to a consideration of human behavior in small-group settings. In a number of respects, however, the line of research initiated by Barker provides a rather incomplete account of behavior at the micro scale. Most importantly, the focus of ecological psychology has been on extra-individual behavior, or the manner in which most people would respond given specific social-structural features of a setting. Although behavioral and subjective data are obtained on individuals, response profiles are typically aggregated over group members and tend to downplay the role of individual differences in mediating the relationship between the structure of the setting and the responses of its occupants.

Through its neglect of personality factors and basic psychological processes, ecological psychology has failed to address a variety of interesting and important issues: In what types of individuals will conditions of under- or overmanning induce the most negative reactions? Under what circumstances will conditions of inadequate manning be most salient to setting members? Under what conditions and for which persons will perceived limitations of the environment (e. g., scarcity of social roles, physical resources) lead to maladaptive behavior?

The role of basic psychological processes, such as perception, cognition, personality development, and social learning, in determining the impact of environment on individual and group behavior has been considered more fully in the realm of *environmental psychology*. This line of research, initially delimited by Proshansky, Ittelson, and Rivlin (1970; see also Ittelson, Proshansky, Rivlin and Winkel, 1974), Craik (1970, 1973) and Wohlwill (1970), was defined in terms of specific methodological assumptions rather than a formal theoretical structure. For example, environmental-psychological research generally has been organized around a strong concern for the analysis and resolution of pressing social problems and, more specifically, around the use of naturalistic, longitudinal methods of observation as a means of examining the behavioral and psychological effects of the man-made environment. In such research, explicit emphasis has been placed on the manner in which psychological and social processes interact with features of the physical environment to yield varying patterns of behavior.

Despite its methodological rather than theoretical definition, the working assumptions of an environmental psychology are quite similar to those underlying ecological theories of behavior. The continuity between ecological and environmental psychology, for example, is reflected in their mutual emphasis on the implementation of naturalistic, longitudinal research in order to study the dynamic interchange between man and his milieu. The main dissimilarity between the two areas of research is that environmental psychology through its consideration of individual psychological processes, potentially offers a more comprehensive analysis of how the subjective, as well as the objective environment, affects both individual and group behavior.

Although at present, an integrative theory of environment-behavioral phenomena is lacking, threads of theoretical thought are evident within traditional areas of psychological research which at some point may be woven into a more comprehensive analytical fabric. These theoretical threads are essentially conceptual developments within the areas of perception, cognition, personality, and learning with increasing emphasis on the role of environment in determining behavior.

In the areas of perception and cognition, the work of Lewin (1936) and Brunswik (1949) was especially influential in reorienting psychological theory toward a more thorough consideration of environmental determinants of behavior. Lewin's concept of "life space," for example, emphasizes the continual interaction of inner and outer forces (e. g., personal needs, values, and attitudes as well as environmental conditions which support or thwart personal goals) in determining an individual's behavior within a particular situation. Thus, in Lewin's formula, $B = f(PE)$, behavior was viewed as a joint function of personal factors (P) and the perceived environment (E). It should be noted that Lewin's concern was not with the objective environment per se, but rather with the individual's subjective perception of that environment and the manner in which environmental perception guides individual behavior.

Brunswik's (1949) theory is concerned more specifically with the perceptual processes by which individuals come to know their environment through a combination of informational cues. This orientation emphasizes the importance of the subjective environment as a determinant of behavior, and, more importantly, that a particular physical setting may exert divergent effects on the behavior of different individuals, depending on the particular environmental cues which are attended to by each person, and the idiosyncratic strategies they employ in combining such cues into an overall interpretation of the environment.

In the area of personality research, an increasing emphasis on the role of environmental factors is reflected in the work of Murray (1938) and Mischel (1968, 1973). Murray's analysis of human behavior places an equal emphasis on the role of personal needs and "environmental presses" which either satisfy or frustrate these needs. Within this framework, differences in the behavior of the same individual are expected depending upon the pattern of presses he confronts in a particular setting.

Increasing dissatisfaction with trait conceptualizations of personality has been articulated recently by Mischel (1968, 1973). His main argument is that on the whole, human behavior across situations is unpredictable in terms of personality factors alone, and that in order to predict behavioral regularities within individuals, the structural and functional properties of the settings in which they find themselves must be considered. In support of this position, Mischel cites a large number of studies in which substantial proportions of behavioral variance were accounted for by situational variables.

Finally, within the realm of learning research, explicit consideration of environment-behavioral regularities is reflected in stimulus-response (S-R, cf., Skinner, 1953) and mediational models (e. g., Bandura, 1969; Rotter, 1954) of human learning. In these theories, environmental units of analysis are conceptualized as stimuli, i.e., external or internal events that alter an individual's behavior. From a Skinnerian perspective, stimuli may be classified into four major categories: events which regularly precede responses; reinforcers which follow responses and serve to increase the frequency of the behaviors they follow; discriminative stimuli which precede or accompany responses, and increase the probability of behaviors that previously have been reinforced in their presence; and neutral stimuli which effect no change in behavior, whether they precede, accompany, or follow responses.

S-R theories of learning provide a basis for classifying environments in terms of their reinforcement-structural properties. Social learning formulations (e. g., Bandura, 1969; Rotter, 1954), though, suggest that the functional significance of environments can only be understood in terms of the cognitive processes through which individuals construe the potential reinforcement properties of a setting. Thus, the perceived probability and value of specific reinforcers mediate the relationship between environmental context and individual behavior.

As an application of Skinnerian theory to a specific social issue, Everett (1973) used token-reinforcement procedures to modify bus-ridership behavior among the residents of a Pennsylvania community. And, although not stated in learning-theoretical terms, the pioneering research of Hall (1966) and Sommer (1969) on human spatial behavior emphasizes the extent to which socially-learned cultural norms influence the individual's use of space in his encounters with other people.

In addition to ecological and environmental psychology, a related line of research, labelled *social ecology*, has been established by Moos, Insel, and their colleagues (cf., Moos and Insel, 1974). Social ecology is quite similar to the research domains mentioned earlier in terms of its emphasis on naturalistic observation of environmental settings, and its value commitment to the design of human environments which are deemed maximally satisfying on the basis of behaviorally-oriented research. It diverges from ecological and environmental psychology in that it places equal emphasis on the natural, as well as the man-made, environment; it has devoted more attention to the construction of environmental taxonomies organized around the psychosocial dimensions of different settings; and it is concerned in part with the identification and alleviation of maladaptive behavior within institutional contexts.

One of the most significant methodological contributions of social ecological research has been the development of standardized scales to measure the psychosocial attributes of different environments (Moos, 1972). From the use of these instruments in a variety of settings (e. g., dormitories, classrooms, offices, hospitals), three categories of environmental attributes have been delineated: relationship dimensions, personal development dimensions, and system maintenance dimensions. These categories provide the basis for evaluating behavior settings along standardized dimensions, and for relating the obtained environmental profiles to psychological, social, and physical conditions within the setting.

Ecological psychology, environmental psychology, and social ecology comprise related areas of research which have specific implications for architecture and urban design. Michelson (1970) has developed the notion of "intersystem congruence" as a guide to environmental design. This construct defines optimal environments as those in which the physical and social characteristics of an environment are congruent with the personal needs

and cultural values of its inhabitants. Using the procedures developed by Moos, Insel, and others, it should be possible for designers to obtain psychosocial profiles of various environments and use these as a basis for developing future settings which will be maximally congruent with the personal and cultural attributes of its prospective users.

Research on the psychological effects of the visual environment represents another area in which ecologically-oriented studies may contribute toward the design of optimal physical settings. Lynch (1960), Downs and Stea (1974), Kaplan (1973), and others have used "cognitive-mapping" procedures to explore the manner in which large-scale environments are perceived and remembered by their users and inhabitants. These researchers have suggested that the most satisfying and secure environments are those which are highly "imageable," i.e., can be easily remembered in terms of their landmarks, transportation system, etc. It may be possible, in the future, to develop typologies of environments in terms of their relative imageability, and criteria for determining which environmental elements will be most salient to what groups of people. Such research may serve the purpose of enhancing the congruence between personal/cultural needs and the physical attributes of a particular setting.

The Program in Social Ecology

While many features of the Program in Social Ecology were determined by idiosyncracies of context and the predilections of early leadership, the curricula are based upon the three emphases that pervade the *zeitgeist* of academic attention to applied problems of society: community involvement, multidisciplinary, and a broad, encompassing environmental outlook. Moreover, the theoretical mortar (which admittedly is thin at this time) is derived from the ecological paradigm as expressed biologically, sociologically, and psychologically.

The Program at Irvine was started in January, 1970 for the explicit purpose of providing direct interaction between the intellectual life of the university and the recurring problems of the social and physical environment. And since it was founded on the conception of man as biological organism in a cultural-physical environment, the orientation is necessarily multidisciplinary. This orientation pervades the curricula, which are aimed at equipping students to attack and solve environmental problems. In accord with widespread usage, as discussed in the section on the academic milieu, environmental problems are defined as including all aspects of man's relation to other men and to his social heritage, on the one hand, and man's relation to his broader biological and physical environment, on the other.

The Program, in short, emphasizes all knowledge and methodology associated with the relationship of man and his environment in an ongoing interactive process. Communality over areas encompassed by the Program is demonstrated by an introductory course that describes the past and present use of ecological analyses (in the various disciplines) to provide the conceptual framework for the problems dealt with in each subprogram.

It is axiomatic in the Program that learning must be applicable to the community and the community must serve as an auxiliary source of educational enrichment. Because the approach combines environmental education and community activity, the curricula of the Program are organized by problem area, not by discipline or academic subject matter. The curricula are oriented toward producing a coordination between on- and off-campus experience, theoretical and applied learning, so that each enhances and enlarges the other. The Program thereby enables students to work effectively on community problems in a variety of contexts while simultaneously meeting the central goals of a university education.

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