It is necessary to have a clear understanding of the nature and purpose of geography as a science before exploring geography as an applied science. A science has as its purpose the betterment of the world as a place to live. This may be a controversial position for those who believe science strictly originates from curiosity and is the pursuit of knowledge for its own sake. The latter view is only partially true and limits the goal of science to the pursuit of "truth." A broader view permits the realization that scientific activities, whether physical or social, have their final result and justification in terms of contributions to the improvement of society. Scientific energy is realized in its contribution to society, yet the application of a science for practical problem resolution is distinguishable from "pure" science. The nature of this distinction largely has been responsible for dichotomizing academic and non-academic research by geographers.

Geography the science is unique because of the questions it addresses. Its focus has been environmental, based on human-environment interdependen-
cies and spatial explanations, especially within the context of interdisciplinary synthesis. In the former analysis, interpretation of human-environmental linkages, often spatially expressed, is central. In the latter, explanations focus on the spatial structures and spatial processes of given areas. Theories about the spatial organizations of societies and their institutions are the focus, including the natures of the spatial distributions, networks, movements, and interactions within regions of varying sizes. Implicit, here, is the fact that human societies construct and utilize spaces, and that spatial distributions vary over the surface of the earth. How such spaces are structured, how groups relate through space, and how space impinges on human activity and organization are some of the questions geographers seek to answer through the development of general explanations. Emphases are the principles of spatial behaviors and processes, especially in relation to spatial structures. This causal interaction of spatial structure and spatial process results in spatial organization. For example, intraurban migration is clearly a function of a complex set of decisions made: (1) in psychological space (including cultural, political, and other dimensions); and (2) in light of the existing distributions of housing and transportation (structures). Such decisions result in the spatial process of search and selection for housing units and produce new spatial structures.

Geography the science has as one of its purposes the classification and description of environmental linkages and the attributes and uses of space over the earth’s surface. Such descriptions are necessary and may range from identification of cultural ecosystems to the categorization of movements of pollutants through the environment. They may include the levels of resource utilization by region or the description of transportation networks and housing. Such classification is preliminary to analysis and the development of environmental and spatial principles, which in both cases relate to our living space on earth. In the process of theorizing about such interactions and spatial arrangements, we reveal patterns and processes that are responsible for their existences and can be manipulated. Explanations and predictions are produced for spatial and environmental problems in an effort to increase social welfare and to reduce social costs. Although the questions asked make geography distinctive, as a science it shares the goals of explanation and prediction through use of the scientific method while it seeks to improve the human condition.

Applied geography, as a science, likewise shares the goals of general science, but as an applied science it is an extension of pure science. Applied geography, like other applied sciences, has several attributes: It (1) is user-oriented; (2) is action-oriented; and (3) extends the experimental method to include evaluation and implementation stages to achieve the first two attributes.

Although pure geographic research includes observation, hypothesis elaboration, deduction of the effects based on the hypothesis, and new observation for verification, applied geography continues with the evaluation and includes an implementation stage. In doing so, applied geography

14 Part I Introduction
assesses what factors control the environmental linkages or the spatial patterns and seeks to modify the relationships, resulting in the final outcome. In the process, issues such as efficiency, environmental balance, spatial allocation, and spatial equity are addressed in the design of effective control strategies. Manipulation, then, is a key word. The results are user oriented. The research is undertaken for the purpose of solving an immediate problem. Results are means to ends for a target population, which may be an agency, client, or some other group. The researcher gives directives for action and may participate in the implementation of the results. It is distinguishable as planned action rather than thought for planning. On the academic side, applied geographers most often find themselves more involved in the directives stage than in the implementation phase. Nonacademic, applied geographers are, of course, equally involved in the two stages. Whatever the case, because applied geography includes impartial observation, measurement, analysis and reporting, and evaluation and implementation, it emphasizes “the way things should be” not “the way things are.” That is, it requires explicit value judgments. This is not unique to geography, but is true of all the applied social sciences. This distinction makes applied social science much more complicated than applied physical science. Applied social science is involved in providing means to ends which involve human activities and welfare. Ends involve values and values are, after all, an integral part of reality.

Human interests, desires, prejudices, and group values vary across space. Policy based on applied geography, whether it be the modification of an environment, the removal of inequity in housing, or the preservation of a cultural landscape, includes researcher and client values that may vary substantially from the values of other subpopulations, especially those directly involved. The applied geographer’s recommendations also can have long-term impacts. Substantially different policy types depend on which value the applied geographer gives priority. They must realize how their work is affected when they select an action role, as well as how the research relates to the opportunities of the affected population. One takes a position in an attempt to influence an action, whether it be the location of a facility, environmental change, or the spatial allocation of resources. At minimum, moral dilemmas are involved; at maximum, the convenience of subpopulations. Whatever the case, value judgments are involved. Some simple examples follow to explain this point.

An issue appropriate to geographical analysis is the nature of urban regions. Geographers have long theorized that areas of the earth’s surface have internalizing attributes that result in distinctiveness. The United States, for example, is grouped into regions based upon the areal differentiation of cultural, economic, political, and other attributes. An extension of this theoretical statement could be that nodes (cities) within the spatial structuring also share similar attributes that result in an urban regionalization. This hypothesis has, in fact, been tested utilizing retail and socioeconomic data representing cities of United States regions. The purpose of this research was
to develop further the theory of geographic regions, that is to find out "the way things are" not "the way things should be." Could the findings of this research be extended to applied science? The answer is yes. If, for example, the researcher wished to affect policy regarding federal aid to urban centers, the results of the previous research effort could be utilized to suggest a strategy for federal spending based upon the urban regions, their structures and their attributes. The latter step, however, reflects movement on a continuum from the pure scientist to the applied scientist to the pure pragmatist (administrator). It involves the necessary judgement that federal spending for regional needs is desirable.

Most academic work does not reach this stage, save a few relatively weak statements of recommendations at the end of scholarly publications. However, the applied scientist, who is employed outside academia, operates in this stage daily. The applied geographer in this case must be involved in the stages of evaluation and implementation and, in the process, make a value judgement in supporting or denying a policy initiative. This is not an issue to be treated lightly. The role of values in determining the nature of the problem selected, the methodology adopted, and directives that follow results is critical. (Vogeler does an excellent job in providing an explanation within the context of rural geography in Chapter 12).

The findings of the pure scientist provide the foundation for applied science. However, in the application of the findings of pure geography to the solution of a practical problem, we are confronted with considerations that lie outside the range of pure science as defined previously. The very existence of a practical problem that suggests an end to be achieved implies a value judgement of what is ultimately desirable.

In another example, the problem may be one of locating low-income people in high-rise apartments. It implies that the building of such units is desirable; this, however, must be accepted on ethical grounds. Once a moral judgement is made, the applied researcher scientifically can employ principles of locational analysis. Similarly, one may assess scientifically the best means of spatially distributing abortion information to women experiencing unwanted pregnancies; however, a moral judgement concerning the issue of abortion is implicit in such an analysis. Such applications of geographic principles, methods, and theories in the solution of a problem and the attainment of an end are applied geography.

Applied geography involves the formulation of goals and strategies and the testing of existing institutional policies within the context of ethical standards as criteria. This should not imply a simple system maintenance approach to problem solving. Indeed, it is often necessary to take an unpopular, "antiestablishment" position, which can result in a major confrontation. On the social geographic side it may involve the spatial distribution and spatial equity of income or optimum city size; on the environmental side, the level of acceptable pollution or a coastal management decision. Considering economic geography, a researcher may be faced with an allocational decision of downtown rehabilitation or a zoning-variance decision.
These examples are not presented to suggest that pure geography is science and that applied geography is not. Both are sciences. However, judgements, ethical, aesthetic, and otherwise, are clearly necessary in applying geography. This is true for academically employed geographers as well as for professional geographers who act as decision makers or in advisory roles.

Thus, in applied geographic research, several components of the research design must be addressed. These issues include philosophical persuasion, value judgements, adherence to scientific methods, and policy advocacy. First, the philosophical position of the researcher, whether liberal, conservative, or radical, must be made clear because it results in particular types of value judgements. It also must be stressed, however, that once such judgements are made, scientific methods are employed by the applied geographer in their solution of the practical problem. In this entire process, however, reality is changed through advocating a policy direction. Applied scientists are action agents who seek the implementation of their research findings. In this sense, ideas facilitate either social or environmental change, or both.

SUMMARY AND CONCLUSIONS

Applied geography has a long history as a theme in American geography. The strength of this has varied over the past half century and was completely dwarfed by the controlling logical positivistic paradigm and teacher-training orientation of the 1960's. Its resurgence in the 1970's was based on demands for relevance in both teaching and research, especially in view of the increased demand for social sciences to solve real-world problems and a stronger career orientation of the university in a tight job market. In the process, applied geography has been rethought and is emerging as one of the applied sciences. It can be differentiated from geography, the pure science, both in terms of its orientation and purpose and its extension of the experimental method.

Applied geography, the science, then, is a branch of general geography; clinical medicine is related to scientific medicine in the same fashion. Applied geography uses the principles and methods of pure geography but is different in that it analyzes and evaluates real-world action and planning and seeks to implement and manipulate environmental and spatial realities. In the process, it contributes to, as well as utilizes, general geography through the revelation of new relationships. New principles for functioning spaces and environments can be derived, in addition to contributions to social practice. Value judgements are an integral part of the geographical realities studied and manipulated. Rather than hide from value issues, applied geographers clarify the role of ideology through viewing the impacts of means and ends. This critical cognizance is utilized in assessing reasons for the success or failure of action. Applied geography, then, deals with the normative question, "the way things should be," a bold but necessary position in dealing with real world problem resolution. In the process, the geographer combines "the world of opinion" with "the world of decision."

Chap. 1 Applied Geography: A Perspective 17