MAB

Guidelines for field studies in environmental perception

Prepared in co-operation with SCOPE

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Guidelines for field studies in environmental perception

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MAB Technical Notes 5

Launched by Unesco in 1970, the intergovernmental Programme on Man and the Biosphere (MAB) aims
to develop within the natural and social sciences a basis for the rational use and conservation of the
resources of the biosphere and for the improvement of the relationship between man and the environment.
To achieve these objectives, the MAB Programme has adopted an integrated ecological approach
for its research and training activities, centred around fourteen major international themes and designed
for the solution of concrete management problems in the different types of ecosystems.

Preface

How does man, as an individual or as part of a particular cultural group, perceive his environment? This question should be a fundamental consideration in all attempts to understand the complex interrelationships between man and the biosphere. Man's decisions and actions concerning his environment are based not only on objective factors, but also on subjective ones : this is the underlying principle of environmental perception research.

One of the fourteen international project areas of Unesco's intergovernmental Programme on Man and the Biosphere (MAB), Project 13 ("Perception of environmental quality"), is addressed to such perception studies. The main characteristics of this MAB project were elaborated by an expert panel convened in Paris in March 1973. As described in the report of the panel (Unesco 1973a), six priority research areas were identified for Project 13, including perception of environment in isolated or peripheral ecological areas, perception of typical man-made landscapes of ecological, historical or aesthetic importance, and perception of quality in urban environments.

The panel also considered that perhaps the most important point to be stressed in MAB Project 13 activities is that in any programme which hopes "to increase man's ability to manage efficiently the natural resources of the biosphere", the perceptions of the people directly involved need to be taken explicitly into consideration along with those of experts or officials. The panel concluded that Project 13 would have limited value as a relatively isolated component of the MAB Programme. The success of this project will depend mainly on the degree to which a perception approach can be incorporated into, and reflected in, other MAB projects.

Since 1973, many MAB National Committees have launched or identified concrete field research activities within the framework of the Programme. Some of these are directly concerned with perception as a major variable, as in the MAB field study in Tunisia on the perception of the quality of coastal zones modified by socio-economic development, and particularly tourism. Other projects have included perception as part of a broader scientific study, such as that sponsored by the MAB National Committee of Sri Lanka on ecological and socio-economic aspects of peasant farming in upland areas of that country. Certain countries, such as Australia (Seddon and Davis 1976, "Man and landscape in Australia") have organized seminars around specific aspects of MAB Project 13. Other countries, such as Canada, the United States and Mexico (Canada-MAB 1977), have joined together in sponsoring methodological training workshops in the field of environmental perception research.

These and other attempts to promote environmental perception research within MAB, have at times revealed that a lack of awareness of available methods - many of them recently developed - has hampered the incorporation of a perception approach into field studies dealing with man's interactions with various types of ecosystems and oriented towards the solution of concrete problems. Also it has become clear that many biologists and natural resource scientists are unfamiliar with the possibilities for systematic observation in the field of subjective perceptions.

Thus the need for methodological guidelines for planning field investigations in environmental perception became increasingly apparent. In particular, it was felt that a methodological study was required which would both provide a rationale and description of the field of environmental perception in the context of man-biosphere relations and ecosystem management, and suggest alternative research methods for field investigations of

environmental perception accompanied by indications of their advantages and limitations for specific purposes and conditions.

In an agreement with the Scientific Committee on Problems of the Environment (SCOPE) of ICSU, Unesco entrusted this methodological study to an *ad hoc* group of SCOPE Project 7 ("The communication of environmental information and societal assessment and response"). This group was headed by Dr. Ian Burton – chairman of SCOPE Project 7 – and Dr. Anne Whyte, both of the Institute for Environmental Studies of the University of Toronto, Toronto, Canada. Dr. Whyte generously agreed to be responsible for the study of methods and techniques suitable for inclusion and to prepare a guidelines document.

In order to make this methodological study more than a simple transcription of readily available knowledge into a new format, SCOPE Project 7 undertook to draw a large number of people into a discussion of the study. A number of small group meetings were convened to explore its possible contents and orientation. In addition to individual reviews and advice from many scientists, the draft document was reviewed at an international workshop on methods and interpretation of environmental perception research, sponsored by the MAB National Committees of Canada, United States and Mexico, and held at the University of Victoria, B.C., Canada, in May 1976. The present Guidelines is the result of this process of consultation, review and refinement. Its main purpose is to provide an elaboration of the ideas involved in the perception approach, to describe methods and techniques of research, and to discuss and evaluate their requirements and suitability for field research in the MAB context.

It is hoped that MAB National Committees and other national and international groups will make wide use of the Guidelines and in particular that research project managers and field investigators will find it helpful to refer to this document in the formative or preparatory stages of research design.

Two cautionary notes must, however, be made. First, it should not be assumed that the Guidelines document, placed in the hands of inexperienced field workers, will automatically provide all the knowledge and understanding of available methods necessary for carrying out perception studies. The Guidelines is no substitute for the direct involvement in research activities of social scientists knowledgeable about available methods and trained in their use.

Second, most perception research and development of techniques has been undertaken in industrialized, and in particular English-speaking, countries which are often characterized by a high level of urbanization, and a relatively modern agricultural economy. Care must be taken in extending and transferring the methods described in the Guidelines to circumstances different from those in which they were originally developed and tested. This can be done, and done very satisfactorily, but the caveats that apply to the transfer of technology also apply to that of research methods and techniques.

In making available the Guidelines as MAB Technical Notes 5, Unesco and ICSU hope to encourage the inclusion of perception studies as an integral part of interdisciplinary research on man–biosphere relations and ecosystem management. Another aim is to promote the exchange and dissemination of information among scientists working on environmental perception problems in different cultural settings and geographic regions. In this respect, a detachable questionnaire on the methods and techniques described in the Guidelines has been included to solicit the concrete comments and suggestions of research workers in the field. In the light of the responses to this questionnaire the Guidelines will possibly be revised and up-dated.

Contents

Foreword

In this Technical Note, I have tried to bring
together methods and techniques that have been
developed in many different disciplines, and
to evaluate them for use in the field in wide-
ly differing environmental and cultural set-
tings. Throughout the work, I have grown in-
creasingly aware of the isolation of differ-
ent disciplinary approaches from one another
in their testing of techniques and concepts.
Evaluating them for measuring environmental
perception and for use cross-culturally, has
proved to be a more critical test than most
techniques can survive. In general, highly
structured techniques were not included, eith-
er because they impose the researcher's view
too heavily on the data or because they can-
not be used outside the cultural setting in
which they were first developed. The evalua-
tion of available techniques revealed a clear
need to develop new field techniques and re-
search instruments that can be used in more
than one cultural context.

In bringing together the material included
in the Guidelines, I have been helped by the
advice of many scientists who responded to a
request from myself and Ian Burton in 1974
for suggestions and materials. These are:
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thing that they suggested.

The Guidelines has also been reviewed by
Ian Burton, Peter Jacobs, Robert Kates and
Philip Porter, whose thoughtful advice has
improved the manuscript both in detail and
in reorganization of some sections. I am grate-
ful to them for their time and patience.

The Guidelines has received the rare ben-
efit of a practical comparative field testing
by over twenty-five participants from some
twenty countries during a workshop on methods
and interpretation of environmental percep-
tion research held in Victoria, B.C., Canada
in May 1976. The workshop was sponsored by
the MAB National Committees of Canada, Mexico,
and the United States of America and was sup-
ported by the Canadian International Devel-
opment Research Centre (IDRC), Unesco and the
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Estela Zamora (Philippines). A report on the
workshop is being prepared and will be pub-
lished in 1977 by Canada-MAB.

Ian Burton, chairman of the SCOPE Working
Group and of the Expert Panel on MAB Pro-

Introduction

THE ROLE OF ENVIRONMENTAL PERCEPTION IN MAB

Environmental perception research shares a paradigm of man-environment relations in which man's individual and collective understanding of the environment is seen as a major force in shaping that environment through the action of man's choices and behaviour. Man's perception of the environment is considered so fundamental that it becomes the main point of departure for any analysis of man-environment relations.

A perception approach to man-environment relations recognizes that for each objective element and relationship in the biosphere, there are many perceived elements and relationships as seen and understood by different people and at different times and places. Man reaches decisions and takes action within the framework of his perceived sets of elements and links rather than any externally defined "objective set". Within any given time frame or culture, scientific knowledge of the day may also be viewed as more formalized and rigorous sets of perceived environmental elements and relationships. This is most easily recognized for past, superceded modes of scientific thinking such as pre-Copernican astronomy. For the purposes of analysis (and decision-making), the present state of scientific knowledge of the environment is usually taken to be "objective reality". In this sense, the environmental perception of an individual or group may be brought more closely into line with scientific, "objective" understanding by education and information.

Environment is both a physical and social milieu, but within the scope of this Technical Note emphasis is placed upon perception of physical or tangible parts of the biosphere, including the works of man himself.

One important objective of research based on environmental perception is to provide a systematic and scientific understanding of the view from the inside-out, in order to complement the more traditional and external scientific approach. The view from the inside may be that of any individual, of a local community, or even of a whole rural population. The scale is less important than the relationship between those on the inside, and those traditionally on the outside. The inside view is characterized by familiarity and long experience often coupled with inability to effect rapid changes. It is seen as personalized and subjective. In comparison, the outside view becomes associated with development, action and objectivity against internal tradition and resistance to rapid change.

It is where these two ends of the spectrum come up against one another in a conflict of interest over resource use – for example, in a conflict between the local community and national planners – that the differences in perceptions between the two groups, and the need to understand both within the same analytical framework, become highlighted and of urgent, practical importance.

Many examples could be cited to show the value of a perception approach to man-biosphere relations. The two which are given here illustrate some of the advantages and some of the difficulties.

Soil erosion

Few areas demonstrate so graphically the existence of the unexpected result – or unpredicted perception – as the Valley of Nochixtlan in southern Mexico. Many of its side slopes are ravaged by active gullies which remove the surface wholesale and leave the slopes bare of vegetation, fields or houses. Since the Spanish Conquest, an aver-

age depth of 5 m has been stripped from the entire surface area, producing one of the highest rates of erosion recorded in the world.[1] Set between the forested uplands and the agricultural valley floor, the area seems a wasteland which only drastic soil conservation measures could reverse.

Government experts share this view and have instituted conservation measures including the construction of low earth ridges to slow down soil movement. Few scientifically trained experts would disagree with their general perception of the gullying as a problem but the view from inside the valley is different. Gullies are seen not as a hazard but as a resource. By directing the flow of the eroded material, Mixtec farmers can annually feed their fields with fertile soil and can, with greater effort, extend their agricultural land by building new fields over a few years.

Over the past 1000 years, Mixtec cultivators have managed to use gully erosion to double the width of the main valley floors from about 1.5 km to 3 km; and to infill the narrow tributary valley floors with flights of terraces several kilometres long. Judicious use of gullying has enabled them to convert poor hill-top fields into rich alluvial farmland below, using the gullies to transport the soil (Fig. 1). Thus before large-scale gullying began, the agricultural productivity of the valley area was less than it is today.

The difference between the "outside expert" view and the inside Mixtec one rests on the farmers' greater experience and knowledge of the local situation. Their experience of the highly fertile and erodible local deposits, and their familiarity with the technical and social bases of controlling soil movement, are too particular to the Valley of Nochixtlan to be readily translated to other areas. Thus the concept "gullies are good" is not part of the outside expert's portfolio. Nor could he be expected to know that intermarriage between the hill-top and valley bottom communities enables families to "move with their soil" downvalley.

The Valley of Nochixtlan is an unusual case; usually different groups agree that soil erosion is a problem but disagree about how to solve it. This example is intended, however, to illustrate the importance of understanding local perceptions of the environment in the context of local resource use and

1. The average erosion rate over the whole surface was in the order of >10 mm per year over the last 500 years for a drainage basin of area >0.4 km^2 (M. Kirkby 1972).
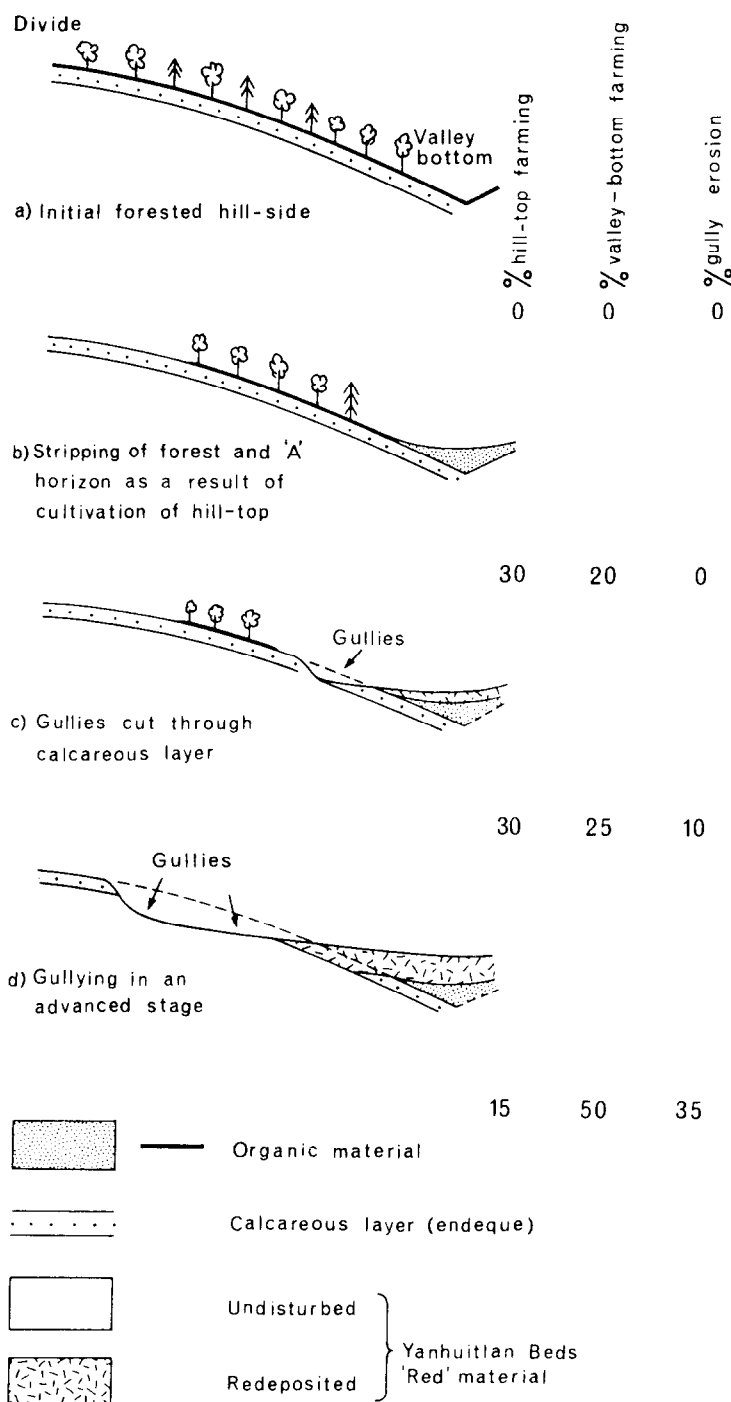

Figure 1. *Beneficial effect of gullying on production of agricultural land in Nochixtlan, Mexico (reprinted with permission from M. Kirkby 1972)*

social structure. But this is only the first, important step. In the example of Nochixt-lan - as almost everywhere - both perceptions of the environment are valid, within their own contexts. For the farmers in Nochixtlan, gullies are an important agricultural resource. For the government authorities concerned with the area as a whole, gullies are also a problem - not for those farms whose owners remain, but for the farms abandoned by their urban-migrating owners and no longer receiving replenishment and protection from the gullies. Thus, the national "problem" is that of urban migration and rural depopulation, which is a higher-order one, and which is outside the scope of agricultural authorities and local communities.

Environmental perception research needs, therefore, to be contextual, i.e. able to relate perceptions to the resource management context. In so doing, it becomes but one entry point into a larger system of environment, technology and society, and the difficulty becomes one of conceptual and empirical closure to the "research-system".

Urban renewal

In many cities, of which London, England, is just one example, planners are trying to move people out of old, poor housing of central "slum" or "twilight" areas into modern homes in planned communities. The perceptions of the planners have been mainly focussed on the physical conditions of the slum areas with their inadequate housing, poor sanitation, and lack of public open space. The new communities they design are more open and green with adequate sanitary facilities and more modern housing. Services such as shops, social centres, transport facilities and schools may lag several years behind the arrival of the new residents, but are eventually provided.

Why then is there accumulating evidence that urban renewal creates distress, and social and family disruption, and may even increase health problems rather than solve them?

The view of the old and new areas seen from the inside - from the residents' perspective - is different from the external one. To the outsider, a slum area may appear as rows of tiny, old houses crowded together on streets with no trees or grass and overhung by heavily polluted air. The same area to the long-term resident means familiar places, encrusted with significant memories, and reassuring him of physical and social stability.

The rows of houses provide a close-knit social structure, based on long-residence and inter-marriage with its own institutions and customs. Information, advice, goods and services are shared and available when needed.

In moving people out of the old areas, people lose both the physical and social aspects of the support they had in their neighbourhood and grieve in much the same way as for a lost person (Fried 1963). It is not easy to see how the planning dilemma might be solved. The evidence on clinical health effects of moving people to new communities is equivocal (Freeman 1972). Several studies show increases in morbidity when people are moved, especially among women who have lost their social support while bringing up young children. But it is difficult to separate the effects of moving from the effects of living in the new community. The two are different but linked planning problems.

Isolation from familiar places and faces as well as low residential densities and fewer really local facilities (such as the corner shop) became officially recognized as "new town blues" as early as 1960 in the United Kingdom. "New town blues" were old community social problems exacerbated by the moving process (Gold 1974; Goodey 1974).

Speaking about Harlow in England, Pevsner puts forward the designer's view in the context of governmental constraints on permitted population densities:

the New Town Look is an appearance resulting from urban types of building in a green rural setting. It is a happy look. There is, however, one danger in this emphasis on a green setting for every house. It is a danger for which the architects and planners have no responsibility. The cause is the density laid down by the authorities. The New Towns will never be towns in the sense in which Chipping Campden, or Lewes, or Petersfield are: urban density is not permitted in residential areas. The resulting looseness is difficult to master visually, and it has, in addition, its social drawbacks (Pevsner 1954, p. 207).

The example of urban renewal reinforces the significant differences that can exist between the inside and outside views of an area. It also introduces the problems of criteria and proof in situations that are ambiguous and conflicting. These problems are not unique to environmental perception research but they may be said to be endemic to it, because *ipso facto* perceptions are unique and likely to be

conflicting.

In the urban example a major difficulty in implementing research results arises from inadequate criteria of what constitutes "mental health" and "environmental quality" and how to separate interacting factors. In terms of implementing the results of research, the policy-maker is confounded as much by what the criteria might mean as by the conflicting implications of different studies.

These two examples dramatize the inside-outside view as dichotomies whereas in most situations no such simple polarizations exist. There are Mixtec farmers for whom gullies are a problem; and there are urban residents who perceive the slums as their prisons, not their homes; and for whom the new towns spell wealth, health and freedom. Similarly there are increasing numbers of scientifically trained administrators who are sensitive to the inside view and who seek to harmonize change and stability in better resource management. One of the roles of environmental perception research in the MAB Programme is to foster such an approach on an international scale.

It can be argued that wherever people are already living in an area and using its resources, scientific studies of their perceptions are a necessary corollary to any scientific evaluation of the environment designed to improve the rational use of natural resources. Local perceptions of the environment provide a time frame that extends into the past; they are an active agent in organizing the system of resource use in practice; and for good or ill, they reflect the raw material from which a more rational use of resources will emerge. In this connection, it is important to note that an individual farmer deciding which crop to plant or which tree to cut, is a resource manager in the same sense that the head of a state water authority or national forestry commission is a resource manager.

The difference between the individual farmer and the state official is one of scale: the scale of environmental impact of their decisions and the scale of society on whose behalf their decisions are made. They are both resource managers in that they use, and thereby directly affect, the biosphere through their choices. Their perceptions and choices can be modelled and empirically investigated in the same analytic framework for different levels of resource management. The processes involved are similar for the individual and the government body but the

management task (that is, the organizational task) increases in proportion and in sophistication at more aggregate and collective levels of authority. Thus the relative emphasis on communication and organizing processes will increase in the research model of collective management.

The role of environmental perception research in man-biosphere relations can be synthesized into five goals:
1. contributing to the more rational use of biosphere resources by harmonizing local (inside) knowledge and that available from outside;
2. increasing understanding on all sides of the rational bases for different perceptions of the environment;
3. encouraging local involvement in development and planning as the basis for more effective implementation of more appropriate change;
4. helping to preserve or record the rich environmental perceptions and systems of knowledge that are rapidly being lost in many rural areas;
5. acting as an educational tool and agent of change as well as providing a training opportunity for those involved in the research.

These goals are deliberately formulated in policy-oriented terms. It remains the task of each researcher to be sensitive to the needs of policy-makers. Ultimately his research hypotheses, criteria, measured variables and results should be capable of being translated into action and generalized, if they are ever to be implemented beyond the scope of his own research project.

DESIGN OF THE GUIDELINES

This Technical Note is designed to fulfil two main functions: to describe alternative research methods for field investigations of environmental perception accompanied by suggestions about their advantages and limitations for specific purposes and conditions; and to provide a rationale and description of the field of environmental perception in the context of man-biosphere relations and ecosystem management. The ultimate purpose is to encourage organizers and planners of national and international research projects on man-biosphere relations and ecosystem management to include perception studies as an integral part of interdisciplinary investigations at the conceptual and field levels.

The Guidelines is considered as a flex-

ible set of suggestions which provide the
basis for individual choice of both the as-
pects of the perception system to be inves-
tigated in the field and the methods by which
to do so.

At the same time, by presenting an ap-
proach to environmental perception that is
oriented to both systems modelling and eco-
system management choices it is hoped that
the Guidelines may encourage and facilitate
the inclusion of coordinated and comparable
perception studies across several MAB pro-
jects and the ecosystems with which they are
concerned.

Design and scope

This Technical Note is designed as a prac-
tical document for use in the planning phases
of field investigations into man-biosphere
relations. It attempts both to structure the
field of environmental perception and to sug-
gest specific methods for analysis.

The need to formulate a structure in the
field of environmental perception became ap-
parent after a survey of the literature
showed that no general frameworks had yet
been developed. The frameworks suggested here
are not, at least in their present form, ade-
quate for the field as a whole. They have
been selected as being most appropriate for
the MAB Programme rather than on their *a
priori* theoretical validity. Their merit lies
in the social science parallel to ecosystems
modelling that the systems approach provides,
and in the perspective from the resource man-
ager's position that a choice model gives.

The adoption of a particular framework in-
evitably leads to a rearrangement of the top-
ics and methods within the field. Some con-
cepts and studies become central while others
are considered to have only peripheral impor-
tance. This selection process has occurred in
the Guidelines and thus some researchers'
most important concerns are treated lightly
or omitted. For this reason, and in consid-
eration of the heterogenous nature of the
field, the advantages of offering a framework
may seem debatable. It was decided, however,
that, although the boundaries of the frame-
work could remain open and flexible, it would
be more useful in a planning document to
clearly indicate the key elements.

In the section on methods, emphasis has
been given to providing the basis for making
a choice of methods rather than giving a de-
tailed account of the development and anal-
ysis of each method. This latter alternative
would have been impractical in a document of

this nature; instead reference is made to a
few principal sources.

The methods also differ in spirit and gen-
eral philosophy. Some are more extractive in
nature while others have the dual aim of data
gathering and education. Self-study, or the
design of methods to enable local people to
gather information about themselves, is an
important tool for creating scientific self-
awareness and local research capability.
Many of the tests described here have not
been used in self-study investigations but
could probably be adapted for this approach.
The methods are summarized in a reference
chart designed for easy location of the al-
ternatives described in this Technical Note
(see page 105).

Relationship to environmental perception research

In the Guidelines "environmental perception"
is used to mean human awareness and under-
standing of the environment in a general
sense. It is taken to include much more than
individual sensory perception such as vision
or hearing. This broad definition of percep-
tion is used in the MAB Programme (Unesco
1973a and 1974) but the use of the term "per-
ception" in this way, whilst correctly ap-
plied in terms of everyday language, is more
akin to "cognition" in psychological frames
of reference. The term "environmental percep-
tion" is therefore sometimes confused with
the more rigorous and narrower concept of
direct sensory perception as it is used in
psychology. It is an unfortunate situation,
which can lead to problems of communication
between psychologists and others in the field.
However, the term "environmental perception"
to mean both sensory perception and cognition
is probably too well established to be
changed now and in any case no generally ac-
ceptable alternative is available.

Environmental perception as an area of
study is a loose confederation of research
interests which share a common orientation
and philosophy rather than close disciplinary
origins. The substantive field of interest is
thus defined only at the most general level.
Both the wide range of methods employed and
the great range in scale at which analyses
are made reflect the contributions which dif-
ferent disciplinary traditions have made.
Some of the disciplines which have contributed
to the field are anthropology, architecture,
city and regional planning, geography, psy-
chology and sociology. So far, the convergence
of interests from these disciplines has not

led to any synthesis of models or methods that lie beyond their traditional boundaries, although several summary papers and books reviewing the field are available. The field has been characterized by the transferring of concepts from one focus of inquiry to another and the borrowing of methods between disciplines. One major direction in this exchange which is of particular relevance to environmental management at the governmental level is the transfer of ideas from individual psychology, such as identity and role, to the behaviour of groups and larger organizations (e.g. Katz and Kahn 1966).

In a number of disciplines, the importance of individual and cultural perception of the environment for human behaviour began to be discussed in the 1950s or even earlier. But until the 1960s there was little sense of impetus or cross fertilization of ideas. As a multidisciplinary field with some common research problems, environmental perception began to appear in the early 1960s. During this time, earlier ideas about cultural influences on man's use of the environment became re-expressed in terms of the influence of the "perceived" or subjective environment. These ideas soon led to a rapid development of empirical investigations into environmental perception, and the need for more knowledge about the role of environmental perception in environmental management became identified as a practical objective. During the last decade, environmental perception has become a rapidly expanding area of research that is empirically and practically oriented.

Although environmental perception is concerned generally with man-environment relations as a function of man's perceptions, it has so far concentrated on a few aspects of that relationship and ignored others. The parts of the field which have been developed arise out of the interests of related disciplines and have often been pursued in relative isolation from each other. For example, work by psychologists and architects on the perception of the architectural environment and its effect on behaviour in buildings has until very recently developed alongside, but having little interchange with, work on perception of natural hazards by geographers or anthropological studies of folk taxonomies of environmental phenomena.

Figure 2 presents diagrammatically one view of the main research foci within environmental perception ranging from those that are almost developed to those that are identified, but neglected. The methods and concepts employed in each of these sub-areas of environ-

p = perception
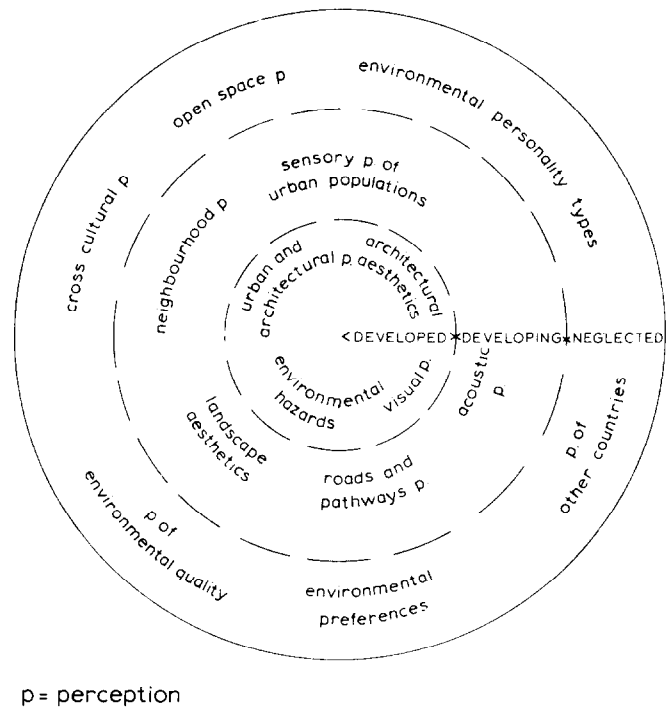
Figure 2. *Research effort in environmental perception (based on Unesco 1973a, pp. 58-59).*

mental perception are not necessarily transferable or even compatible with those developed in other sub-areas, despite the common "perception" point of departure. Furthermore, the sub-areas defined in Figure 2 as receiving at least some attention within the field of environmental perception do not cover all those which are of concern and relevance to the MAB Programme.

SUGGESTIONS FOR FURTHER READING

There is now available a selection of books and review papers in English which serve as good introductions to the field of environmental perception. The following suggestions cover only some of these, including the most widely available.

Two early and comprehensive review papers which provide good reference lists are those by Brookfield (1969) and Craik (1970). Goodey (1971) has written a short and very readable introduction to the literature. Lowenthal (1967) and Downs and Stea (1973) have brought together papers by different authors which provide useful sets of readings. Two books with a stronger psychological emphasis are those

by Proshansky, Ittelson and Rivlin (1970) and by Ittelson *et al.* (1974). The first book is a more detailed collection of research papers and the second serves as a more easily assimilated introductory text. Another book exemplifying the psychological approach to environmental behaviour and its implication for design and planning is that by Canter (1975). Saarinen (1976) organizes the field in terms of environmental scale from architectural space to urban and regional space to the nation and the world. Perception literature with a more environmental resource management focus includes Burton and Kates

(1964), O'Riordan (1971, 1976), Sewell and Burton (1972), Burton, Kates and White (1976), and White (1974). The last two are concerned with the perception and management of environmental hazards. At least one journal is primarily concerned with the environmental perception research field: *Environment and Behavior*.

In languages other than English, the literature is sparser, but the following are available: Gehl (1971) in Danish; Hesselgren (1966) in Swedish; Moles and Rohmer (1972) and Kates (1970) in French; and Eringis (1975) in Lithuanian.

Field methods

II. BASIC APPROACHES

The number of techniques that have been de-
veloped or borrowed for field study of envi-
ronmental perception has increased signifi-
cantly in the last ten years. These tech-
niques tend to have the aura of complexity
and disciplinary specialization that is often
confusing in new transdisciplinary research
fields. It is important to note, therefore,
that all field techniques are based on a com-
bination of three main approaches: observing,
listening and asking questions (Fig. 3).
These methods are complementary and basic to
all research in the field.

The variety of specialized techniques
gives the researcher the misleading impres-
sion that there is a wide range from which
to choose. Figure 3 shows diagrammatically
that "asking questions" represents the heav-
iest concentration of specialized field tech-
niques. This situation is based on three
trends: the reliance on questionnaires and
surveys in the social sciences in the past
few decades; the development of field inter-
view methods in environmental perception by
modifying clinical and laboratory techniques
(mainly "paper and pencil" tests); and the
search for scientific objectivity through ex-
perimental and statistical approaches to
studying "subjective" material. This does
not mean that well tried methods are not
available for those who would observe and
listen, but that methodological innovation
and specialized techniques consist mainly of
asking questions in different ways.

It is equally important to note that
there is no single, ideal or best method. In
the first place, the best method is a func-
tion of the research objectives, the field
situation and the researcher. These are
three major criteria for selecting any meth-
od and no one technique is so universal that
it can be successfully applied in all situ-

Areas of research concentration
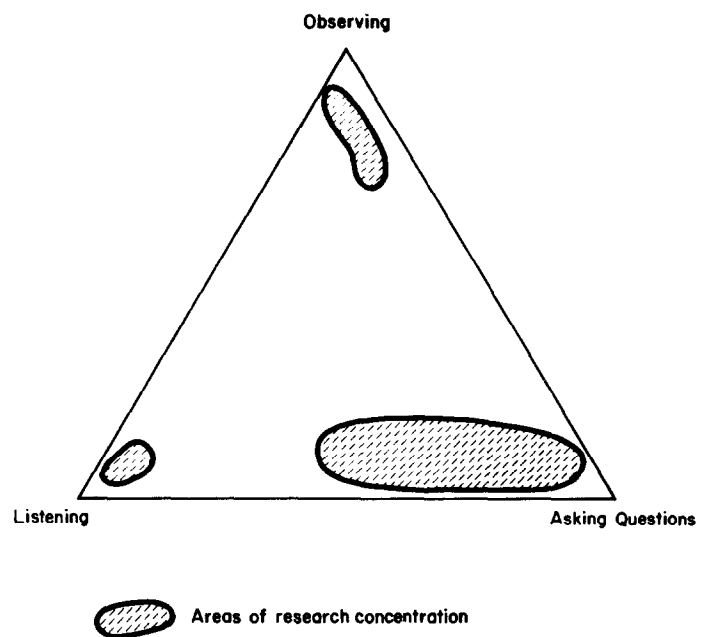
Figure 3. *Principal methodological approaches*

ations (see discussion on criteria for selec-
tion, pages 103-113). In the second place,
methods of observation, listening and asking
questions provide different information which
is mutually enriching. Thus, when possible, it
is better to select techniques that are com-
plementary in that they provide cross-checks
and new information (e.g. observed and re-
ported behaviour), than to concentrate all
field techniques in one corner of the metho-
dological triangle.

Figure 4 shows the relative proximity of some common field techniques to the researcher, the respondent and the field situation. Each of these three points - the researcher with his own informal perspectives and more formalized research question, the respondent representing the individual data point on aggregates of which data (especially verbal) are largely based, and the environmental and social setting of the field investigation - can exert more or less influence on the design of the research project and on its implementation. Different methods can be selected which provide for more or less prior structuring of the research questions by the researcher. Other methods more directly base the data on the concerns and activities of those whose perceptions are being studied. Various methods of observation, questioning and listening cover a spectrum from researcher-structured to "respondent-situation"-structured.

In the most general terms, this spectrum can also represent a trade-off between more controlled, experimental designs and consistent measurements, where the researcher takes the lead role, and the more idiosyncratic, less statistically reliable, but of-
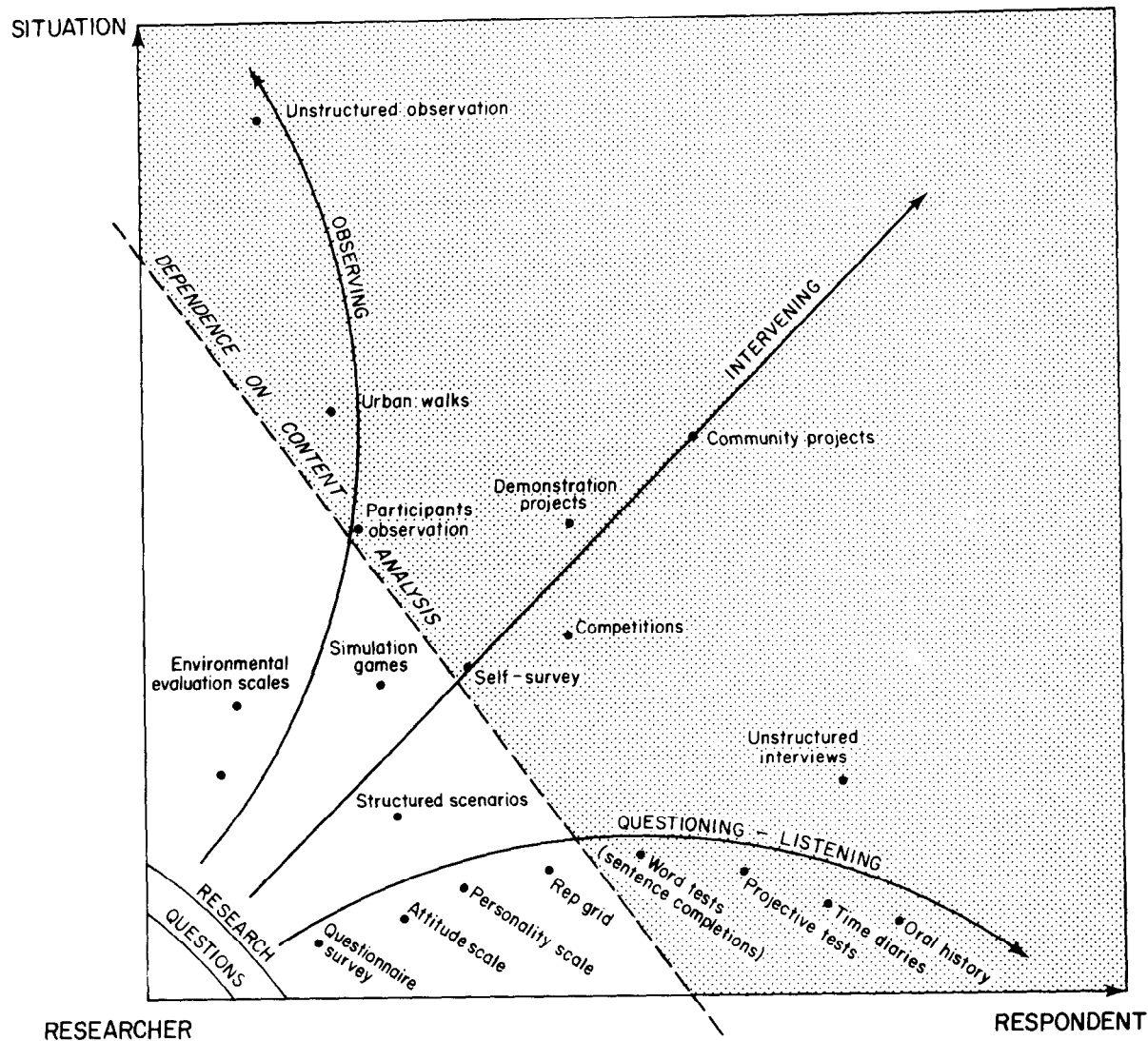
Figure 4. *Field techniques in relation to the researcher, the respondent and the field situation*

ten more relevant findings of "situation-defined" research. These differences are typified in the contrast between "surface surveys" and "in-depth case studies", although the two are not, and should not be, mutually exclusive approaches. The many merits of the situationally-open approach (respondent or situation-structured) are dependent, however, on two methodological elements:
- the individual qualities of the researcher, especially his ability to harmonize appropriate selection and interpretation of data with minimal distortion (a very difficult path to draw guidelines for, or to define);
- content analysis, either formal or informal, of the unstructured data obtained, in order to structure and interpret it.

In addition to methodological approach and degree of prior structuring, a third axis is shown in Figure 4 - that of degree of intervention. Very few field research methods are unobtrusive. Most incur the Heisenberg effect of interference with the phenomena they set out to observe, although the motivation for the development of many techniques is to minimize researcher impact on the observations made. Misinforming people followed by debriefing afterwards (telling subjects about the real purpose of the experiment) is a classic routine in psychological experiments. Less directly, participant observation seeks to minimize the difference between the researcher and the researched in the eyes of the study group; projective tests are then based on the rationale that their ulterior purpose and design is not perceived by the respondent.

Other less used methods are more oriented towards "research as action" and are expressly designed to have an impact on those forming part of the study. These methods are based on the philosophy that the research experience is valuable in itself, and therefore something which should be equally shared between researchers and researched.

This goal is achieved through techniques which make the respondents into field researchers through self-study methods. The role of the researcher is therefore one step removed from direct field data gathering; he becomes a part designer of materials for use by the local population, and a part trainer of people to use them.

In this Technical Note, methods are discussed under four headings: observing, asking questions, listening, and coding answers. These are not exclusive categories and many techniques fall within more than one. The methods are only briefly described and researchers should therefore consult more detailed explanations of their concepts and procedures before using them.

SUGGESTIONS FOR FURTHER READING

Two of the books recommended on page 17 have sections devoted to methods: Proshansky, Ittelson and Rivlin (1970) and Ittelson *et al.* (1974), which provides a more introductory overview. There are also numerous books available on research methods in the social sciences in general and in environmental behaviour in particular. These include Festinger and Katz (1953), Michelson (1975), Moore (1970), Moore and Golledge (1976), Preiser (1973), Selltiz *et al.* (1959) and Schatzman and Anselm (1973). Chapters in these books dealing with particular methods will be suggested in succeeding sections of this Technical Note. As the above books are largely concerned with quantitative methods, Filstead (1970) on qualitative approaches and Webb *et al.* (1966) on unobtrusive measures are also recommended. An applied, problem-solving approach is emphasized in Ackoff, Gupta and Minas (1962) and Feyerabend writes "against method" in Radney and Winokur (1970).

III. OBSERVATION

DIRECT OBSERVATION

Observing human behaviour in the environment is the basic method for all other approaches to environmental perception. It provides the context in which methods are developed and tested, and it is the most flexible in terms of time, cost, concepts and technique. High standards of observation are not easily ac-

quired - they require pretesting, trained observers, long periods of time, systematic application and objective interpretation.

Observations in environmental perception can be structured according to three dimensions (Fig. 5):
- the extent to which they are focussed directly on environment or on human behaviour in relation to it;

- the degree to which they are structured
  or unstructured;
- whether the emphasis is on just recording
  what is there or on rating (evaluating) it.

Structured observations

Structured observations are designed to mea-
sure the occurrence or interaction of speci-
fied sets of variables that are isolated as
far as possible by the researcher in his
choice of observation points in space and
time, and in his definition of categories in-
to which the observations are placed. Without
detailed knowledge of the research aims and
field situation, sampling and coding frames
cannot be prescribed. This is why unstructured
observation must come first, in the form of
a pretesting or design stage. During the pre-
testing, hypotheses can be generated and sel-
ected, the observations can be designed in
terms of which points, how many, and how of-
ten, and coding sheets can be drawn up and
tested for recording the observations. The
experimental design will dictate the neces-
sary level of reliability of observed data.

Unstructured observations

Unstructured observations are more dependent
on the qualities of the particular researcher
since there are fewer guides for him to fol-
low and a larger area open to his own initia-
tive and biases. The advantage of a less
structured approach is that it better pre-
serves the holistic nature of what is being
observed - the stream of human behaviour and
its complex interaction with the environment.
The disadvantage is that it is usually a less
rigorous approach in which the effect of dis-
crete variables is hidden in a matrix of the
"whole system".

Thus the two approaches achieve different
types of analysis: the structured one tends
to emphasize the interaction of individual
factors and the unstructured one stresses sys-
tem interrelationships. These distinctions
are as important as the more commonly recog-
nized one that unstructured methods are more
open to subjective interpretation through the
observer's own perceptions and preconceptions.

Expert or similarity judgement

One way to reduce the subjectivity of an in-
dividual's observations is to increase the
number of observers at any point and compare
their results. This gives an idea of the range
of values (error or standard deviation) and
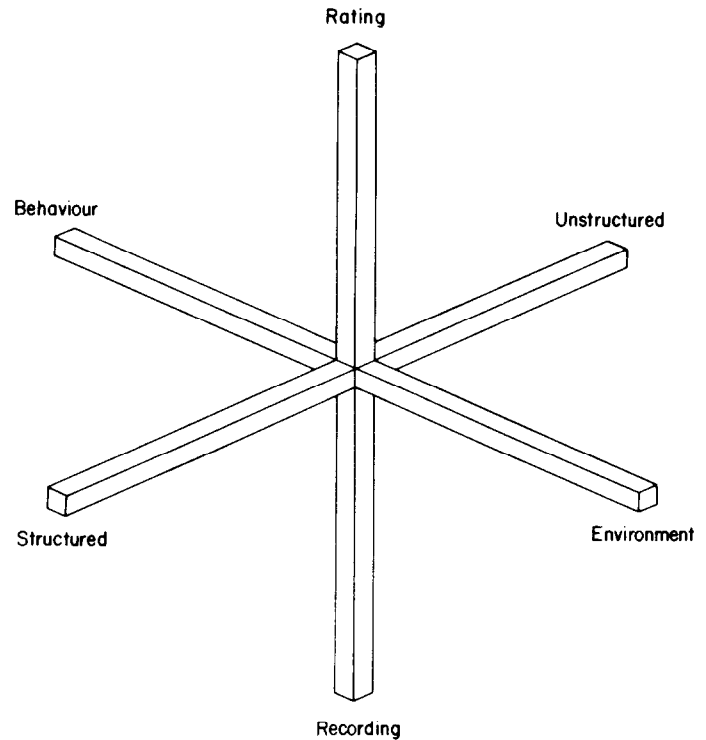
Figure 5. *Three axes of observation methods in
environmental perception*

a better approximation to the average or
"true" value. It is a particularly useful
technique in the pretesting stage of struc-
tured observations, and where ratings (eval-
uations) are required. The use of several
judges is widely practised in environmental
perception studies because one is often deal-
ing directly with "subjective" values and cer-
tain types of obvious biases can be reduced
simply by asking more than one person to judge
the same data. The selection of individual ob-
servers can be based on their roles as "ex-
perts" in a relevant area of knowledge or ex-
perience or can simply be in the interests
of increasing the number of judges to obtain
an acceptable "mean observed value". Thus
the observers themselves become calibrated
as measuring instruments.

Example

Teams including teachers, engineers, psy-
chologists and architects visited twenty pri-

mary schools in England and rated several dimensions of the school environment such as thermal, visual, and noise levels (Sommer 1972).

For example, the following thermal properties were rated and/or measured:

1. Thermal comfort of the interior

air temperature	measured values
radiation	measured values
air freshness/stuffiness	expert ratings
air movement	measured values
humidity	measured values
variability in conditions	expert ratings

2. Thermal environment design

thermal properties of building	expert ratings
solar penetration	expert ratings
thermal insulation	expert ratings
surface treatment outside/ inside	expert ratings

Assumption. It is assumed that consensus of same expert's judgements provides consistent measures of properties between buildings.

Evaluation. In this example, no effort was made to obtain ratings from the teachers and pupils in the building. This would have added significantly to the value of the survey and helped to validate the results.

Study units in direct observation

The study unit for observation will involve sampling in space and time. Observation points are usually fewer in number than, for example, the number of interviews in a questionnaire survey, because the observation of human behaviour takes longer than the average questionnaire, and environmental observation usually involves greater distance between data points than interviews. Rarely will it be possible to include all observation points (e.g. market places, landscape views, fields) in a given study programme, so that sampling is necessary. However, in observation of behaviour in particular, sampling strategy is often best designed with an eye to common sense as much as to statistical procedures. Random numbers may never place the water quality observer at the single oasis in a desert valley.

Time samples also need to be selected in the context of study and not on *a priori* grounds. Landscape evaluation observation will take as long as the observation and rating task requires - perhaps up to one hour at a point. Observation of human behaviour will take longer as the flow of events or

acts is less frequent. For example, social interaction in a market place will be more frequent on market day than other days in the week, during the day rather than at night, in fine weather rather than in bad. The market place will have a more rapid series of interaction events to observe than an empty residential street. The context of the investigation and the daily, weekly, seasonal pattern of activity associated with it are the main criteria for time sampling - together with the general one that the longer the time period, the better. Common time units range from 1/2 day (6 hours) once a day for a week up to 12-24 hours once a week for several months.

The unit for observation can be a place or a group of people (or individual); or the observer himself can cover a transect and even make his observations from a closed traverse. In studying water or plant use, for example, the researcher can either station himself at the collection point or consumption point or preferably both in succession. It would be useful also to have a complementary observation unit of the water or plant collectors - that is, the observer should follow a person or group and record exactly what is done throughout the day. This procedure has been followed for nomadic groups where the need to move with the resource managers is more obvious. It is also the best way to study the use of wild plants in diet since many of these are consumed en route and not brought back to the home. There are many other situations where a similar sampling strategy is advantageous.

Evaluation

Direct observation as a formal technique is less used in environmental perception than other, more verbally oriented methods. This is probably because it takes longer to carry out in the field than the average interview. Its design and pretesting requirements and needs for well trained observers are similar to interview studies, but many studies seem to lack the benefit of just a few days' observation with which to compare their responses to hundreds of interviews.

One bias of direct observation of behaviour as a method is to emphasize "events" rather than "non-events" because discrete acts are easier to count, and nothing happening is seen as a continuous event until relieved by another "event" when something happens. Thus despite what was said earlier about selecting observation points where there is most activity, the record of "nothing happening" can also be valuable data.

Sometimes it is difficult or impossible to do direct observation of behaviour. Response to earthquakes or floods, for example, is difficult to observe at the time because it requires the researcher to know in advance where the event will occur, or to be able to travel quickly to the site. Such obstacles are not easily overcome, hence the necessity to recreate behavioural responses by asking questions or listening to respondents' narratives, after the fact. Similarly, behaviour that occurs very rarely in the life of an individual (such as during a serious accident) or gradually over a long period (learning, some industrial diseases) are less amenable to a direct observation approach.

SPECIALIZED TECHNIQUES IN DIRECT OBSERVATION

Landscape evaluation

> The sensory experiences [of landscape] are derived not from visual satisfaction alone but from an amalgam of all five senses. The sounds of birds, running water, rustling trees, church bells, bustling city streets; the smells of earth, vegetation, newly tarred roads; these can be powerfully evocative of the 'genius loci' of country or town (Fines 1968).

Despite the great difficulties in trying "objectively" to evaluate the subjective experience of landscape perception, it is increasingly necessary to do so. Landscape is a resource which has an economic value and usefulness. Planners at all levels of government are asked to identify priority landscapes and areas as part of local and regiona land use planning.

Much of the work done in measuring landscape quality has been problem-oriented and designed to meet specific land use planning needs. Similarly, a visual analysis of landscape quality is often undertaken as one part of a larger socio-economic and ecological evaluation of an area. The recent trend in several countries towards requiring environmental impact assessments to be made for new man-made projects and processes has encouraged efforts to provide scales by which landscape quality can be measured. Thus the plan to build a hydro-electric dam in Hell's Canyon in the United States led to Leopold's work in devising a "uniqueness" scale for landscape quality (Leopold 1970).

Assumptions

All of the methods used for landscape evaluation involve three main assumptions:
- Visual landscape elements in some way in-

fluence how people respond to an area.
- The significant visual elements can be isolated and scaled either in the field or from photographs.
- The relationship between selected landscape elements and their perceived value is sufficiently culturally influenced for an observer's perceptions to be shared to some degree by a relevant larger group ("residents", "users", or "general public").

The first assumption is concerned with the validity of the measure, and the last with its reliability. In other words, would people other than the researcher select the same features of the landscape as being diagnostic for determining landscape "value" and would other people make the same evaluations of particular landscape scenes even if they agreed on the salient diagnostic features?

Whether or not these assumptions are reasonable can be determined by comparing two methods of landscape evaluation, both of which use direct observation of the environment. The first is a technique developed by Leopold (1970) to compare the aesthetic appeal of different river valleys in the United States to aid the environmentalist to quantify his judgements. The second is a method to develop a map of landscape quality to use as a regional planning tool in southeastern England (Fines 1968).

Example 1: Leopold's (1970) method of landscape evaluation

Method. Forty-six factors were selected which were considered relevant to landscape aesthetics (Table 1). These were grouped into physical factors (e.g. river width, velocity, valley height); biological and water quality factors (e.g. water turbidity, pollution, land flora); and human use and interest factors (e.g. accessibility, vistas, urbanization).

Each of these factors was provided with a 1 to 5 evaluation score for which verbal descriptions or numerical values or categories were given by the author (see Table 1).

Sites to be evaluated were observed from one point at the edge of the river. The observer completed the checklist of forty-six items without regard to whether he considered evaluation number 5 as superior or inferior to evaluation number 1.

Once the set of selected sites was directly observed (in the original study this consisted of twelve river valley sites in Idaho), the relative uniqueness of each landscape factor at each site was computed by dividing each evaluation category by the number of sites that fell into it and assigning the same score ("uniqueness ratio") to each

FACTOR NUMBER	DESCRIPTIVE CATEGORIES	EVALUATION NUMBERS				
		1	2	3	4	5
	PHYSICAL FACTORS					
1	River width (ft.) (at low flow)	<3	3-10	10-30	30-100	>100
2	Depth (ft.)	<.5	.5-1	1-2	2-5	>5
3	Velocity (ft. per sec.)	<.5	.5-1	1-2	3-5	>5
4	Stream depth (ft.)	<1	1-2	2-4	4-8	>8
5	Flow variability	Little variation		Normal	Ephemeral or large variation	
6	River pattern	Torrent	Pool & riffle	Without riffles	Meander	Braided
7	Valley height/width	≦1	2-5	5-10	11-14	≧15
8	Stream bed material	Clay or silt	Sand	Sand & gravel	Gravel	Cobbles or larger
9	Bed slope (ft./ft.)	<.0005	.0005-.001	.001-.005	.005-.01	>.01
10	Drainage area (sq. mi.)	<1	1-10	10-100	100-1000	>1000
11	Stream order	≦2	3	4	5	≧6
12	Erosion of banks	Stable		Slumping		Eroding large-scale deposition
13	Sediment deposition in bed	Stable				
14	Width of valley flat (ft.)	<100	100-300	300-500	500-1000	>1000
	BIOLOGIC & WATER QUALITY FACTORS					
15	Water color	Clear colorless		Green tints		Brown
16	Turbidity (parts per million)	<25	25-150	150-1000	1000-5000	>5000
17	Floating material	None	Vegetation	Foamy	Oily	Variety
18	Water condition (general)	Poor		Good		Excellent
	Algae					
19	Amount	Absent				Infested
20	Type	Green	Blue-green	Diatom	Floating green	None
	Larger plants					
21	Amount	Absent				Infested
22	Kind	None	Unknown rooted	Elodea. duck weed	Water lily	Cattail
23	River fauna	None				Large variety
24	Pollution evidence	None				Evident
	Land flora					
25	Valley	Open	Open w. grass, trees	Brushy	Wooded	Trees and brush
26	Hillside	Open	Open w. grass, trees	Brushy	Wooded	Trees and brush
27	Diversity	Small				Great
28	Condition	Good				Overused
	HUMAN USE & INTEREST FACTORS					
	Trash & litter					
29	Metal (no. per 100 ft. of river)	<2	2-5	5-10	10-50	>50
30	Paper	<2	2-5	5-10	10-50	>50
31	Other	<2	2-5	5-10	10-50	>50
32	Material removable	Easily removed				Difficult removal
33	Artificial controls (dams, etc.)	Free and natural				Controlled
	Accessibility					
34	Individual	Wilderness				Urban or paved access
35	Mass use	Wilderness				Urban or paved access
36	Local scene	Diverse views and scenes				Closed or without diversity
37	Vistas	Vistas of far places				Closed or no vistas
38	View confinement	Open or no obstructions				Closed by hills. cliffs or trees
39	Land use	Wilderness	Grazed	Lumbering	Forest, mixed recreation	Urbanized
40	Utilities	Scene unobstructed by power lines				Scene obstructed by utilities
41	Degree of change	Original				Materially altered
42	Recovery potential	Natural recovery				Natural recovery unlikely
43	Urbanization	No buildings				Many buildings
44	Special views	None				Unusual interest
45	Historic features	None				Many
46	Misfits	None				Many

KEY: < less than, > greater than, ≦ less than or equal to, / divided by

Table 1. *Scales for evaluation of landscape factors (reprinted with permission from Leopold 1970)*

site for that factor. For example, if two sites were classified as category 5 for accessibility (paved access), then each site would have been assigned a uniqueness ratio for accessibility of 0.50 (1 divided by 2 sites). The uniqueness value was thus independent of the scales set up for each factor (in this example, paved access to wilderness).

When uniqueness ratios were obtained for each of the forty-six factors, the ratios for each site were added up to give a "total uniqueness ratio" for that site. Using these totals, the uniqueness of one site could be compared with that of another; the higher the ratio, the more unique the site. This total ratio was objective in that it did not distinguish between aesthetically attractive or unattractive uniqueness.

Any combination of the forty-six factors could be selected to perform additional operations and obtain indices of, for example, river character, degree of pollution or biological importance.

Using two such indices of "valley character" and "river character", Leopold sought to validate his case for Hell's Canyon's (Idaho, United States) scenic qualities by comparing its score with those similarly obtained for four recognized spectacular natural beauty spots in the United States: Grand Canyon, Yellowstone, Snake River in Grand Teton National Park and Yosemite National Park.

Assumption. Leopold's main assumption is that unique landscape is of more significance to society than landscape that is common. Beyond this explicit rationale, there are several other assumptions that are implicit in the method:
- The forty-six landscape factors selected are appropriate for measuring landscape significance to society.
- Of the forty-six landscape factors selected, twenty-three can be concerned with river characteristics.
- Social features of landscape (historic features, urbanization, appropriateness of buildings) can be scaled from 1 to 5 in the same manner (and by the same observer?) as river depth, width and velocity.
- A site can be evaluated from one observation point.
- "Uniqueness" can be additive to enable comparison of sites.
- The method is quantitative and scientifically objective.

The setting out of the assumptions implicit in Leopold's method indicates some of the main problems in using it. In its present form, it is culture-bound and researcher-structured. If used in other studies and in other countries, the significant landscape features would need to be chosen within the local cultural context. The selection should also reflect a consensus of a representative example of people, using similarity judgement techniques (page 22).

The main assumption of the method – that uniqueness is critical to landscape value – is probably less true for longer settled countries where typicality (e.g. the typical Normandy countryside in France) is valued in its own right. Similarly, the emphasis on natural river features of the landscape is obviously less valid in other environments. With appropriate selection of landscape features and recognition of the cultural and spatial limits to their validity, Leopold's method can form the basis of a useful and systematic approach to landscape evaluation.

Example 2: Fines' (1968) method of landscape evaluation
Method: development of scale. A representative group of forty-five "judges" was selected to independently rank and evaluate in terms of beauty, twenty selected colour photographs of landscape and townscape views, all of which were taken under average atmospheric conditions. One photograph was selected as a "control view" with a value of 1.0 and numerical values were assigned by each judge for each view in relation to the control view. The design experts within the forty-five judges provided a scale of values from 0 to 32 which were then arranged in six categories: unsightly, undistinguished, pleasant, distinguished, superb and spectacular (Fig. 6).

Field work. This technique was used to develop a map of landscape value for use in regional planning of East Sussex, England. It required one surveyor and one driver for 90 working days in the field for an area of 773 square miles (c. 2000 km^2), which is a rate of progress of 8.5 square miles per day (c. 22 km^2/day). This was followed by 25 man/days of office work in drawing the map (equivalent to about 30 square miles, or 80 km^2, per man/day).

The surveyor needed to be trained in landscape and map interpretation. He was expected to choose an area of suitable size for each day's work and design an economical route around it. He then selected his own observation points. In the East Sussex survey, about two viewpoints per km^2 were used. Some idea of the field task involved will be gained from these extracts from the field manual:

Figure 6. *Scale for landscape beauty evaluation (reprinted with permission from Fines 1968)*

- "At each viewpoint the value of views in all directions (where significant) will be recorded."
- "Views over a particular tract of land should be obtained from several different directions."
- "Establish for a particular tract of land the highest and lowest values."
- "View – a sector of the landscape enclosed within an angle of 60°."
- "Tract – a small indivisible area of land, homogeneous in character, normally bounded by natural features, e.g. a ridge and watercourse" (Fines 1968).

Field observations (the numbered values for each view) were recorded directly onto maps. Later, in the office, these observed, view values were converted into values for areas or tracts, paying particular attention to uniqueness of a view and to special sequences of views. The evaluation of "absolute beauty" was made irrespective of the relative accessibility of the area (i.e., even where no one could see it).

Assumption. The assumption in this method is that landscape beauty is a culturally shared value, which can be reliably scaled independent of the observer and that, in England, relative relief (and associated land use) is a prime determinant of landscape beauty.

Evaluation. This approach to landscape appraisal is replicable in other environments where "views" are relevant although the criteria for the categories are clearly culturally biased and researcher-structured. New sets of categories would need to be selected and validated for extending the study outside of England. The method is laborious and requires an "expert" observer in its present format but could be modified to use several less experienced observers. Accessibility may not be considered an important criteria of beauty in the landscape but it is important in evaluating it for mapping as opposed to "site" evaluations. The field time would be much increased where roads are poor and the observation points would be more widely spaced. Where topographic and land use maps are available (scales of 1:63,360 or less), a map interpretation technique produces comparable results to direct observation (Linton 1968). In the absence of detailed maps or air photos, direct observation can be a systematic though culture-dependent method for landscape evaluation. Fines' technique, modified for local circumstances, could, for example, be used for this purpose.

Comparison of Leopold's and Fines' methods
Comparison of these two direct observation methods reveals that the major weakness of landscape evaluation is its subjective appraisal of landscape on behalf of other people, and its highly local validity to specific cultures and environments for any one scale or system of nomenclature. There is so far no universally accepted system of landscape values or of the most significant landscape features. The criteria for selection of view values (in Fines' method) and landscape features (in Leopold's method) are arbitrary. Neither method deals explicitly with the issue of changing landscape value over time or with more complex values such as "ambiguity" and "complexity" which have emerged in studies of urban perception as valued attributes (see pages 66-69).

Other methods have been developed specifically for forest landscapes (Litton 1968) urban landscapes (Steinitz 1968), and the absorptive capacity of landscapes to change (Jacobs and Way 1969). Some of these use direct observation of the environment, while others use photographs or slides as surrogates. Some focus on landscape as an aggregate or "view", while others evaluate particular landscape elements.

Behavioural mapping

Behavioural mapping is a technique used to record what human activities take place where. The maps provide a graphic, shorthand description of different types of behaviour for a defined spatial unit, which can be a building, a street or a larger area such as a national park. The scale of the study unit helps to define the number of observation points and time samples. In large areas such as national parks, the observed behaviour may be of car and pedestrian movements, such as stops to admire views or animals, or to take walks and picnics. In these cases, several observers stationed at points or going along transects through the area can be used as the sampling basis. In smaller areas such as buildings and children's playgrounds, all the relevant space may be observable from one point and time samples may be every 15 minutes to 1 hour over an entire day.

Method
The standard procedure for behavioural mapping is to:
- identify the categories into which the continuous stream of behaviour is to be

grouped by first observing the areas to be
mapped and recording observations as a nar-
rative; use similarity judgement to check
reliability of categories (see page 22);
- define the area to be mapped;
- prepare observer instructions and coding
  sheets, and a sampling schedule;
- carry out field observations, recording
  them onto data sheets or maps;
- analyse data;
- make experimental change in environment
  and repeat survey of behaviour (optional).
The total frequency of all types of activi-
ties in any one place defines its behavioural
density and the relative frequency of each
type of behaviour defines its activity pro-
file.

Assumption

The underlying assumption is that the spa-
tial distribution and frequency of different
behaviours of individuals and groups are re-
lated to the environment in which they take
place.

Evaluation

Behavioural mapping is a simple and re-
liable technique for observing how people re-
act to specific environments. It is most rig-
orous where the area to be mapped is small
(e.g. within buildings), and where the "be-
haviours" are of a restricted range. It is
particularly useful in longitudinal or ex-
perimental study designs where an environ-
mental variable can be modified after the
first maps are made and its effect on behav-
iour measured by a second observational sur-
vey (as in the example below). Two decisions
which must be made at the outset, and which
affect the interpretation of the results, are
the way the behaviours are categorized and
whether the observed behaviours are those of
individuals, in which case the observed en-
vironment must include both other people and
physical components, or of groups. Observa-
tions of group behaviour may still emphasize
interaction with other groups (e.g. people
on beaches) or the groups may be relatively
isolated from one another (e.g. in a wilder-
ness area).

The technique requires that the observer
does not intrude on the behaviour of the ob-
served any more than necessary. He should
try to fade into the background and obviously,
the longer he continues to observe, the less
intrusive he will be. Cross-checks of ob-
server intrusion are useful, such as asking
some people afterwards whether they saw any
significant differences in behaviour when the

observer was or was not present.

In conclusion, it has been demonstrated
that the technique is highly reliable as a
scientific method. Its validity is more dif-
ficult to ascertain, but despite its heavy
dependence on the initial categories set up
to group many different behaviours, it is al-
so expected to be reasonably valid. Its con-
straints are the practical ones of the area
that can be covered by direct observation
and its limitation to easily visible and
spatial behaviour.

Example

An example of the application of behav-
ioural mapping is provided by Ittelson, Riv-
lin and Proshansky (1970). The study unit was
two psychiatric wards of a large, private gen-
eral hospital each having about twenty-two
patients staying up to about 3 months each.
Observers first recorded all patient behav-
iour over periods of a few hours and listed
300 descriptions of behaviour. Trained judges
reduced this list to six categories: isolated-
passive, isolated-active, social, mixed-ac-
tive, visit, and traffic-behaviour (Table 2).
Observers were trained in the method and be-
came familiar with the hospital routine and
ward personnel before making observations.
These were recorded on data sheets and key
punched later. Observations were made every
15 minutes during most of the working day.
Where it was checked, agreement between ob-
servers was high - 84 per cent of behaviours
were reported identically by two independent
observers. Other checks on reliability were
equally high.

An initial survey showed a high proportion
of isolated behaviour in the one room of the
ward and alterations to this area, followed
by a resurvey, showed a complex pattern of
behavioural adjustments throughout the var-
ious parts of the ward. The study thus demon-
strated that overt behaviour and environment
are functionally related, and that this re-
lationship can be measured by behavioural map-
ping. The researchers also stress that be-
havioural mapping can be used to describe the
relationship between physical space and be-
haviour and to compare two or more different
situations or conditions.

Behaviour-setting survey

Assumptions

A survey of behaviour-settings is the me-
thod developed over a 25-year period by
Roger Barker. This method is an outcome
of his "real world" approach to the study

Behavior	Observational Categories	Analytic Category
Patient reclines on bench, hand over face, but not asleep Patient lies in bed awake	lie awake	Isolated Passive
Patient sleeps on easy chair One patient sleeps while others are lined up for lunch	sleeping	
Patient sits, smiling to self Patient sits, smoking and spitting	sitting alone	
Patient writes letter on bench Patient takes notes from a book	write	
Patient sets own hair Patient sits, waiting to get into shower	personal hygiene	Isolated Active
Patient reads newspaper and paces Patient reads a book	read	
Patient and nurse's aid stand next to alcove Patient stands in doorway smoking	stand	
Patient paces between room and corridor Patient paces from room to room saying hello to other patients	pacing	
Upon receiving lunch some patients take it to bedroom Patient sits at table and eats by self	eating	Mixed Active
Patient cleans tables with sponge Patient makes bed	housekeeping	
Two patients listen to record player Patient turns down volume on radio	phonograph-radio	
Patient knits, sitting down Patient paints (oils), sitting down	arts and crafts	
Patient and registered nurses watch TV together Patient watches TV, goes to get towel, returns	TV	
Patient stands and watches a card game Patient sits on cans in hall watching people go by	watching an activity	
Patients play soccer in corridor Patient and doctor play chess	games	Social
One patient talks to another in reassuring tones Four patients sit facing corridor, talk sporadically Patient fails to respond to doctor's questions	talk	
Patient introduces visitors to other patient Patient stands near room with visitors	talk (visitor)	Visit
Patient comes in to flick cigarette ashes Patients go to solarium	traffic	Traffic

Table 2. *Classifying behaviour into categories (reprinted with permission from Ittelson, Rivlin and Proshansky 1970).*

of behaviour and environment (Barker 1968).
His model of environmental perception is fo-
cussed on "behaviour-settings" which are eco-
logical units in which people exhibit char-
acteristic patterns of behaviour. The units
have definite bounded locations in space and
time. For example, a church service and a
school playtime are behaviour-settings where-
as the educational system and teenagers are
not. Most of human behaviour occurs in well
defined socio-physical settings such as a
shop, meeting hall or recreation park.

Barker's thesis is that behaviour within
the same behaviour-setting is more similar
than the behaviour of any individual as he
moves between different behaviour-settings.
This is true for both individuals and people
in the aggregate. Thus we will behave dif-
ferently in a church, in a shop, and on a
sports ground although we remain the same peo-
ple. In overt behavioural terms, the behav-
iour-settings are more consistent than peo-
ple, thus forming characteristic ecological
units. A survey of behaviour-settings is thus
a method for obtaining an inventory and des-
cription of the behaviour-settings of larger
ecological units, such as a town or an in-
stitution (e.g. school, hospital). It is one
way to discover the rules of the game - the
arrangement of appropriate behaviour for dif-
ferent places and different times, which peo-
ple read from environmental cues every day.

Method

The steps Barker proposes for a complete
behaviour-setting survey of a town are:
 - identify all possible behaviour-settings
   using direction observations, content analy-
   sis of local newspapers, public notices,
   etc.;
 - eliminate "non-behaviour-settings" that
   do not fulfil specified criteria (see Bar-
   ker 1968, p. 37-46);
 - conduct a direct observation survey
   of each behaviour-setting (usually by 30
   minute periods), recording observations
   in terms of behaviour episodes and rating
   them into eleven action patterns and four
   behaviour types, as well as describing the
   characteristics of the setting (see Table
   3 for summary of observation ratings and
   scores);
 - classify behaviour-settings into groups
   (genotypes); behaviour-settings are in
   the same genotype if they can continue
   functioning normally when their key per-
   sonnel are interchanged (e.g. lawyer in
   a legal office, teacher in school, man-
   ager in a factory);
 - interpret data in terms of implications

for the design of built environment in
comparisons between towns, countries, cul-
tures, etc.

Example

Barker's survey of Midwest, Kansas (Barker
and Wright 1955; Barker and Gump 1964; Bar-
ker 1968), a small town of 830 inhabitants in
the United States, has been a major effort of
the Midwest Psychological Foundation for over
25 years. The study - with its comparisons in
Yoredale (Yorkshire, England) and Svelvik,
Norway - stands as the prototype behaviour-
setting survey. Trained observers were used
in direct observation studies which sometimes
followed one person for a whole day and which
together total several man years of field ob-
servation.

The results of this study have been de-
tailed in several reports, showing the dif-
ferent levels of usefulness of the results of
this kind of survey.

For the town of Midwest, the 830 inhabi-
tants spent 1,125,134 hours in the town's 884
behaviour-settings during the survey year.
The time spent within any one setting ranged
from 1 hour (Saddle Club Organizing Meeting)
to 87,376 (Trafficways).

In terms of local autonomy, over 70 per
cent of the inhabitants' time was spent in
behaviour-settings controlled within the
town and the surrounding district compared
to less than 5 per cent controlled at state
and federal levels - an interesting index of
the high degree of local control over their
life-spaces.

The 884 behaviour-settings of Midwest could
be grouped into 198 categories, or "genotypes"
in Barker's terminology. In a comparison with
Yoredale, in England, nearly half of these
genotypes were shared between the two differ-
ent national and cultural settings.

In comparing behaviour-settings within
schools, critical distinctions in behaviour
were found between large and small schools
(Barker and Gump 1964). Children in small
schools were more actively involved and more
closely regulated; they saw themselves as
functionally more important to the school
and sharing more responsibility. They
identified more closely with the school.

Evaluation

A behaviour-setting survey on the scale
of the Midwest survey is a time-consuming
and expensive operation involving trained ob-
servers, the analysis of many data and a com-
mitment of at least a year's field work for
one small community. The work done is impor-
tant as a rare in-depth study of environmen-

B E H A V I O U R - S E T T I N G								
A C T I V I T Y	RATING SCALES						BOUNDARIES	SCORE
ACTION PATTERNS	frequency	output	evaluation	learning	TOTAL			
aesthetic business education government nutrition personal appearance physical health professionalism recreation religion							frequency duration occupancy time penetration (roles)	OT P
TOTAL					a			
BEHAVIOUR	frequency	tempo	intensity		TOTAL		ORGANIZATION	
affective gross motor activity manipulation talking thinking							pressure welfare (purpose autonomy	
TOTAL					b			

$$\text{Richness of Behaviour-Setting Index} = \frac{(a + b + p)}{100} \text{ constant K OT}$$

Table 3. *Barker's system for describing behaviour-settings*

tal perception in a natural setting, but it
is unlikely to be replicated on a similar
scale. At the level of a whole community, it
is questionable whether the investment in
field effort is worth the output in terms of
results which can be useful for policy-
making. In Midwest, more behaviour-settings
were found than the total number of inhabi-
tants. The logistics of doing such a survey
soon grow to unmanageable proportions if lar-
ger communities are studied.

Many interesting data were generated which
suggest possibilities for better describing
a town as an ecological unit, but the most
practical results were gained at the level of
comparing buildings and their functions. The
work on schools has direct value in design-
ing their physical layout and their social
organization. The comparison made in the be-
haviour of old people in Yorkshire, England,
and Kansas (Barker 1961) can be used in help-
ing to provide better community facilities
for old people.

It is possible to take Barker's methodo-
logical approach and study particular behav-
iour-settings to answer specific research
questions. His scheme for categorizing behav-
iour may not, however, be universally appli-
cable. There also remains the problem that
the classifying and rating of behaviour re-
lies on the judgement of the observer. Where
tests for inter-observer reliability were
made, they were found to be acceptable (Bar-
ker and Wright 1955).

The behaviour-setting survey is based lar-
gely on direct observation with some inter-
viewing. A future direction might well be to
increase the complementary role of interview-
ing after observations have been made. The
data would be richer and less time consuming
to collect.

INDIRECT OBSERVATION

Direct observation sees behaviour as it hap-
pens; indirect observation uses the effects
of human action on the biosphere as a mea-
sure of behaviour. It is an integrated mea-
sure which includes environmental perception
with behaviour.

For example, the movement of people in the
countryside can be measured by direct obser-
vation or by interviewing a sample of respon-
dents. It can also be measured by the differ-
ential width and wear of tracks and paths. In
an area where people's movements are entirely
recreational, such as a national park, their
behaviour might be directly related to their
perception of the landscape and preference
for different recreational activities.

Webb *et al.* (1966) provide many examples
of indirect observation, or unobtrusive mea-
sures. In addition to measurements made by
hidden instruments (instead of human obser-
vers), they suggest three main sources for
indirect measures:
- erosion measures, trace indicators such
  as wear on paths to measure traffic;
- accretion measures, accumulating indica-
  tors such as dust on library books to mea-
  sure readership;
- archival records, official, institutional
  and sales records as data sources.

The use of archival records is similar to
"listening and coding" methods. In Durkheim's
(1951) study of suicide, analysis is made of
suicide rates from archival records for sev-
eral centuries in terms of season of the year,
time of day, education, sex, etc. McClelland
(1961) also makes use of a wide variety of
archival material including folk-tales and
children's stories in his analysis of "The
Achieving Society". City directories can be
used to study rates of residential mobility
for different ethnic groups as they become
acculturated into the urban society (Ianni
1957-58). Social mobility and family organi-
zation have been studied using information
inscribed on gravestones (Warner 1959).

The possible sources of indirect informa-
tion are endless and can provide important
supporting evidence to that gained by other
methods. The methodological advantages of
these sources lie in the non-interference with
human behaviour as it happens, also possible
to some extent with other methods. The major
weakness of such sources are that they inte-
grete many variables and are thus less useful
for analysing the process of environmental
perception leading to human actions.

Example: Dongore well water use

At Dongore, in rural Ethiopia, good water is
supplied by a government well which serves
about 3000 people who walk an average dis-
tance of 2.5 km to fetch water. A study was
made of water use at the well (Browne 1974).
Direct observation on several days was used
in combination with interviews with people
who came to the well, and the use of water-
sale records to integrate the other time sam-
ple data over a year.

Figure 7 shows the water collected from
the well over a year, as indicated by the in-
direct measure of monthly revenue. It was re-
vealed that water was bought from the well
by most users only in the dry season. During
the wet season, they used other poorer quality
sources. The implications for health benefits
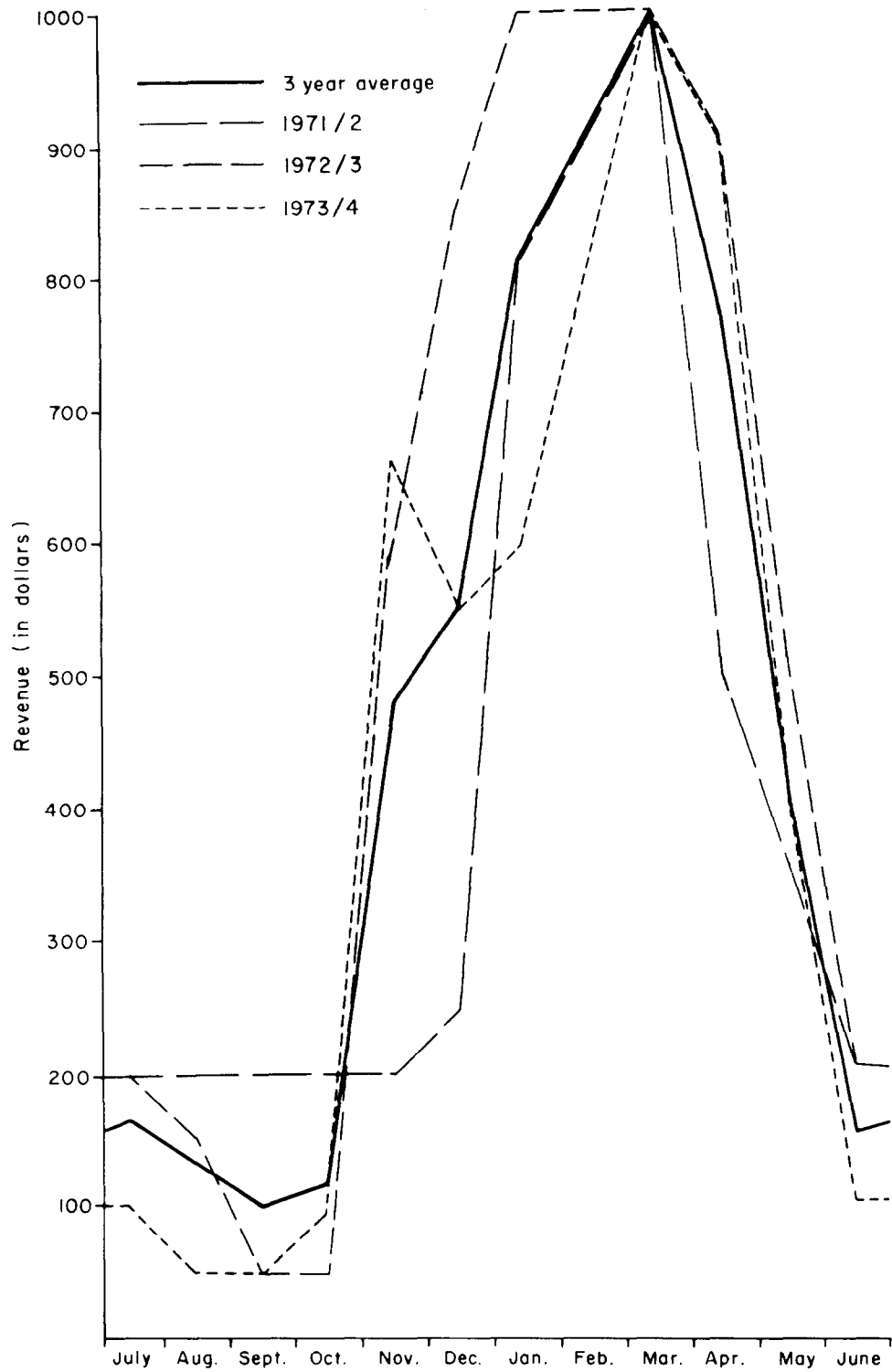
Figure 7. *The use of indirect observation: monthly revenue from water at Dongore well, Ethiopia (reprinted with permission from Browne 1974)*

of installing the deep well are obvious - for part of the year, the installation had no beneficial effect.

Supplementing this information by direct observation and interviews at the well for a few sample days, the researchers were able to relate the water use to poor management of the well which exacerbated a situation in which water quality was not perceived as a high order priority for most households. Thus, in addition to the cost of good water, people were discouraged by long queueing times of 3-6 hours at the well which led to black market prices of eight times the official water rate.

Evaluation

This study is a good example of a small-scale, well designed investigation using three complementary methods, including indirect observation, to provide a practical set of recommendations. It demonstrates how an indirect measure can be used to extrapolate direct observation and interview data over a longer period and for the total population concerned. It also demonstrates the force of the argument that three methods are better than one.

PARTICIPANT OBSERVATION

Participant observation is a widely used and highly adaptable method for field investigation of environmental perception, whose theory and method are relatively little discussed. It is a method more often practised than "talked-about".[1] In participant observation, direct observation, asking questions and listening are blended together as the researcher takes part in the life and actions of the people he is studying. The researcher thus plays two roles - observer and participant. His field work consists of joining in the lives of his respondents, talking to some of them (especially his "informants") and assembling detailed notes as soon as possible after the events take place.

Assumption

As an approach, participant observation implies less concern with methodological refinements for handling data after they are collected, and more concern with the needs for valid data (Vidich 1954-55). Its rationale is that the researcher who participates

1. Some important exceptions are Kluckhohn (1940), Lewis (1951) and Whyte (1951).

will have access to more data and will be able to interpret those data more meaningfully in relation to the respondents' perceptions.

Until recently, participant observation was largely an anthropological method which evolved as a necessary means to understand foreign cultures and unknown languages. In using participant observation to study the perceptions and functioning of the researcher's own society, new possibilities and problems emerge.

Observer-observed interaction

Participation involves relationships with other people. For the direct observer and the interviewer with his structured questionnaire, relationships with respondents can be kept relatively distant and short-lived. The participant observer may have to maintain credibility and sociability with others for weeks, months or even years, when he may be living relatively isolated from his own social structure.

The participant observer occupies a position in the network of relationships he is studying. His role as observer may be more or less disguised, as he may be more or less active in the affairs taking place or more or less marginal to the society, aloof to its concerns and transitory to its development.

But wherever the observer may place himself on any of these dimensions is less important than how the respondents perceive him. Their images of the observer are critical to how they respond to him and what data he will be able to collect. Once the observer is accorded a meaningful role by respondents, his position in the social network is assured and data collection are facilitated.

The collection and interpretation of data are conditioned by the observer's own perceptions and experience. The contrast discussed by Oscar Lewis between his study and one done by Robert Redfield of the same community of Tepoztlán in Mexico, illustrates the importance of different observers' perceptions over and above any "objective" changes that took place in the village between the two studies:

The impression given by Redfield's study of Tepoztlán is that of a relatively homogeneous, isolated, smoothly functioning and well-integrated society made up of a contented and well-adjusted people. His picture of the village has a Rousseauan quality which glosses lightly

over evidence of violence, disruption, cruelty, disease, suffering and maladjustment. We are told little of poverty, economic problems, or political schisms. Throughout his study we find an emphasis upon the cooperative and unifying factors in Tepoztecan society. Our findings, on the other hand, would emphasize the underlying individualism of Tepoztecan institutions and character, the lack of cooperation, the tensions between villages within the municipio, the schisms within the village and the pervading quality of fear, envy and distrust in interpersonal relations (Lewis 1951).

Field strategy

Commitment versus aloofness

Participant observers usually try to keep their own preferences and allegiances hidden. Sometimes the problem of conflict of interests emerges and each group will want to know with which faction the observer's loyalties lie. It is a natural demand, for the researcher is likely to be entering several camps – indeed, he will be deliberately trying to maintain his neutrality and access to all sides in order to describe the situation objectively. This may make him suspect unless his role as transcender of local discords and "aloof-observer" is acceptable to all. His position outside the situation clearly shapes the character of the data he can obtain.

The alternative direction to take is that of "emotional identity" with the respondents (or one section of them) in addition to "role identity". It may thus become impossible for the observer to remain outside the situation and he may even deliberately reject his objective role in favour of commitment to his new society. Rather than a slide in one direction, the participant observer often experiences emotional swings of the pendulum as he observes events from day to day. As a scientist he should be aware of these emotional pulls and record them as part of his data.

Naivety versus expertise

Anthropologists working in alien cultures and languages have an important advantage over the researcher working within his own society; they can reasonably maintain an attitude of ignorance and naivety which enables them to ask simple questions, and to repeat them rather in the manner of a child seeking information. It is easier for the anthro-

pologist to put the respondent at his ease as teacher and expert where the researcher is clearly alien to the society. It is a much more difficult role to play in one's own society without incurring the personal label of fool or deceiver, or both.

Working in his own society, the participant observer has the advantage of familiarity with much of the cultural meaning of what he observes and the disadvantage that, in fact, his experience is more limited than his respondents usually realize. Situations paralleling those in anthropology, where subcultures are studied within one's own society (e.g. ethnic, social, occupation groups) enable a naive stance to look more plausible.

Use of informants

Again, the obvious difficulties in understanding foreign cultures has made the anthropologist more experienced in the use of local informants than most other social scientists. Experience has shown that informants are often self-selected people who are themselves somewhat marginal to the group being studied, and who are able to "objectify" their experiences. The great advantage informants have over the observer himself is that their perceptions have been shaped over time by their experiences within the study group, however much they are able to "objectify" them later. Like the observer, however, they tend to be marginal to the local group and this will colour their information. The use of informants is thus an adjunct to participant observation; it should not be considered a substitute.

Field notes

Records of observations should be made as soon as possible as the sense of immediacy is important to what they convey. Writing up notes each day is a standard part of field work in participant observation. The research process inevitably brings changes in the observer's perceptions as his understanding of what he sees deepens. Field notes made later in the period of observation will reflect these changes. There is a natural tendency to discard earlier perceptions in favour of later ones, and to redraft earlier notes into the perceptual framework of later ones. The final report thus emerges as a more coherent document which may mask valuable data on the process of change and alternative perspectives on the events which took place. The observer's last set of categories and perceptions are not necessarily his only, or most valid, ones.

SUGGESTIONS FOR FURTHER READING

Selltiz *et al.* (1959) discuss structured and unstructured observations and Webb *et. al.* (1966) have useful comments on simple observations and problems of sampling. Barker (in Barker and Wright 1955, Barker and Gump 1964, Barker 1968) has developed the most comprehensive system of behaviour observation and, in addition to the references cited in the text, a good analysis using long periods of observation is given in the account of "One boy's day" by Barker and Wright (1951).

In addition to the specific references to landscape evaluation techniques, two overview papers by Jacobs (1975) and Crofts and Cooke (1974) can be mentioned. Webb *et al.* (1966) provide the best source of material on indirect observation and Rosenthal (1966) complements their thesis with his work on experimenter effects in behavioural research.

Kluckhohn (1940) and Whyte (1951) discuss the methodological issues in participant observation. There are many examples in different languages of participant observation available in sociological and ethnographic studies.

IV. ASKING QUESTIONS

INTERVIEWING

As in observational methods, techniques in asking questions range from highly structured, precoded ones to informal, unstandardized approaches. Interview and questionnaire methods are used far more than observational methods in the social sciences; this is still true to a lesser extent for studies of environmental perception. The rapid proliferation of questionnaire social surveys since they were developed in nineteenth-century Europe is less a reflection of their superior validity as a means of obtaining data, than of their relative economy in time and effort. Except for the more specialized interviews - which may merge into participant observation - asking questions to which responses are specifically directed generally takes less time per respondent than observing him or listening to his freely composed narratives and descriptions.

Asking questions of people also provides information that could not be systematically observed, such as questions about the past and future, and questions on attitudes, feelings and beliefs. The choice of a more or less standardized approach involves consideration of:
- the confidence with which the researcher feels he can "precode" the data and anticipate all the relevant questions and categories of responses;
- the need to obtain large samples for quantitative analysis and statistical inference to larger populations;
- the time, money and personnel available to do the research;
- the literacy and familiarity of respondents with questionnaires and interviews, opinion polls, etc.;
- research questions and goals, e.g. trans-

itory "opinions" versus deeper-seated "values".

If the answers to these questions are generally positive, then a questionnaire or standard interview schedule is likely to be the research instrument chosen. Questionnaires are the most structured form of asking questions since respondents are usually asked to complete the answers without the interviewer being present to clarify and elaborate the questions or to give encouragement. The choice of a standardized interview schedule (sometimes also called a "questionnaire") usually implies a trade-off between reliability and efficiency, over validity, in its widest sense of measuring perceptions as the respondent perceives them.

In contrast to some of the observational, listening and interviewing methods described in this Technical Note, there are many descriptions and discussions of interviewing methods. A practical guide to structured survey interviewing was published by the Survey Research Center in Michigan (1976). Dexter (1970) has discussed specialized interviewing and included an annotated bibliography. Gordon (1969) has compared various types of interviews and their applications. In addition, most standard texts on social science methods include interviewing techniques and sampling design. The Guidelines will therefore briefly review the various ways of asking questions and concentrate on describing some specialized techniques for environmental perception.

Unstandardized interview

An important difference between an unstandardized (elite, in-depth, specialized, key actor interview) and a standard, survey interview is that in the unstandardized one, all respondents are not considered equal. Some

people are better informed and more sensitive to the topic of the interview and their responses carry more weight in the final analysis. Thus, where a deviation would be handled statistically in a survey, a unique or unusual response in an unstandardized interview may form the basis of a revised interpretation.

The design of the interview is not unstructured, as is sometimes claimed, but is implicit and not visible in the form of questionnaire schedules, etc. It requires thorough familiarity before the interview with the topic of the interview and with the main actors and events likely to be involved. A set of key questions should be prepared beforehand and can be written out on a single sheet as a reminder during the interview.

The reward for good preparation is often an easy, conversational interview between two people who respect one another's roles and who have a certain degree of mutual trust, with one person (the respondent) sharing his greater knowledge and experience (of the topic in hand) with the other (the interviewer).

The main principle to keep in mind is to encourage the respondent to present not only his perceptions of the situation but to let him define that situation in his own terms, to include, as far as possible, what he himself regards as relevant. Apparently inconsequential remarks can reveal important information when considered in the context of that, and other, interviews. It has been suggested that one should aim for "something which sounds like a discussion but is really a quasi-monologue stimulated by understanding comments" (Dexter 1970).

In introducing the interview, the interviewer should be fairly vague about the focus, becoming more precise with later questions. "Tough" questions are best left until near the end of the interview, after there has been an opportunity to establish some rapport between the respondent and the interviewer. Notes should ideally be as complete as possible and written up the same day. Tape recording is possible in some interview situations but requires an enormous amount of time to transcribe and inhibits some respondents as well as some interviewers.

It is important to establish a temporary working relationship with the respondent but the form the relationship takes will vary between situations and cultures. In North America, interviews tend to go better, compared to England, if the interviewer displays an outgoing, slightly aggressive personality. In France, interviews with key actors need more frequently to be established on intel-

lectual criteria with the respondent seeing himself as "consultant to the research project" (Lerner 1956). Nadel (1939), describing his field work in Africa with one tribe whose culture was characterized by individual aggression and jealousy, comments:

> In the case of interviews which bear on secret and forbidden topics, I have found it profitable to stimulate the emotionality of a few chief informants to the extent of arousing almost violent disputes and controversies. The expression of doubt and disbelief on the part of the interviewer... induced the key informant to disregard his usual reluctance to speak openly (Nadel 1939).

In other tribal and peasant settings, an interview situation should reflect the highly deferential and respectful mode, characteristic of many traditional societies.

Reliability and validity in unstandardized interviews

A frequently asked question is: how do we know people are telling the truth? In survey interview studies, errors in response are handled statistically - it is hoped that the number of people giving false answers is small enough to be counterweighted by the large number of "correct" responses.

In unstandardized interviews, the number of interviews is not as high and each one may produce "unique" information. One approach to this problem is to design the interviews so that each interview acts as a partial cross-check on the others.

For example, in a study of information flow between key people involved in managing an environmental pollution problem, the object was to relate their perception of the problem with their roles and access to relevant information. Questions directed to finding out who passed confidential information to whom for each respondent, acted as cross-checks between the interviews (Whyte 1975a). Thus one can proceed round a structure of interviews as though surveying a closed traverse. The degree of error is represented by the gap between the starting and finishing points, and there is usually sufficient additional information to allow the "error" to be assigned to particular interviews.

Interviewer-respondent effects

An interview represents a social interaction between two or more people, no matter how short and formally conducted it may be. The nature of that social interaction inevitably

will make some difference to the data obtained. The researcher needs to be aware of likely effects and their magnitude and direction, especially when they are systematically operating in one direction.

It is usually assumed that establishing a friendly rapport based on mutual respect will minimize bias either in the respondents' answers or in the interviewer's interpretation and recording of them. Standardizing the question is one strategy to minimize interview biases. Another is to select interviewers who are likely to be able to establish rapport and to be sympathetic to the respondent. This selection may include consideration of the ethnic origin, age, sex, social status and personality of the interviewers. There are no hard and fast rules, but in North America, female interviewers and younger interviewers of both sexes are generally found to make the best interviewers in terms of establishing rapport (Hyman *et al.* 1954). This may imply that the interview situation is most successful when it mirrors one of "experienced teacher-naive learner" in the eyes of the respondent - at least for survey questionnaires.

Another source of interviewer-respondent effect is where either party is embarrassed by a question or perceives the other to be. This is particularly important for projective techniques where familiarity, competence and ease with the technique on the part of the interviewer are critical to their successful use in the interview.

Where interviews are aimed at a socially useful objective such as improvements in forest management or soil conservation, it is important to make the interview itself a two-way exchange of information. At the same time as obtaining information from the respondent, it is possible (and usually desirable) to use the opportunity to provide him with information on the topic of the interview. Thus, interviewing becomes more than an extractive process; it is educational for both interviewer and respondent.

Questionnaire and interview schedule design

Pretesting with a small number of respondents is almost always necessary in designing a good questionnaire. It is not possible to see all the ambiguities, conflicts and difficulties that particular questions and wording might produce, nor to know all the alternative responses that should be included in closed questions. The first affects the reliability of the research instrument and the second, its validity.

In general, the following points should be considered in designing interview schedules.

Logic

The schedule should have its own internal logic and consistency. Its structure and purpose may not be fully appreciated by the respondent but he should be able to see the "sense of it" or he will be confused and start asking why the questions are being asked. Questions should therefore flow logically from one another, to the extent possible, and, where a new topic begins, it should be introduced with an explanatory sentence or two.

Information

The respondent should be told at the outset something about the questionnaire/interview – its purpose, who is doing the research, how long it will take, and if results will be available to respondents. The respondent should usually be assured of anonymity (except where he agrees not to be anonymous) and thanked for agreeing to be interviewed. In some cases, confidentiality of data obtained and reassurances of security of information will also be relevant.

Clarity

The schedule should be clear to the interviewer, who should have been trained or at least familiarized with this particular schedule. Instructions to both interviewers and respondents should be uniform and unambiguous.

Cross-checks

The design should include questions which enable cross-checks to be made either within different parts of the schedule or between the interview and other (e.g. census) data (internal and external validation).

Order

Order within the schedule is important since there are sequential and time effects as with any other social relationship. Respondents tire through the course of an interview. They also may become wary, oversensitized, anxious to please or hostile. "Difficult" questions are therefore asked towards the end; and open questions are asked before closed ones. In giving lists of objects to rank or scale, there are systematic order-effects and biases. For example, last ones are most recalled; right-hand end of scale is more commonly used whatever its label; first ones mentioned in predominantly right-handed societies are more influential. These

can be minimized by careful design and by
the use of cards.

Interviewer's report

This report is completed privately at the
end of the interview by the interviewer. His
evaluation of the respondent's attitude and
any additional comments he may make, enable
the researcher to evaluate the meaning and
usefulness of the responses. The interviewer
can also make his own estimate of the age and
income of respondents.

Length

Ideally, interview schedules should be as
short as possible. Thirty minutes is about
as long as an interview can reasonably be in
Europe and North America without prior ap-
pointments being made with the respondent.

MEASURING VERBAL RESPONSE

Alternative question formats

Open questions

Open questions fall into the same class
as unstructured observation and non-standard
interviews – that is, they maximize the res-
pondent's view of the situation and minimize
the effect of the researcher's preconceptions
on the responses. This type of question pro-
vides, however, a more time-consuming and
less rigorously quantifiable set of responses
for analysis. In environmental perception re-
search this disadvantage is often outweighed
by the fact that the rationale for doing the
study in the first place is to understand the
respondent's perspective.

Responses to open questions should be re-
corded as verbatim as possible to include
both the relevant "facts" and enough of the
verbal expressions used to convey the nuances
of meaning. Anonymous individual responses
can be used as examples to illustrate and de-
tail particular aspects of the perceptions
being studied. The usual caveats about the
protection of identity apply (see page 112).
Open-ended questions can also be handled quan-
titatively by using content analysis to code
them and to draw up frequency tables for the
categories selected. This is commonly the way
that pretesting is done to find out what res-
ponses should be offered as alternatives in a
closed question.

One way to allow for more rapid analysis
of open questions while not losing the fla-
vour and variety of individual responses is
to use precoded open questions. The interview-
er is asked to code the open response at the

time it is said (or immediately after the in-
terview) without structuring the respondent's
answer before he gives it (Table 4).

Open questions can provide daunting arrays
of data but if they do, it suggests that a
closed question would have been less valid
(would have missed important options) and
when they do, they can usually be coded into
a manageable number of categories with ac-
ceptable inter-coder agreement. The main dif-
ficulty is not that the task of coding such
questions is unquantifiable or not objective,
but that it is time-consuming.

Closed questions

Highly structured techniques have not been
widely used for environmental perception, but
there are times when closed questions are the
obvious and best format. Some questions seek
specific information, such as the individual
characteristics of the respondent – his age,
education, address, etc. Other questions sim-
ply require a yes/no answer. Where closed
questions are given with a list of alterna-
tives, they can be used to educate the res-
pondent and indirectly make him aware, with-
out embarrassing him, of more possibilities
than he might otherwise consider. They also
are less difficult for many respondents who
have only to respond to a given set of choices
rather than initiate or create an answer. In
a long interview, fatigue and impatience are
important considerations; time limitations,
where many topics need to be covered, are com-
monly met by using closed questions.

Closed questions usually simplify the situ-
ation. However, when attempts are made to
make the closed question comprehensive, the
number of options which must be given can
make the question so cumbersome that an open
question becomes simpler to ask and easier to
respond to.

As a general rule, open questions are given
before closed questions covering the same to-
pic in order not to bias unduly the content
of the open responses.

Forced-choice questions

The forced-choice question asks respondents
to select from two or more given alternatives,
that which one comes closest to their own view
or situation. It requires that each alterna-
tive be simple, conceptually and literally,
and that each be roughly opposite on some rel-
evant dimension. This is a more difficult task
than it may appear.

Forced-choice questions facilitate coding
and analysing of the results, but there are
sometimes difficulties in administering these

Open: How would you describe this area?

         (Probe)   What are its main characteristics?

         Response   (record verbatim) _____

         _____

         _____

Pre-coded open question: How would you describe this area?

         (Probe)   What are its main characteristics?

         Response   (record verbatim) _____

         _____

         _____

Interviewer coding (do not say these to   Respondent mentions:

respondent.   Check as many as applicable)   people   ____

         housing   ____

         services   ____

         cheap, convenient____

         changes   ____

         other (specify) ____

Closed: Which of these descriptions do you think apply to this area?

	Yes	No	In-between	Don't know
too many people				
poor housing				
poor services				
cheap				
convenient				
changing				
good neighbours				

Forced choice: Which of the following statements do you think

         best describes this area?

         a or b

a.   The houses and services are poor

b.   It is cheap and convenient   _____

a.   There are too many people

b.   The neighbours are good   _____

a.   There are a lot of changes here

b.   This area hasn't changed much   _____

Table 4. *Comparison of open, closed and forced-choice question formats*

questions because respondents feel none of the alternatives are suitable and are hesitant to select one without being encouraged. Thus, their response may literally be "forced". This is more common with respondents who are particularly knowledgeable or aware of the topic, as they often see the forced-choice question as irrelevant and over-simplified. It is also sometimes unclear what the forced-choice question is actually measuring, especially when compared to scaled questions.

Scaled questions

Scaled questions, often called Likert questions, are advantageous in that they provide ordinal data (and, in the case of attitude scales, interval data). There is a vast literature on scaling techniques, especially in the context of attitude scales (see, for example, Fishbein 1967). Scaled questions are often put in the form of statements to which the respondent shows his degree of agreement or disagreement with the scaled value - degree of importance, expense, experience, etc.

There are several formats for the scales, the simplest being a three-point scale (e.g. high-medium-low) from which the respondent selects the appropriate value (Table 5, part A). These are simple enough to be read out to the respondent and short enough to repeat for each successive statement.

More complex scales can have from five to thirteen points but three to seven are most common, since the task of discriminating so finely becomes arduous and may not reflect the respondent's perceptual categories unless he is very involved and informed on the topic. Each point on the scale can have its own label or the end points only are labelled (Table 5, part B). The second form requires the respondent to be more familiar with the idea of such scales and what he is asked to do. The exact wording of the scales is highly influential in where people score their feelings and opinions on it. In the example given, changing the end label from "very large" to "large" or "extremely large" would change its perceived value, and the number of times it was used, even though it remained the extreme category.

The format given in Table 5, part C, has been developed more recently. It consists of a line (usually 100 mm long) with labels only at either end, such as "highly important" and "highly unimportant". The respondent is asked to cross the line at the point which he feels best represents his view. The advantages of the line scale are that it lessens the undue influence of particular labels on intermediate points and it gives the respondent a freer choice which does not greatly increase the difficulty of his task and which can still be readily scaled by the coder (by simply measuring with a 100 mm ruler). Its main disadvantage for some interviews is that it requires the respondent to read the statements and fill in the scale himself.

A danger in the use of a continuous scale is that it may appear more accurate than it really is. By cumulating many such observations into a frequency diagram, a false impression can be given of the fineness of gradations that people use or of the distinctions that they actually make.

Card questions

The problem of order-effects in asking questions is a particularly acute one in environmental perception because questions are likely to raise topics which the respondent has not intellectually formalized or verbalized to any great extent - for the most part, people relate to their home, city, and interactions with the natural environment in an implicit, non-verbal way. The order in which topics or environmental stimuli are given to the respondent will be most influential where he has not thought them out beforehand. One way to reduce this source of error and to make the data more valid is to present the stimuli in random order for each respondent. Thus order-effects will still operate at the individual level but not when the data are handled collectively.

Card questions, where the elements are written or depicted on individual cards, enable the interviewer to "shuffle" the cards and randomly select them for presenting to the respondent. The interviewer should note the order of presentation.

The use of cards is also valuable where the respondent is asked to evaluate a set of elements, e.g. to rank them in order, or to put them into categories. Ranking more than about six elements is a difficult task when they are presented either verbally or visually as a consolidated list. The respondent's task is simplified by being able to arrange and rearrange the cards until the (perceived) right order is found and a more accurate response is also achieved. Similarly, cards are valuable means of grouping elements into sets, especially where the sets are created by the respondent himself to reflect how he discriminates between elements (Q-sorts). The advantage of card questions is that they can be easily rearranged and that they allow for

A. **3-point scale**

If your village had a new water supply would :   check one

the number of people using it be | more | less | about the same | don't know |

the number of animals using it be | more | less | about the same | don't know |

B. **7-point scale**

Hand respondent card with scale (below). Circle number each time that corresponds with his views. If he says 'don't know' check number 8 but do not suggest it to him.

SCALE

very large increase	some increase	very little increase	neither increase nor decrease	very little decrease	some decrease	very large decrease
1	2	3	4	5	6	7

If your village had a new water supply how would you rate the following possible changes?

Circle one   Don't know

the number of people using it in the wet season	1 2 3 4 5 6 7	8
the number of people using it in the dry season	1 2 3 4 5 6 7	8
the amount used for drinking and cooking	1 2 3 4 5 6 7	8
the amount used for washing	1 2 3 4 5 6 7	8

C. **Continuous scale**

Here are various views that have been expressed about what happens when a new water supply is put in a village. Would you please say how far you agree or disagree with these views for your village by putting a cross on the line at the place which represents your position. If you strongly disagreed with the view, you might put the cross at that end of the line. If you neither agree nor disagree, you should put your cross in the middle of the line.
Please only cross each line in one place.

	Water will cost less money	
strongly agree	_____	strongly disagree
	The women will have too much free time	
strongly agree	_____	strongly disagree
	There will be more illness	
strongly agree	_____	strongly disagree
	Many people and animals will come in the dry season	
strongly agree	_____	strongly disagree

Table 5. *Some alternative formats for scaled questions*

"second thoughts". Another advantage is that the respondent is allowed to handle the cards, which is a more interesting and concrete task than answering a series of questions. Respondents in many cultures have been found to enjoy this type of questionning and to be interested in sorting cards.

Obtaining relevant quantitative data

Categories

In most questionnaire studies, categories are provided by the researcher in the light of his research questions and the results of his pretesting. In environmental perception research, there is a strong rationale for enabling, as far as possible, the respondent to determine his own categories and to assign elements to them. The use of open questions which are coded by several judges is one way of emphasizing the respondent's view, especially if one or more of the judges has a similar background to the respondents, or to whom the respondents are well known.

Q-sorting, or asking the respondent to arrange elements into sets, is a more open way of obtaining the respondent's own categories and the criteria he uses for dividing up his perceived environment. Q-sorting is a recognized laboratory research technique for obtaining inter-coder agreement in similarity or expert judgement approaches, for example in designing attitude scales. It can also be used in the field as a research instrument with respondents. The task can be more or less structured, from putting the elements (usually in the form of cards) into a specified number of labelled categories (boxes or piles), and with a specified (forced) distribution, to allowing the respondent to decide the number and labels of the categories himself. The size of categories and the frequency with which they are used by different respondents can be analysed quantitatively to obtain a "cultural" or collective view of the environment that is relatively free of the researcher's influence.

Categories can also be obtained using a specialized technique called repertory grid (see page 59).

Interview schedules and questionnaires provide a great wealth of raw material for producing frequencies and cross-tabulations in environmental perception as for any other research area. The importance of having relevant frequencies in terms of the environmental categories used has already been discussed.

It is also valuable to consider the most relevant ways to classify respondents for the particular research goals of environmental perception studies. Their socio-economic characteristics are usually obtained in the interview as a standard procedure (age, sex, income, occupation, etc.). Running cross-tabulations of responses with the respondent's age, sex, socio-economic status is also a fairly standard type of analysis provided for in many package social science computer programmes. While these data may be valuable from an environmental perception point of view, the respondent's own categories of his social setting are also relevant. This has been found to be true in studies of perception of environmental pollution in England where people did not think of themselves according to the researchers' categories of "45-60 year olds" or "income group 3". Instead, their reference groups were residential associations and professional groups, which were the groups with which they identified and which determined their behaviour (for response to pollution).

It is possible to obtain the resident's own perception of his socially relevant groupings by asking him to describe himself or by using Q-sorts to arrange social elements into categories (e.g. age, ethnic, occupational groups or named individuals).

Rankings

The problem with strong order-effects in previously non-verbalized data has been discussed with reference to card questions, which are recommended for ranked questions. For similar reasons, i.e. the topic not being formally considered by the respondent before the question is asked, many questions in environmental perception that ask respondents to rank data do not obtain relevant orders in the middle ranks where respondents are relatively "indifferent". Thus respondents are able more readily to say which comes first and last and less sure of exact order in the middle. With this proviso, useful ranked data on environmental perception can be obtained from interviewing respondents.

Scaled data

The use of a scaled format (Table 5) enables responses to any individual question to be ranked along the dimension of the scale. Sets of questions or statements can be constructed which provide interval data on strength and direction of respondent's perceptions and values. These statement sets are usually done for scaling attitudes and their construction requires expert judgement,

pretesting and validation in the field. Alternatively, already constructed scales are available but they also entail pretesting in the field situation (see page 57). Such scales require that the respondents answer in terms of the dimensions provided by the researcher. An alternative approach, which provides non-parametric data, is multidimensional scaling in which the scales are elicited by the respondent (see page 58).

SUGGESTIONS FOR FURTHER READING

Books on research methods usually discuss interviewing and survey techniques in more detail than other methods. Reference can be made, for example, to Cannell and Kahn (1953) and the chapters on verbal scaling in Selltiz *et al.* (1959). Hyman *et al.* (1954) is entirely devoted to the issues of social research interviewing and Kish (1965) discusses survey sampling. The interviewers' manual written by the Survey Research Center of the University of Michigan (1976) is clearly set out with illustrative sample pages. A good introduction is also given in Michelson (1975), particularly in the chapter by Marans. Dexter (1970) is recommended for unstructured interviewing.

V. PROJECTIVE TECHNIQUES AND OTHER SPECIALIZED WAYS OF ASKING QUESTIONS

Projective techniques can be used to encourage respondents to give freer, less inhibited responses that include both their conscious and unconscious feelings. This is achieved by enabling people to "project" their own thoughts onto a character or scene represented in words or pictures. The techniques vary considerably in how deeply they are intended to probe the individual's personality or unconscious. As used in the field, the techniques are generally modified to test for specific dimensions of perception rather than an in-depth analysis of personality or attitudes.

The procedures described in the following discussion are more formalized and reliable methods of asking the type of questions which can easily be posed in an unstandardized interview, questions such as: "Imagine a flood bigger than any you have experienced in which ..." or "How would you describe your ideal environment or Utopia?". These are everyday conversational projective techniques.

The techniques included in the Guidelines have been used in the field and are, with some training, relatively easy to administer and code (usually for specific dimensions). The techniques may also produce data rich enough for a trained person to extract much additional information. Projective techniques are, however, often worthwhile even when the analysis is deliberately limited. Adaption to the field situation usually reduces the experimental rigour or clinical depth with which they were first developed. But the compensations can be that, compared to the laboratory setting, the tests are more relevant to respondents' real lives and concerns; in addition, related interview and behavioural data provide checks for validity.

The tasks involved in projective techniques range from a simple association of words to asking respondents to create a story from a short beginning or a picture. The tasks thus include association, ordering and selection, completion and creation. The respondents are asked to respond to verbal stimuli (words, sentences, stories), graphic stimuli (cartoons, pictures, blank sheets of paper), and game situations (Table 6). Each of these combinations of task and stimulus is best suited for particular research needs and field situations. There is no single best method. Generally speaking, projective techniques rely on trained, sympathetic interviewers and are biased towards literate respondents used to working with paper and pencil.

VERBAL TESTS

Adjective check-lists

A list of adjectives can be presented to the respondent who can indicate which adjectives describe the environment or other topic of the test. The list should comprise adjectives relevant to the topic and should reflect all the environmental attributes likely to be perceived by respondents. It should also reflect everyday language and avoid specialized terminology. The technique is simple and provides limited though useful information. The list should not be too long or the task becomes wearisome.

Semantic differential

This technique is presented as a more elaborate form of the adjective check-list, more carefully grounded in psycho-linguistic the-

TASK	STIMULUS						
	VERBAL			GRAPHIC			GAMES
	WORDS	SENTENCE	STORY	CARTOON	PICTURE	BLANK	
Association	*Adjective check-lists*			Rorschach Test (inkblots)			
Ordering, selection	*Semantic differential* Place preferences *Q-sorts* *Rep. grid*	*Attitude scale* *Personality scale* *MDS*	*Structured scenario*		Picture Arrangement Test Szandi Test *Rep. grid*		
Completion		*Sentence completion* Argument completion	*Story completion Scenario*	Rozenzweig Picture Frustration Test			Doll construction
Creation	Self-description labels		Free story		*Environmental Apperception Test* TAT	*Mental maps* (TAT)	Environment building (children) Role games

Note. Techniques discussed in this Technical Note are indicated in *italics*.

Table 6. *Tasks involved in some projective and related techniques*

ory. It is one of the most popular "paper and pencil" tests in environmental perception, used especially in relation to architectural space. It is not dissimilar to attitude scales in its construction of bipolar scales and in what it often seems to measure.

Method

The test consists of a set of concepts which are measured by a set of bipolar adjectival scales. The set of scales is repeated for each concept. Each concept/scale measurement is called one "item".

Respondents are asked to place an "X" in one of the seven spaces between the adjectives pairs at the location which best represents their view of the concept. For example,

CONCEPT : Wilderness

SCALE:
Orderly   - - - - X - -   Chaotic

Dangerous - - X - - - -   Safe

Thus for each scale, the respondent's direction and intensity of polarity is obtained. Scales and concepts are presented randomly to reduce order-effects and the "high" and "low" values of the scales are varied from right to left for similar reasons. Typical instructions given to the respondent are shown in Table 11.

The choice of number of concepts and scales can be left to the individual researcher. Students have been found to do ten to twenty

items per minute so that ten concepts each with ten scales take about 15 minutes per respondent. Analysis is usually done by computer, using coefficient of correlation tests to measure interrelationships among scales and concepts, and factor analysis (principal components solution) to explain the interrelationships in terms of their overall pattern or dimensionality. Thus the number of items per respondent should be as large as is practicable in order to increase the accuracy of the measure. Usually the semantic differential test takes about 30 minutes to administer.

Assumptions

The test was originally developed by Osgood, Suci and Tannenbaum (1957) in order to measure the "meaning" of word labels in relation to the psychological "meaning" of the concepts they describe. Their theoretical basis centred on linguistic encoding; researchers using the semantic differential technique should become familiar with its conceptual background.

One important idea is that of "semantic space" which is defined as
a region of some unknown dimensionality and Euclidian in character...Each semantic scale defined by a pair of polar (opposite in meaning) adjectives is assumed to represent a straight line function that passes through the origin of this space, and a

sample of such scales then represents a multidimensional space. The larger or more representative the sample, the better defined is the space as a whole (Osgood, Suci and Tannenbaum 1957, p. 25).

These authors define differences in semantic meaning as:

the successive allocation of a concept to a point in the multidimensional semantic space by selection from among a set of given scaled semantic alternatives. Difference in meaning between two concepts is then merely a function of the differences in their respective allocations within the same space.

Semantic space has now been defined by over 1000 studies (Heise 1969) and it has three characteristic dimensions: evaluation, power and activity. Where these dimensions have fixed ratios of one to another (Bechtel 1975), they appear to mirror a part of language structure itself.

An example will clarify the concepts involved in semantic differential tests. Figure 8 shows the "meaning" of twelve environmental hazards as perceived by a sample of fifty-eight Canadian students (Golant and Burton 1969). Each student judged each hazard against twenty-one adjectival scales. The results were analysed by correlations and principal components analysis. The two main factors to emerge were "man-made hazards" and "natural hazards", with quasi-natural hazards of pollution as a third factor.

NATURAL HAZARDS
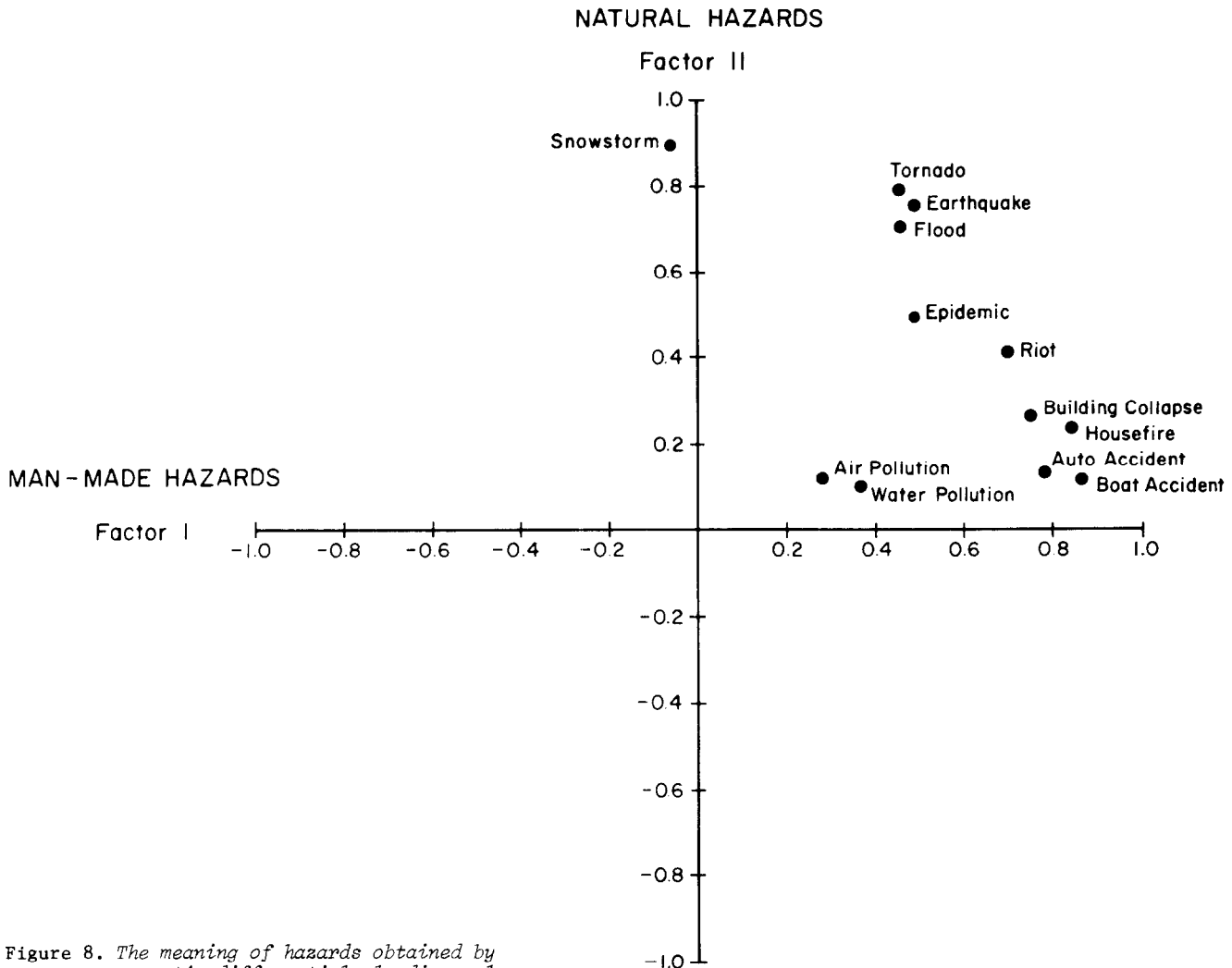
Figure 8. *The meaning of hazards obtained by semantic differential: loading values of concepts on two principal factors (reprinted with permission from Golant and Burton 1969)*

Evaluation

The semantic differential is a relatively simple test to administer, though it is a highly repetitive task which rapidly induces boredom. In the field, it is difficult to ask respondents to spend 30 minutes or more filling in semantic differential scales without specific motivation, such as analysis of a particular building for which user-evaluation is needed. It is in these latter situations that the test has been most widely used.

A number of problems posed by this test have been described by Bechtel (1975). For use in large-scale environments, especially complex natural and man-made ones, the problems Bechtel discusses are exacerbated. These are mainly problems of ambiguity about the concepts being measured and ambiguity and distortion of the factors elicited.

When a concept (e.g. strange environments) is unfamiliar to the respondent, it can seem ambiguous so that he cannot meaningfully describe it in relation to other concepts. Ambiguity also arises when the concept is a complex one (e.g. landscape, street) and when it is not clear to which specific parts the respondent is referring when he scales the concept. The use of a semantic label for such complex environmental stimuli obviously glosses over many details giving the impression of "wholeness" that may not exist in the respondent's eyes. This problem has arisen when semantic differential scales have been used to measure perception on urban walks (see page 66).

One problem with this technique is that the use of the factor analysis procedure always gives factors or dimensions which are orthogonal in nature, whereas in reality the dimensions may be "correlated" and oblique to one another. Also, in many empirical studies, the way the dimensions should be labelled is unclear because they often seem to contain a mixture of adjectival scales. This difficulty arises in part because researchers derive their own scales for particular investigations without any very clear basis for doing so.

These difficulties are related to a more general issue in assigning "dimensions" to environmental perceptions, cognitions and values. Often such classifications are constructs of the method and/or the research questions. They do not necessarily reflect the way the respondent categorizes the world, either explicitly or implicitly, nor reveal the principles of his classificatory system.

Generally speaking, despite the fact that this test is one of the most commonly used in environmental perception, it is more economic in design and administration than it is in enabling the researcher to meaningfully interpret and use the data obtained. It requires elaborate analysis and is weakest for those environments of most interest to field investigators.

Sentence completion test

Method

In this technique, the projective element is provided by a sentence beginning or stem which the respondent is asked to complete. For example, in a study of perception of home area one might use sentence stems such as: "When I think of my farm, I..." or "If we moved from here I...".

The stems ideally should be free of affect-laden (emotional) words that might unduly influence the response and should encourage dichotomous classification of responses or a simple range of responses along a defined dimension. Sentence completions are often most effective when they describe behaviour situations. They can be read out to the respondent and his completions recorded by the researcher or written in by the respondent himself.

Sentence completions are one form of a related series of tests ranging from word association to paragraph completion, argument completion and story completion. They enable the respondent to answer freely within an ambiguous framework constructed by the researcher. Thus the subject of the response is directed by the sentence stem but the direction is free enough to reveal strong differences among and between people. As illustration, one sentence completion test has been used in the twenty-three nation comparative interview-study of perception and response to natural hazards (White 1974). The results showed differences among and between people as individuals and among and between social groups as to how they viewed natural hazards and other negative events, which were seen as setbacks either to be mastered or to be accepted fatalistically.

Assumptions

Sentence completions are based on the following assumptions:
- The respondent will reveal his subjective feelings and intended behaviour in the way he completes the sentences.
- The sentence stems do not bias or direct the respondent when he completes them.
- The respondent understands the task suf-

ficiently and is familiar with the idea
of sentence construction.
- The sentence completions can be reliably
coded for the dimensions they were de-
signed to measure.

Evaluation

Compared to other projective techniques,
the materials for sentence completion tests
seem relatively easy to design for each spe-
cific field investigation. Similarly, ad-
ministered as part of a longer interview,
they are less time-consuming than most other
projective tests. They appear to have val-
idity in that they do reveal differences be-
tween people's responses.

It can also be argued, however, that a di-
rect question would be as effective and prob-
ably simpler to code. As for most projective
techniques, coding is a disadvantage of the
test. When responses are reduced to a posi-
tive-negative dichotomy, much of the rich-
ness of data and advantages of the indirect
technique are lost. More refined coding, on
the other hand, is best done by those with
training and experience, and by using more
than one coder to provide a measure of re-
liability. In field conditions, coding is of-
ten middle-range in depth and refinement,
with three to five categories set up for spe-
cific dimensions.

Some problems also arise in constructing
and administering sentence completion tests.
Special care needs to be taken in not in-
cluding sentence stems which bias the res-
ponse, such as everyday expressions to which
there are "automatic" completions. For exam-
ple, this sentence stem used in a study of
air pollution perception in England was:
"Being a success in the world results from
..." to which over 80 per cent of respondents
added "hard work". Other construction prob-
lems include the use of "I" and "my" over "we"
and "our". If the inappropriate pronoun is
used, respondents seek to correct the stem
rather than complete it.

The major difficulty lies in administering
the test. Because of its simple construction,
its projective aspects and checks for inter-
nal reliability (such as repeated themes) are
visible to the respondent and may well irri-
tate him. It is also a rather unnatural task
to finish someone else's sentence, especially
in cultures where politeness in waiting for
people to finish what they are saying is the
norm. Nor is it an interesting or very re-
warding task. In the field testing of percep-
tion methods during an international MAB work-
shop in Victoria, Canada (Canada-MAB 1977),

several respondents were alienated by the
test, although they understood it. Perhaps
even more significant was the fact that some
interviewers disliked the test, and their
feelings about it were probably conveyed un-
knowingly to respondents.

The test requires respondents to under-
stand the task, i.e. to comprehend the struc-
ture of a sentence. From a cross-cultural
point of view, this is a severe limitation to
the test. In parts of Bangladesh and certain
other rural areas where it has been used with
largely illiterate populations, the task
(seemingly simple to researchers) is not eas-
ily understood; the respondent tends to wait
for the interviewer to finish his sentence,
and he may well think the interviewer rather
foolish to stop in the middle of a sentence.
As a specifically cross-cultural test, there
are also difficulties of translation into dif-
ferent languages and idioms. To measure the
same dimension or concept in different cul-
tures, quite different sentence stems need to
be used, requiring a translation of concepts
rather than just a simple word translation.
Research workers in each country must under-
stand the test fully and be capable of design-
ing their own field instruments using the
technique.

Example: perception of hurricanes

A study on perception of hurricanes (Bau-
mann and Sims 1974) was carried out as part
of the cross-cultural research on perception
of natural hazards (White 1974). The sentence
completion test consisted of ten sentence
stems given in the first part of a standar-
dized interview. The sample consisted of 360
respondents in the United States (in three
towns in Florida, Mississippi and Texas) and
147 respondents in Puerto Rico (one coastal
and interior site).

The sentence completion test was designed
to explore:
- perceived response to hurricane hazard be-
fore, during and after it might occur;
- perceived efficacy - internal-external con-
trol (see page 89).
The coded responses to the sentence completions
on perception of hurricane hazard for the
United States and Puerto Rican samples are
given in Table 7. They show that respondents
in the two areas differ in the ways that they
anticipate responding to a hurricane before
and after it might occur, but perceive very
similar strategies for coping during the storm.
There is generally greater acceptance and
passivity on the part of respondents in Puerto
Rico than in the mainland United States in the

Sentence stems and completions	Puerto Rico (N = 141) (%)	U.S. (N = 360) (%)
Before the hurricane		
If a hurricane is predicted, I ...		
make preparations (unspecified)	55	31
keep on the alert	10	19
feel fear/anxiety	7	4
seek refuge	14	29
[other]	14	17
When a hurricane is coming, I feel ...		
fear	48	31
anxiety	9	18
concern for the consequences	26	15
desire to take precautions	2	14
[other]	15	22
During the hurricane		
During the hurricane, I ...		
make preparations (unspecified)	38	17
pray	10	18
communicate with others	13	9
feel fear/anxiety	9	16
protect myself	13	18
protect others	12	8
proceed normally	5	7
[other]	0	7
Going through a hurricane makes me feel ...		
fear	38	31
anxiety	11	23
negative emotions (unspecified)	6	10
concern for the consequences	36	15
[stays calm]	9	4
[other]	0	17
In a hurricane the people I feel some responsibility for are ...		
family of procreation (husband or wife and children)	40	37
children	9	17
parents	6	7
family and nonfamily	24	25
nonfamily	14	12
[other]	7	2
After the hurricane		
When a hurricane is over, I ...		
feel positive emotions	25	26
check results	23	18
thank God	10	10
begin restoration	12	29
aid victims	14	4
feel negative emotions (fear, anxiety)	6	6
[other]	10	7
When a community experiences a hurricane, the feelings among its people ...		
are of mutual cooperation	31	48
are of fear and anxiety	6	6
are of sadness	42	11
are shared	11	2
are positive	4	17
[other]	6	16

Table 7. *Sentence completion tests for hurricane perception (reprinted with permission from Baumann and Sims 1974)*

face of hurricane hazard.

Scenarios

Scenarios are a technique which are related to sentence completion but which provide much richer data. They consist of a short story or set of initial assumptions which describe an initiating chain of events. The respondent is asked to continue the sequence as he thinks it might, or will, occur. As used today in perception research, the method has parallels in both the story-telling tests used in clinical psychiatry and educational psychology (as well as in social games in many cultures) and in fault-tree analysis as developed in systems engineering (particularly in nuclear engineering). In the latter case, the scenario is used to discover and assign probability numbers on possible combinations of events, such as simultaneous failure of engineering components. It is a highly quantified and rigorous form of scenario analysis which is rapidly increasing in importance.

The advantage of scenarios as a field research method is that people generally enjoy doing them and appear to readily "project" their own attitudes and feelings into the sequence of events and their outcomes. At a relatively superficial level, scenarios are fairly easy to code, but, as in other projective techniques, more profound analysis is more difficult.

Structured scenarios

One way to ease the coding problem is to structure the scenarios into three or four possible alternative outcomes and to ask the respondent to either select the one he prefers or thinks most likely to occur, or to rank or rate each outcome. Providing alternative outcomes constrains the respondent's freedom of expression but enables him to consider possibilities he may not have thought of by himself. In this situation his response may not be stable. It may change rapidly over time because the question is not salient to him. On the other hand, a valuable education process may take place. Presenting alternatives is particularly useful for stimulating discussion between respondents in a group setting.

Method. A test consists of one or more structured scenarios, describing locally relevant situations in two sentences. Each "story" is followed by about three alternative outcomes and the respondent is asked to read the scenario and then to state which of the alterna-

tives he most agrees with. If he feels an additional outcome is likely, this should also be recorded. A card should be made for each scenario and should be presented separately to the respondent. His answer should be obtained before the next card is presented.

Example. The following test example was used in the MAB Perception Workshop, Victoria, Canada (Canada-MAB 1977). A structured scenario (one of two stories) was given to farmers to measure their feelings of personal control or responsibility for environmental hazards to agriculture. The three alternative outcomes given in each case included one external response, one internal, and one intermediate response indicating compromise or adaptation. Instructions given to the researcher were:
- Give respondent card.
- Explain that you would like him to read first one story and then say which of the three outcomes he thinks would be most likely to happen. Encourage him to select only one alternative. Record his answers together with any comments or additional outcomes he suggests. Prompt the respondent for additional comments if this seems useful, especially if he suggests that there are other possible outcomes, or if he points out reasons for his selection. Once he has done this, ask him to read the second story, and to repeat the procedure. A sample card would be:

CARD REFERENCE

One farmer had a very productive farm in Sanich and grew bulbs and potatoes for export. But a run of bad weather conditions meant the farmer lost his livelihood over a few years. People talked a lot about this.

A. Some people said it was probably the man's fault. If he'd done the right things it wouldn't have happened.

B. Some people said that you couldn't blame a man when things like this happened. We have to learn to take the bad with the good.

C. Other people said that it was just another example of what happened when we didn't work in harmony with the environment but used methods that disrupted the balance of nature.

Which of these explanations do you most agree with?

Unstructured scenarios

Unstructured scenarios are administered in a similar way without suggesting alternatives, although encouragement to develop ideas the respondent introduces and to take them to conclusions, is allowed and is usually

necessary to obtain good (projective) stories. The respondent's story should be recorded verbatim if possible. If he digresses into description without a "plot" he can be gently encouraged back towards specifying events in his story.

Used in this way the scenario is a storytelling technique in which the respondent's imagination is stimulated by the story beginning with which he is presented.

The scenario given to the respondent (whether he is a layman or an expert) can be more or less complete in terms of plot development and sequence of events from the initial conditions. Where the technique is used to educate perceptions and increase environmental awareness rather than to elicit the respondent's perceptions, the story is presented as a more developed chain of events. Obviously, the degree of scientific rigour versus imagination that such developed scenarios include can vary. Erickson (1975) provides examples of carefully constructed scenarios for presenting the likely impact of the 100-year flood in Boulder, Colorado, USA. His detailed construction of the chain of events as the flood progresses through the city is based on documented evidence of existing land use and flood control conditions linked by scientific inference about the velocity and discharge of the flood. The resulting scenario is long but sufficiently well documented to let decision-makers see where they might implement changes to alleviate or reduce a particular danger ("failure-mode" in the language of fault-tree analysis). Well constructed scientific scenarios, however, require considerable understanding of the situation and close documentation to be convincing. In many field investigations, simpler stories are usually at least partly projective in design to elicit reactions from respondents about the outcomes, as well as increasing environmental awareness and sensitivity.

Evaluation
Administration. Scenarios are usually easier to administer than sentence completions and are generally enjoyed by respondents (although some object to them). These reactions help establish rapport as well as obtain good data. Structured scenarios, where several alternative outcomes are listed, are more straightforward to administer and easier for the respondent to complete. Unstructured scenarios, where the respondent is asked to develop a story from a brief set of initial conditions, require more experience on the

part of the interviewer and the ability to encourage respondents without directing them. Otherwise, the stories can be sketchy and poorly developed without providing data rich enough for analysis.

Analysis. Analysis of structured scenarios is straightforward since respondents are asked to check one of several given alternatives, each of which is usually designed to correspond to a general dimension of interest to the researcher. Analysis of the unstructured scenarios requires content analysis, preferably by several independent judges.

The structured format where alternatives are given allows the respondent to consider equally several possibilities, which may not have occurred to him spontaneously in the interview situation (though they could possibly have occurred to him outside the interview). It has been used successfully as a technique in rural areas in developing countries with people who would not be comfortable with some of the other "pencil-and-paper" tests. It is also a valuable technique for involving individuals and groups in decision-making in both developed and developing countries and for educating people to the range of options possible.

GRAPHIC TESTS

Environmental Apperception Tests

The term Environmental Apperception Tests (EATs) is used for picture-story tests designed to elicit environmental perceptions. They are similar in format to the clinical technique known as Thematic Apperception Test (TAT) developed originally by Murray (1947) as a measure of personality and aptitude.

Since Murray developed the original set of picture stimuli, many others have been used with specific relevance to individual studies. The form of analysis also varies from analysis rooted in the tradition of abnormal psychology, to straightforward analysis of the respondent's story in terms of its structure, style, coherence and consistency, etc. In terms of the pictures used or the analysis of them, there is, therefore, little in common between TAT tests that have been applied to personality testing, and Environmental Apperception Tests, except for the general "picture stimulus-story response" format. It is unfortunate that all of these tests tend to be described as TAT tests, since some other term such as that proposed here would perhaps provoke less defensiveness on the part

of some psychologists who feel, with good reason, that untrained researchers should not embark on individual personality analysis.

As used in environmental perception, EATs can usefully form a field technique for obtaining responses along specific dimensions being investigated (e.g. efficacy, territoriality) while placing less demand on the training of the story analyst. The more parochial pictures (showing local scenes or events) and more explicit ones appear to evoke less deep emotional responses, and responses that are more directly related to people's roles and behaviour than to their personality.

The pictures should be sufficiently ambiguous to allow free rein to the respondent's imagination (for this reason colour is usually avoided) and the set should together show a range of incidents and scenes. They can be either photographs or drawings (Fig. 9). If people are in the picture, they ideally should include some of the same sex and approximate age as the respondent (or be ambiguous). In a clinical TAT for personality, ten to twenty pictures are used in two 1-hour sessions. As a field instrument, EATs usu-

ually include three to six pictures.

Method

The respondent is shown a picture and asked to make up a story about it describing who is in the picture, what his or their feelings are, what is happening in the picture, what led up to the scene, and what the outcome will be. Prompting is allowed and the story is recorded as verbatim as possible. The other pictures are similarly presented in turn and the stories recorded. They can be presented to groups of people (e.g. as slides) and the stories written by the respondents themselves. The stories are later analysed using content analysis.

Typical instructions for administering the test could be:
- Hand respondent one picture at a time.
- "Please would you look at this picture carefully for about 30 seconds. Now can you please make up a short story based on the picture. Try to give the story a definite ending and use what is in the picture for your plot. For example, who do you think is in the picture and what might he be saying? What might have happened
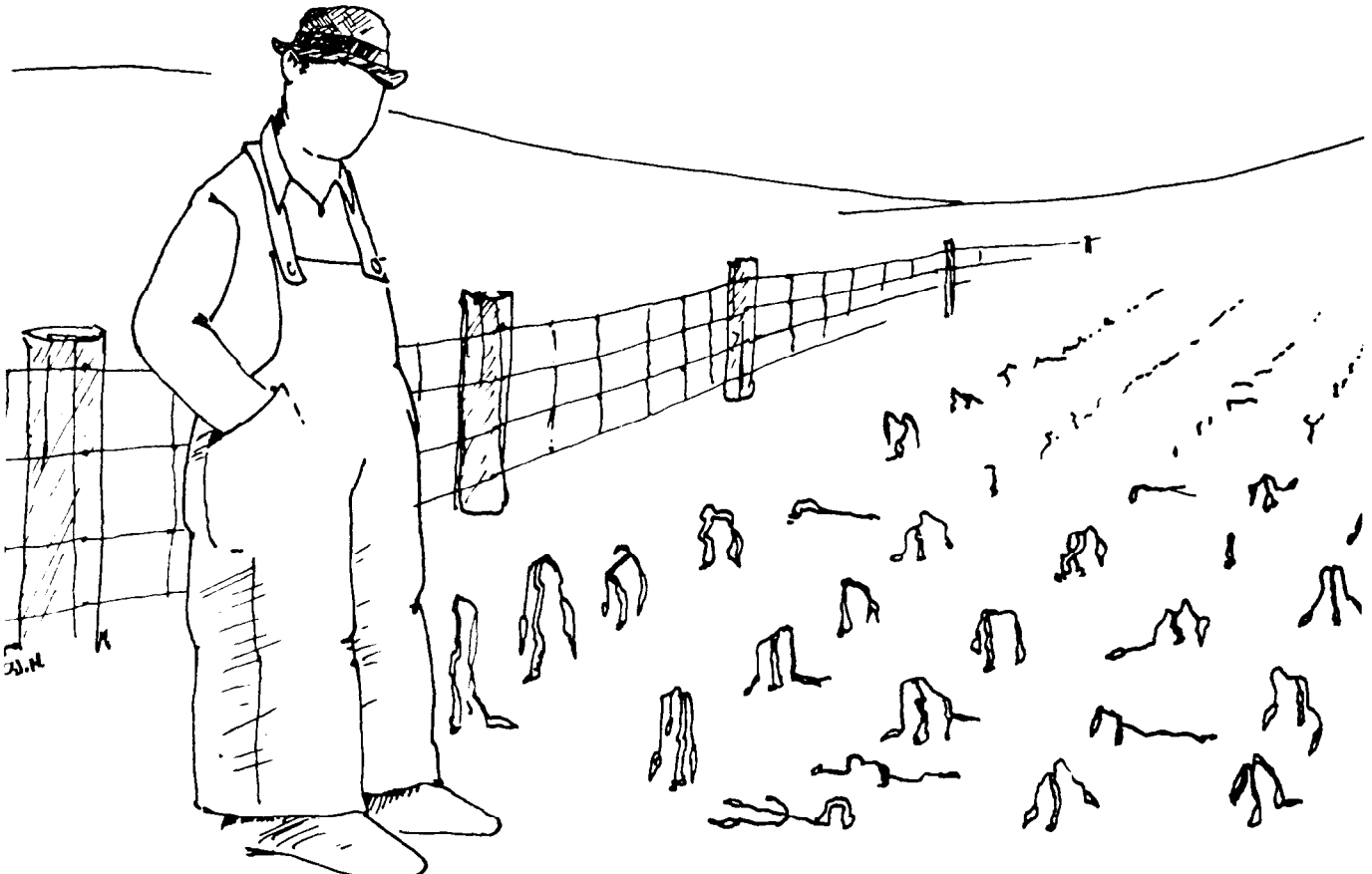
Figure 9. *Environmental Apperception Test: example of a picture shown to farmers in Victoria, Canada*

or will happen?"
- Interviewer should ask the respondent to speak slowly so that the main ideas can be noted.
- Interviewer should try not to say anything more until the pictures have been described, although general encouragement can be given to elicit more detailed narratives. He should then thank the respondent and say the stories are very good and interesting.
- It is very important to try to record the story verbatim.

Example: perception of drought hazard on the Great Plains, United States

One of the photographs used by Saarinen (1966) in his study of drought perception showed a man with a stooped posture standing in a barren field. The attitudes revealed by farmers in the Great Plains to this situation are shown in the following extracts of the stories that Saarinen obtained: "Because of the great opportunities in the late 20s and early 30s, this farmer moved to the drylands of the High Plains. His first few years were successful...And for the next four or five years the wind blew and the soil drifted... And in despair with his hands in his pockets and his head bent low, he started his return to the big city." "...He's thinking of some way he's going to control it." "...Nature will take care of it if he gives a little help." "...'Bout the most hopeless feeling there is in the world." (Saarinen 1966).

In this study, the stories were analysed using a technique to abstract a three-part theme (initial phase which sets the scene; action phase in which something is done; and a resolution phase or outcome). Murray's (1947) scheme of psychological "needs" and external "presses" on the personality was used to analyse the events described within the three parts of the theme. Saarinen used a group method of analysis rather than trying to understand the relationship between individual personality and environmental perception.

Saarinen was able to show that conflict was the main element in the farmers' perception of their environment, with their need to achieve production in opposition to environmental forces (drought). However, whilst most farmers experienced this conflict, they expressed in their stories little in the way of solution. Almost half envisaged doing nothing and most of the others showed only passive coping mechanisms. Thus for them the conflict continued unresolved, with the far-

mers tending to see success in terms of perseverance.

Evaluation

Saarinen made some suggestions for making practical use of the results of this type of study. Since the dominant environmental perception of the farmers was of a long-term, "deadlocked" conflict between man and nature (farmer and drought), Saarinen considered that innovative solutions were unlikely to be adopted by the majority of farmers. Thus he concluded that government policies to relocate farmers would be resisted by most farmers, and agricultural innovations would be adopted by only a few individuals.

Both interviewers and respondents can enjoy this technique if the interviewer is competent and at ease with it. For both, it provides a change from the routine verbal question-answer format of an interview. As for several of the techniques described in the Guidelines, the results can be analysed at more than one level, depending upon the research questions being asked, the suitability of the pictures, and the experience of the analyst. Where the pictures are essentially graphic forms of structured questions, they will elicit fairly specific, structured responses which should not be analysed at any deep psychological level but rather at the level of attitudes, or dispositions to act, in relation to the environment.

Commonly, the stories generated by the pictures evoke longer and more useful data than those evoked by verbal scenarios. But pictures require even more careful pretesting than verbal stimuli because incorrect details, or too many of them, in the picture can stimulate inappropriate responses, which cannot be readily coded. In a cross-cultural test a picture stimulus has advantages over verbal ones because of its suitability for many populations. For some people, such as illiterate groups, old people and children, it has obvious important advantages over verbal tests. The difficulties of finding suitable pictures, whether drawings or photographs, should not be underestimated. It is not yet known if a set can be devised which would be valid for more than one culture or ecological setting because little effort has yet been given to developing such environmental cross-cultural picture tests.

Barrau (1976) has used a procedure in southern France in which children were asked to draw pictures of their community. The children as a group selected those pictures which they felt were most representative of their

village or neighbourhood. These pictures were then presented to the adults of the community as a set of picture stimuli to elicit adult perceptions of their home environment. In this way, child and adult perceptions could be compared and discussed and the pictures themselves were generated from within the community.

In general, this method has considerable potential for field studies in environmental perception. It enables free responses that provide insight to the researcher beyond what he may be able to code in a formal analysis, at a group level, and gives revealing specific details which convey the flavour of the local situation.

Mental maps

Mental or "cognitive" maps are a technique for finding out the images of spatial relationships and environmental characteristics that people "carry about in their heads" and the attitudes they hold towards them. These maps fall into two main groups:
- mental maps of places of which people have direct sensory experience (e.g. their home area, place of work);
- mental maps of areas perceived through cognitive processing of personal experience (e.g. travel) and information (e.g. books, films, conversations), reflecting the individual's ignorance, prejudices or beliefs (e.g. national stereotypes).

Maps of places people experience directly are concerned with the cognitive processing of sensory perception, particularly in relation to distance perception, orientation, spatial relationships and environmental "legibility" (see page 65). The second group of maps is based on the whole system of the perception variables described in the discussion on basic approaches and reflects perceptions in the sense of prejudices, preferences and stereotypes. The two types of mental maps are characteristically obtained by different methods.

Direct (or revealed) mental maps

In this method the respondent is asked to draw a map (on a blank piece of paper or area of ground) of an area, or a route. The area or route may be defined as a specific geographic location (e.g. Nairobi), as an area known to the respondent (e.g. his neighbourhood), an area in his past (e.g. his childhood environment), or a hypothetical area (e.g. his "Utopia").

The unifying element is not the type of

area that is drawn but the fact that the respondent himself translates his mental images into graphic, spatial terms.

The respondent may be asked to describe what he has drawn and to annotate it. Depending on the research questions of the investigation, the map can be content analysed in terms of its structure, components, style, or what it includes or does not include. The analysis of the maps obtained from a sample of respondents can be converted back into a cartographical form to present a model of the collective image held by a group of people. Such group mental maps can then be compared with those of other groups.

Sanders and Porter (1974) compared drawings of an outline map of Africa made by students in Tanzania and the United States (Fig. 10). Using principal components analysis and principal axes factor analysis, they were able to systematically compare shape and orientation errors between the two groups of students. They suggested that similar analyses might be made of successive early maps of, for example, Africa or the New World to determine how historical perceptions of newly discovered lands changed as knowledge of them increased through time.

These collective images have been used in comparing different ethnic and social groups' mental maps of a city and in tracing the developmental sequence of spatial images in children of different ages. Lynch (1960) did pioneering work in comparisons of urban images, but his samples of respondents were small and not selected primarily to represent social or ethnic differences within the city. His main concern was with the "imageability" of the environment.

In a more structured form of the test, the respondent is simply asked to draw a line around the part of the map which he considers to be his own area or neighbourhood. The concept of "neighbourhood" has both social and physical meanings to most people whose area of social contact and identity is usually smaller than their perception of physical homogeneity such as housing type (Lee 1968). It has been found in other studies that the residents' perceptions of what constitutes their neighbourhood differ from that of planners, and knowledge of residents' perceptions is useful to planners in urban renewal and design. The careful structure of respondent samples (e.g. ethnic groups; young and old people) can enable researchers to make valuable suggestions about the planning and design of such areas with particular reference to the needs of particular groups. A good ex-

ample of the use of this technique in urban planning is given by Appleyard (1969) in his study of the new Venezuelan city of Ciudad Guayana.

Example: Children's perceptions of their home environment. Maurer and Baxter (1972) used mental maps to study children's images of their homes, neighbourhoods, journeys to school, liked and disliked places and their city of Houston, Texas. The children included ninety-six black, white and Mexican-American boys and girls from 7 to 14 years old. Each child was interviewed by a young woman of the same race and asked to draw maps on paper of his neighbourhood and city. Each child was asked to name places on the maps, to describe the journey between home and school and to say where he most liked and least liked to play.

Younger children were found to draw their neighbourhoods much smaller than older children. This was the only significant effect of age found, which is a surprising finding in view of the developmental psychology assumptions made about children's perceptions of space. The effect of race was strongest; white children were able to draw more accurate maps of the whole city, and their neighbourhood maps covered larger areas. Their friends lived farther away from their home and they were more likely to ride than to walk to school. White children had lived at their present home for less time than black and Mexican-American children. Their maps emphasized the structure and pathways of their areas and were bounded by main roads and railways. In contrast, black children's maps emphasized the home.
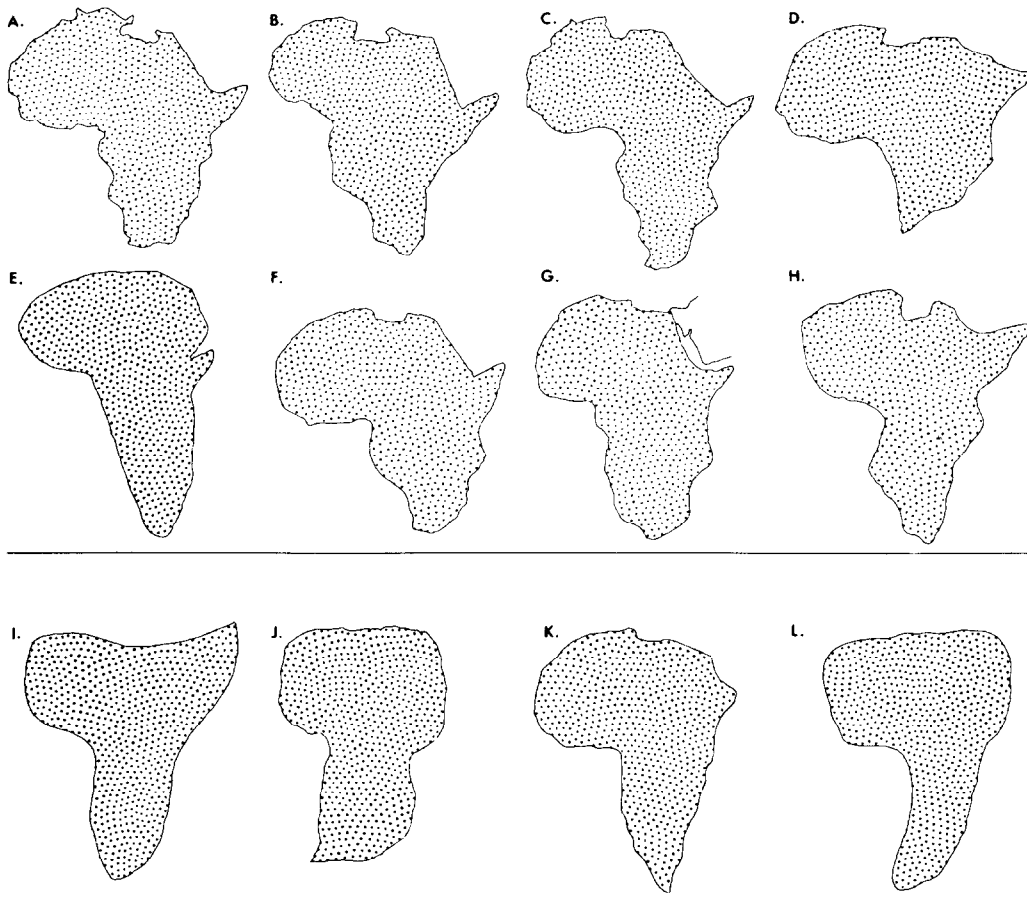
Note. Twelve randomly selected examples of student attempts to draw the shape of Africa. Figures A-H were drawn by Tanzanian students, and Figures I-L by American students. The area of each has been standardized.

Figure 10. *Revealed mental maps: African and American students' attempts to draw the shape of Africa (reprinted with permission from Sanders and Porter 1974)*

Indirect mental maps

With this method, the respondent is asked to rank a series of elements (e.g. countries, towns) in terms of some attribute (e.g. knowledge, or his preference for them as a place to live in). These rankings are then aggregated for the total sample of respondents, factor analysed, and presented graphically in map form. The mapped attribute can be presented as isolines superimposed upon a cartographic map of the area.

Distortion in distance or area can alternatively be used to represent the difference between the geographical spatial relationships of different places and their perceived values for a group of respondents along a named attribute. The latter can produce humorous maps of gross over-distortion of local areas to reflect ethnocentrism and territoriality as well as our common ignorance of more distant places (Gould and White 1974).

Indirect mental maps are less a technique of eliciting spatial images than one of presenting in map form aggregated perceptions of, or preferences for, geographic places. It is unfortunate that both the direct and indirect methods have come to be known as "mental maps", since only the method involving the individual respondent as the principal draughtsman can really be described as a "mental map" test. Maps of the second type (indirect mental maps) are more accurately described as maps of spatial knowledge or preference.

OTHER SPECIALIZED INTERVIEW TECHNIQUES

Attitude scales

The concept of attitude is described on page 93. Attitudes usually are considered to include emotional, intellectual, and behavioural aspects which together predispose the individual to act in a certain way. In terms of stability, attitudes are assumed to come somewhere between values (long-term) and opinions (transitory). Thus, attitude scales are usually designed to measure attitude direction (positive or negative towards the attitude object), attitude strength (the extremity or moderation of view) and consistency (expected relationship between attitudes). Studies measuring attitudes at different points in time for the same population can also use these scales to measure attitude change.

Attitude scaling is now a well developed technique, forming a major research area within social psychology. There are several col-

lections of scales to measure attitudes to a wide range of specific and general phenomena. It is thus worthwhile to survey the literature to determine which is most appropriate for the research to be undertaken (e.g. Robinson, Rusk and Head 1973; Robinson and Shaver 1973; Shaw and Wright 1967).

One problem encountered when using these scales is that the wording of the statements is usually critical to the responses. For this reason, in any particular field situation, it often seems preferable to construct a new scale. Thus, the number of scales is constantly increasing; very few of them are used in more than one study, so that the validity and reliability of most scales are unknown.

Scale construction

An attitude scale is a collection of statements to which the respondent is asked to respond one at a time by indicating to what extent he agrees or disagrees (see discussion on scaled questions). Ideally the statements should be short, contain one idea, and be phrased in unambiguous language suitable to the study population. The statements included in the scale (usually between ten to thirty statements) are selected from a much larger number on the basis of pretesting (with a number of judges rating all statements) so that the relative strength of each statement can be calculated. The final scale is made up of those statements which appear to cover the range of attitudes found among the study population. These statements should be spaced roughly equally apart in attitudinal distance and should be consistent in discriminating between people where their attitudes are placed along the scale.

The scale requires validation by testing on two populations which on other behavioural or social characteristics would be expected to differ in attitude along the measured dimension. If the scale measures significant differences in attitude between the two populations, it is considered ready for use.

Attitude scale construction is described in more detail in Fishbein (1967). It is not possible here to go into the theoretical difficulties surrounding these scales but anyone contemplating constructing his own scale should be aware of them. One major problem which should be at least mentioned is that it is difficult empirically to find a relationship between measured attitudes and observed behaviour (Wicker 1969).

Evaluation

The advantage of using an attitude scale is that, if properly constructed, it provides interval rather than nominal or ordinal data so that the relative attitude strengths of different people and groups may be compared. The difficulty is that the large number of statements necessary to obtain valid measurements sometimes tire the type of respondent who thinks carefully about each one, especially if the scale is part of a longer interview. Some people also find it irritating to consider statements that seem to them to be irrelevant, oversimplified or self-evidently wrong-headed. This is a similar problem to that of forced-choice statements (see page 40) and is a particular difficulty with more knowledgeable and thoughtful respondents. Sometimes respondents want to make two separate assessments, one for the present and one for the future; or alternatively, for how things really are, and for how they should be. Filling in responses to a number of statements, especially for more complex scales, requires effort and concentration. Also the repetitiveness of some ideas used for internal validation can be noticed and queried by respondents. These are problems common to many attitude scales.

Attitude scales are easy to analyse because they are already constructed to allow rapid scoring. The ease of analysis is gained only at the expense of careful and time-consuming scale construction.

Attitude scales are usually highly situation-specific with regard to culture and location. Even between North America and England, attitude statements require different wording. When attempts are made to use the same instrument for widely different cultures, the problems are magnified to such an extent that the validity of the instrument becomes highly questionable. Designing a scale for each specific situation is therefore a time-consuming task leading to scale proliferation and problems of validation, but this is necessary if such a technique is to be used cross-culturally.

A more fundamental problem is that attitude scales were initially developed for literate, western populations generally familiar with questionnaires, opinion polls and pencil-and-paper tests. In many other cultures, the task of saying how far one agrees or disagrees with a set of statements is not part of the culture or social organization. The use of attitude scales cross-culturally is therefore fraught with many difficulties.

Multidimensional scaling[1]

Multidimensional scaling (MDS) is a technique designed to overcome some of the traditional problems in scaling verbal response. These problems include:
- sensitivity to the way the scales are administered, especially in interviewer-respondent interaction effects;
- assumptions that the researcher can prejudge which and how many relevant dimensions to measure;
- assumptions that the scales selected by the researcher are unidimensional.

Multidimensional scaling is a means of scaling respondents' judgements or attitudes along dimensions which are obtained from the respondents' answers rather than from the researcher's questions (Romney, Shepard and Nerlove 1972). It can also be used to show how distance is subjectively distorted in relation to the absolute distances that exist between points in Cartesian space. When inter-stimulus relationships are shown in a two-dimensional configuration, the result is a mental map which depicts the way people stretch and compress their perceived environment.

Method

The technique requires that the respondent makes a successive number of judgements. These may concern the distance between two points, or the difference between two attitude statements, or which one (object, statement, place) he prefers to another. Thus the respondent is evaluating the similarity, dissimilarity or degree of association between any stimuli or elements. These may be presented to him as triads (see page 59) or as successive pairs (Messick 1956; Torgerson 1952). If the stimuli are attitude statements, a respondent can be requested to estimate the differences between stimuli on a scale where 0 represents total dissimilarity and the upper end signifies total similarity. Often a respondent is asked to simply indicate his preference, and the distance between the stimuli is measured by the proportion of times he chooses one over another.

Analysis

Multidimensional scaling is concerned with the problem of representing n objects geometrically by n points so that the distances

between each point in space correspond to an empirical measure of relatedness among various psychological stimuli. Consequently, the technique involves two models. The first one, a *distance model*, is necessary to obtain inter-stimulus distances. Psychological distance is viewed in terms of agreement or disagreement between two statements. Short psychological distances represent dissimilarity or disagreement, while long psychological distances represent similarity or agreement. The distances are supplied by the respondent's judgements.

The second component of the multidimensional scaling procedure is a spatial model to determine the dimensionality of the space, and the projections of the stimulus points along its axes. Numerous algorithms have been developed, but modern multidimensional scaling began with a non-metric procedure developed by Shepard (1962) and Kruskal (1964a, 1964b). Analysis is now carried out using computer package programs such as TORSCA and INDSCAL which incorporate various improvements to the original formulation (Golledge and Rushton 1972). The number of dimensions obtained and their identity must generally be interpreted on the basis of the loadings each stimulus has on each of the dimensions for the various solutions.

This procedure is characteristic of any factor extraction technique such as principal components analysis, but multidimensional scaling has two advantages. Experience has shown that an acceptable solution seldom exceeds three dimensions. When the judgements of a group of respondents are collapsed into a single matrix by calculating the modal or median differences between pairs of stimuli, the Shepard-Kruskal procedure yields a metric solution from the weakest possible assumptions in the original data.

Evaluation

Multidimensional scaling is a potentially important technique in environmental perception because it does not impose the researcher's structure on the data at the outset. Because it is also essentially a non-parametric technique, it has advantages over other multivariate analyses. At the same time, however, it does have several disadvantages for use in the field:

- There is at present no basis for determining the number of respondents necessary to produce meaningful and stable dimensions.
- The number of stimuli given to each respondent must cover a large enough range to ensure that all the relevant dimensions

are included, but every additional stimulus increases the size of the task exponentially.
- The dimensions obtained by analysis are not always clear in their number or identity.
- The task for the respondent and interviewer is time-consuming, onerous, and largely uninteresting.

The last point should perhaps be the most influential one for field investigations.

Repertory grid

The repertory grid is a method devised to measure how people categorize phenomena (places, people, events). It enables the researcher to find out what things are put in the same or different classes in people's minds and how the classes of phenomena are distinguished from each other.

The method was originally developed by Kelly (1955) as a clinical technique to measure personality by asking people to distinguish between people in their personal lives (mother, teacher, etc.). It has since been used in environmental perception to measure, among other things, tribal perceptions of agricultural problems in Africa, perceptions of urban services, and comparisons of different places (locally and nationally). As used in environmental perception, its results are not necessarily interpreted within Kelly's personal construct theory from which it was developed as a model of personality.

Method: presentation of triads

The technique is one of presenting a respondent (or group of respondents) with triads, or sets of three phenomena or concepts. These are usually words either written on cards or spoken verbally. They can also be pictures on cards, drawn on the ground or pointed out in the environment. Cards have the advantage that the respondent can handle them, and physically rearrange them as he considers alternative groupings so that the task becomes easier, more concrete and evidently more enjoyable.

For example, "mountain", "river", "field", "village" etc., could be presented in several different ways depending on the interview circumstances. These are called "elements". They may either be given as a set to the respondent or he may produce his own. Often responses to open questions in the rest of the interview can provide the "set" of elements. Alternatively, the element-set can consist of some researcher-initiated responses and some respondent-initiated ones.

The respondent is then asked to indicate one important way in which any two elements of the three presented to him are alike and are different from the third element. In the example above, he might say "mountain" and "field" are alike because both provide him with food.

Then he is asked which card is the odd one and in what way it is different from the others. If "river" were the third element in the triad, he might say it was different because it didn't provide food but flooded his crops and ruined them. For another respondent, one could imagine a quite different set of constructs and groupings for these same three elements, reflecting differences in environmental perceptions and lifestyles.

For each of the remaining cards in turn, the respondent is then asked to say whether they are more on the "alike" side or the "unalike" side of the construct he has defined. (Alternatively, respondents may be asked to rate the elements according to how much alike or unalike they are on the construct, but this is a more difficult task for the respondent in an already long test and requires more analysis.)

The elements are randomly presented in sets of three, ideally until all possible combinations have been explored. This full repertory grid allows analysis of the relationship between a respondent's constructs by factor analysis or principal components analysis in order to identify the major principles on which he discriminates between phenomena. The triad method of presentation is being increasingly used in field research independently of repertory grid techniques.

The repertory grid presents more difficulties to the interviewers than to the respondents. It is a relatively complex procedure for interviewers to fill in the grid correctly as well as randomly present successive triads. Interviewers therefore need considerable training in the use and rationale of the grid before using it in the field.

The simplest way to present the interviewer's task is to show a grid and a set of typical instructions to interviewers (Table 8).

Evaluation

For the respondent, whose task is to select between three given variables on the grounds of his own criteria of "difference" and "alikeness", the task is relatively simple. The use of cards makes the task more concrete and enables the respondent to make alternative rearrangements. The structure of the task itself is different enough from the usual interview schedule to provide a relief from questioning. To complete a full grid requires one or more hours, and this is a significant problem in using the repertory grid as one part of a longer interview.

Repertory grids can be analysed at several levels. Where complete grids are obtained,

Table 8. *Instructions for repertory grid*

Use a small set of cards. These are the "elements".

1. Interviewer place three cards selected at random in front of the respondent and ask him to say one important way (construct) in which any two of them are alike and are different from the third one. Write his response in the "alike" column.

2. Then ask which is the odd card out and in what way it is different from the others. Write down his response in the "different" column.

3. Write X in the appropriate boxes for the two "alike" elements.

   Write O in the appropriate boxes for the "different" element.

4. For each of the remaining cards in turn, ask him to decide whether it is more on the "alike" side or the "different" side of the construct.

   Write in A (alike) or D (different) for each box in the row as he answers.

5. Repeat for as long as possible, or until the grid is completed.

		ELEMENTS										
		hill	road	village	well	cornfield	stream	forest	beanfield	farm	pasture	
	ALIKE	1	2	3	4	5	6	7	8	9	10	DIFFERENT
CONSTRUCTS L	dry	X	A	A	D	D	O	D	X	D	A	wet
2	home	A	D	X	A	X	A	O	A	A	A	dangerous
3	ours	D	O	A	X	A	D	D	A	X	D	not ours
4												
5												
6												
7												
8												
9												
10												

Note. The elements and constructs filled in are samples only.

they are usually key punched for the computer and analysed by factor analysis or principal component analysis. For incomplete grids where the object is to gain some sense of the main criteria by which phenomena are compared, analysis can usefully be done at the "eye-balling" level. Thus, there is potential for sophisticated analysis with repertory grids, but much can also be learned at the level of identifying people's "labels" for environmental components and places.

The use of cards, real objects (e.g. plants, pointing to parts of the landscape) or drawings in presenting triads of elements makes repertory grids an attractive and flexible cross-cultural technique. However, its two main difficulties - the time taken and the need to carefully train the interviewers - make this technique less useful in a survey or sampling situation. It should perhaps be restricted to supplement in-depth studies by experienced personnel, so that additional material (e.g. folk-lore, linguistic data) can be used to give a more complete context to the repertory grid data. The repertory grid is an important means of probing categorization, but it tends to provide only one possible taxonomy, whereas most people and cultures operate with a complex set of criteria for their environment.

Personality measures

Personality scales and tests (including the TAT) are largely concerned with measuring individual personality in relation to the socio-psychological environment rather than the physical environment - in the context of landscape, towns, streets and places.

Many of these personality measures require use by highly trained personnel and/or they require the respondent to "take a test" in the sense of sitting down with paper and pencil and filling in one hundred or more items. Their predictive ability for how man perceives and relates to his physical environment is not yet known, although work by Craik (1975) using a battery of personality tests in assessing environmental appraisal, may unravel some of the more relevant measures.

Generally, tests which measure only a few dimensions of personality rather than seek a comprehensive personality assessment have been more successful in relating personality to environmental perception. This is true for Saarinen's (1966) modified analysis of farmer's responses to TAT or (EAT) pictures of drought. It is also true for measures of efficacy or perceived control over one's

environment in several studies (Baumann and Sims 1974). This dimension is described on page 89. It can be measured by devising scenarios, sentence completion and Environmental Apperception Tests, among others, to elicit responses along the axis of perceived control or perceived powerlessness.

Internal-External Control Scale

One well known measure for efficacy is Rotter's Internal-External (I-E) Control Scale (Rotter 1966) to measure people's perception of their degree of control over events in their own lives and in the world in general. Although it is not so pure a scale as it was originally thought to be and although later work has shown "personal control" (personal events) and "control ideology" (events in general) to be different components of the scale, it has been widely and successfully used, mainly in North America. Personal control is found to be the dominant factor, accounting for most of the variance. Over fifty per cent of the studies investigating Internal-External control have used the Rotter I-E scale although there are another twenty scales developed to measure efficacy (reproduced in Robinson and Shaver 1973).

The scale is a self-administered paper-and-pencil test and consists of twenty-three forced-choice questionnaires, plus six "filler" questions that are not scored. Internal statements are paired with external statements. One point is given for each external statement selected. Scores can range from zero (most internal) to twenty-three (most external).

The I-E scale was tested in the field by participants at the MAB perception workshop held in Victoria, Canada, in May 1976 and evaluated for its usefulness cross-culturally (Canada-MAB 1977). It was found that in a field setting even within North America (as opposed to student populations on campuses), the forced-choice format produced considerable difficulty in administration. Respondents were unwilling to commit themselves to either alternative, despite the initial assurance that the task was simply an exercise to decide which extreme statement was closest to their own view. Extreme statements were alienating and respondents wanted to modify them, if they had not already rejected both views.

The task was also fairly long (15 to 20 minutes), especially when respondents felt negative about it, and were unused to such pencil-and-paper tests.

The concept of perceived control over the

environment was considered to be significant in environmental perception and behaviour, but doubts were raised as to whether this scale was the best way to measure it for householders in Victoria. The wording of the statements showed a strong orientation towards American college students and was not relevant enough to the respondents. Even though the Victoria respondents were part of a literate, "western" society, the task of identifying themselves with a long series of extreme statements was not congenial to them.

The workshop therefore concluded that the I-E scale in its present format is not useful cross-culturally although the concept of internal-external control in relation to the environment is of relevance. The present I-E scale is directed at control over events in the context of a particular type of society, and in any cross-cultural modification its content and format would need to be completely reconstructed.

Environmental personality measures

The development of personality measures specifically with reference to man's interaction with his natural and built environment, rather than with society, is still in its infancy. We lack a coherent model of man-environment relations which would provide criteria for selecting dimensions along which to measure individual personality dispositions towards the environment. Even more important, in terms of personality dispositions, it is not yet known if the physical environment is significantly different from the social environment to require new models of man-environment interaction. The relationships between the individual, his social setting, and his ecosystem are not well conceptualized in scientific theory.

Three measures have been developed in North America for scaling personality among specific dimensions in relation to the physical environment (Little 1973; McKechnie 1974; Sonnenfeld 1969). The three main dimensions found are: control over nature, social versus technological orientation and risk-seeking avoidance, with a fourth dimension of time orientation and change. These dimensions are shown as axes in a hypothetical man-environment "space" in Figure 11.

Environment Response Inventory (ERI)

The most elaborately developed measure is the Environmental Response Inventory (McKechnie 1974) which consists of 184 statements covering a wide range of attitudes to the natural and built environments, science, tech-
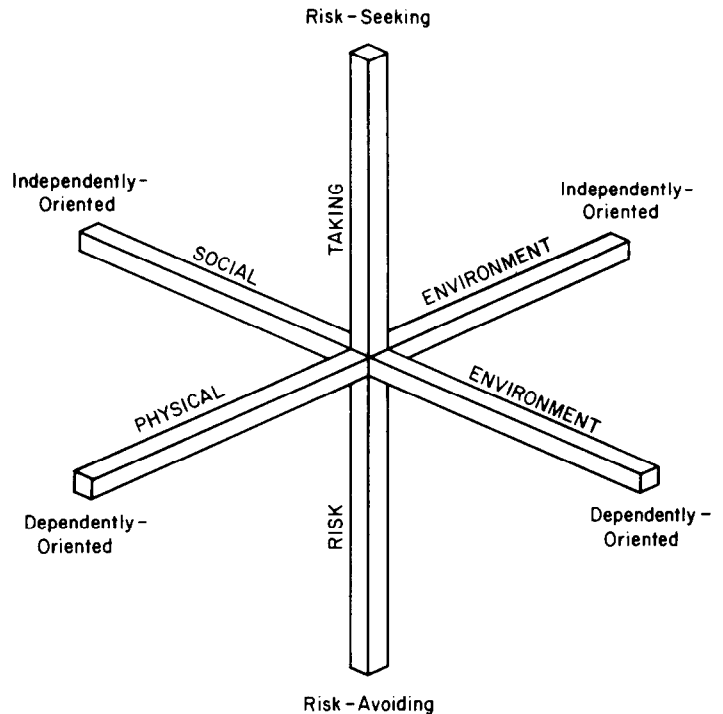
Figure 11. *Major dimensions in man-environment relations being measured by present environmental personality scales*

nology, aesthetics and privacy. The test is a self-administered paper-and-pencil one in which the respondent is asked to indicate the extent to which each statement describes or applies to him, using a full 5-point scale from strongly disagree to strongly agree (see page 42 on scaled questions). The test takes up to 40 minutes for unselected adult samples in North America, and is invalid if more than sixteen items are not completed.

From the 184 responses, eight environmental disposition scores and one validity score (called communality) are obtained. These are described in Table 9 together with idealized descriptions of how a high and low scorer might be described. The ERI has already received some validation in North America and this work is being continued.

Evaluation of environmental personality measures

Table 10 shows the relationship of scales

HIGH SCORERS ARE OFTEN DESCRIBED AS:	SCALE AND MAJOR THEMES:	LOW SCORERS ARE OFTEN DESCRIBED AS:
Aesthetic, affectionate, complicated, distractible, outspoken, progressive, rebellious, unconventional, unpredictable, selfish.	PA (Pastoralism). Opposition to land development; concern about population growth; preservation of natural resources, including open space; acceptance of natural forces as shapers of human life; sensitivity to pure environmental experiences; self-sufficiency in the natural environment.	Apathetic, conscientious, conservative, conventional, deliberate, dependable, friendly, honest, practical, self-controlled.
Critical, skeptical, responsive to urban aesthetics, highbrow, concerned with philosophical problems in life, valuing intellectual activity, managerial interests.	UR (Urbanism). Enjoyment of high density living; appreciation of unusual and varied stimulus patterns of the city; interest in cultural life; enjoyment of interpersonal richness and diversity.	Conscientious, conventional, friendly, generous, nonverbal, opportunistic, robust, simple, unselfish.
Autocratic, condescending, conservative, efficient, enterprising, extroverted, hardheaded, mannerly, methodical, power and money oriented, judgmental, aesthetically unresponsive.	EA (Environmental Adaptation). Modification of the environment to satisfy needs and desires, and to provide comfort and leisure; opposition to governmental control over private land use; preference for highly designed or adapted environments; use of technology to solve environmental problems; preference for stylized environmental details.	Artistic, awkward, compassionate, curious, distractible, idealistic, introspective, moody, nonconforming, sensitive, sensuous, worrying, forthright.
Adventurous, disorderly, distractible, dreamy, easy-going, immature, impulsive, progressive, unconventional, undependable.	SS (Stimulus Seeking). Interest in travel and exploration of unusual places; enjoyment of complex and intense physical sensations; breadth of interests.	Conscientious, conservative, fastidious, practical, responsible, rigid, severe, stingy.
Capable, competent, diligent, efficient, helpful, ingenious, resourceful, stable, thorough, tolerant, well-adjusted.	ET (Environmental Trust). General environmental openness, responsiveness, and trust; competence in finding one's way about the environment vs. fear of potentially dangerous environments; security of home; fear of being alone and unprotected.	Bitter, cold, coarse, dissatisfied, distrustful intolerant, moody, prejudiced, spendthrift, unkind.
Affectionate, artistic, changeable, dependent, dreamy, emotional, forgiving, idealistic, introspective, aesthetically reactive, warm.	AN (Antiquarianism). Enjoyment of antiques and historical places; preference for traditional vs. modern design; aesthetic sensitivity to man-made environments and to landscape; appreciation of cultural artifacts of earlier eras; tendency to collect objects for their emotional significance.	Coarse, cool, conservative, deliberate, mischievous, moralistic, practical, sly, stolid, unemotional.
Aloof, arrogant, autocratic, bitter, cold, formal, hard-hearted, sulky, polished, resentful, stubborn.	NP (Need for Privacy). Need for physical isolation from stimuli; enjoyment of solitude; dislike of neighboring; need for freedom from distraction.	Appreciative, cooperative, easy-going, friendly, seeking reassurance, warm, seeks acceptance, lacks confidence, introverted.
Arrogant, conceited, egotistical, hardhearted, masculine, self-seeking, inflexible, sociable, manipulative.	MO (Mechanical Orientation). Interest in mechanics in its various forms; enjoyment in working with one's hands; interest in technological processes and basic principles of science; appreciation of the functional properties of objects.	Affectionate, feminine, generous, sincere, understanding, submissive, sympathetic, warm.
Calm, civilized, initiatory, mannerly, patient, tactful, trusting, rule-following.	CO (Communality). A validity scale, tapping honest, attentive, and careful test-taking attitude; response to items in statistically modal manner.	Hard-headed, flirtatious, good looking, immature, opportunistic, versatile, witty, independent-minded, psychologically complex.

Table 9. *Environmental Response Inventory Scales (reprinted with permission from McKechnie 1974)*

| Dimension | Scales | | |
	ERI	EPI	T-P Scale
Control of nature	Environmental adaptation	Control	
Harmony with nature	Pastoralism[1]	Sensitivity	
Dependence on nature	Environmental trust		
Social orientation	Urbanism		Person orientation
Technology orientation	Mechanical orientation		Thing orientation
Solitary orientation	Need for privacy		
Risk seeking	Stimulus seeking	Mobility Risk-taking	
Time orientation	Antiquarianism		

Table 10. *Comparison of the dimensions measured by the Environmental Response Inventory (ERI), Environmental Personality Inventory (EPI), and the T-P Scale*

[1]Note that the use of "pastoralism" here does not imply stock-herding people but individuals who are conservationist, somewhat fatalistic and sensitive to nature (see table 9).

(in terms of their verbal labels) measured by the Environmental Response Inventory, ERI, (McKechnie 1974); the Environmental Personality Inventory, EPI, (Sonnenfeld 1969); and the T-P (Thing-Person) Scale (Little 1973). The most comprehensive set of scales is that of the ERI which includes all the axes diagrammed in Figure 11. By comparison, the T-P scale is focussed on the social axis and the EPI measures personality along the risk-taking and environmental control axes.

The rational construction of the ERI scales and their similarity to scales obtained by factor analysis suggest that the scales are measuring significant dimensions, at least for North American populations.

Use of the ERI cross-culturally is, however, limited by its derivation within a single cultural context. It has been shown in many anthropological studies (and discussed cross-culturally by Douglas 1966, 1970, and Whyte 1975b) that an important dimension in environmental perception is where the distinction is made between man and society on the one hand, and environment on the other. What is considered to be "man-made" or "man-caused" versus "environment-caused" varies with individuals and cultures. The personality dimensions presently being measured by available tests may thus be subsumed below another untapped dimension. In view of the strong cultural differences in defining what is external to man (his environment) and in attributing cause and effect in natural and

social processes, the available personality measures are not yet suitable to be used cross-culturally in their present forms.

In addition, as field instruments, especially among largely illiterate populations, present personality tests are obviously limited by their length (except for the T-P Scale), by their paper-and-pencil test formats as well as by the content of their statements. Until further development is made within different cultural contexts, personality dimensions are probably best measured by content analysis of projective tests.

SUGGESTIONS FOR FURTHER READING

The literature on projective techniques is very diverse and much of it is highly technical. Researchers wishing to find out more about the semantic differential technique should consult Snider and Osgood (1968). Similarly, the repertory grid technique is described in Bannister (1970), Harrison and Sarre (1971, 1975) and Slater (1969). Q-sorts are discussed in North *et al.* (1963) in the context of content analysis. Mental maps are described by Gould and White (1974) and Downs and Stea (1973). Saarinen's (1966) study of perception of drought hazard is a good empirical example of some of the possibilities and problems of fieldwork using Environmental Apperception Tests. Saarinen also discusses projective techniques generally in Ittelson (1973). The literature on attitude

scales has already been mentioned but two source books are worth repeating here: Robinson and Shaver (1973) for examples of attitude scales, and Fishbein (1967) for a thorough introduction to theory and method.

VI. LISTENING, RECORDING AND CODING

METHODS OF STRUCTURING LISTENING

The third major methodological approach to environmental perception – that of listening and recording oral and written evidence – combines the skill of observation and interviewing with the art of understanding what is heard and read and the faithful transcription of it into a permanent record.

Listening and recording are primarily, but not exclusively, concerned with oral evidence. As methods, they place major importance on obtaining respondents' perceptions and information without constraining their form or content by the immediate research objectives. These perceptions and knowledge are transmitted to the researcher either as conversations or through diaries kept by the respondent. Like the participant observer, the researcher who uses listening as a main field approach will spend much of his time talking with people and then transcribing what he has heard.

Listening and recording are rarely singled out for separate treatment in methodological discussions. There is no set of rules to follow since so much depends on the individuals concerned – both the researcher and the respondent. They also produce invaluable but generally non-numerical data that have been unfashionable among social scientists in recent decades. The art of "scientific" listening is therefore the most neglected technique in the researcher's field kit.

Listening and recording require sympathy and patience on the part of the researcher who may have to sit through, and later transcribe, a long and apparently tangential monologue whose bearing on his research is uncertain at the time. They also require skill in coding narratives into categories if any quantitative analysis is to be done with the material.

Listening and recording require much time and effort. Each session with a respondent may take several hours and researchers, such as oral historians, who use listening as their main tool may visit one respondent many times over a period of years.

It is not possible to specify a set of methodological rules to follow which, if adhered to, would produce "scientifically" acceptable research results. Some guidelines have been given in the section on unstandardized interviewing (page 37) which is the form of interviewing which comes closest to a "listening" approach. Further guidelines will be described in the section on oral history. Oral historians have developed a wealth of experience in letting respondents speak about themselves and their own lives, using a research approach similar to that of many anthropologists, except that it is applied to the researcher's own society and culture. Both research traditions have much to offer to students of environmental perception.

Three methods – urban walks, time diaries and oral histories exemplify the usefulness of a listening and recording approach. These are not exclusively oral listening methods, nor are they completely unstructured. But they do reflect a research relationship in which the researcher hears what the respondent can tell him in his own terms. In other words, the respondent becomes the "expert" within the confines of the immediate research topic.

Urban walks

Urban walks are a synthetic technique in that they combine observation, interviewing and listening in various degrees. They were pioneered by Lynch (1960) in his study of the imageability of urban environments in the United States. Since then, several similar studies have been undertaken to compare different groups' images of their cities (e.g. children, ethnic groups, occupational groups), including a comparative study of four cities in the United States by Lowenthal and Riel (1972). Each study used the urban walk technique in a slightly different way.

Assumptions

The assumptions of the technique of urban walks are as follows:
- Cities are complex physical and social environments which require "decoding" in order for the individual to find his way. Orientation, route-finding and distance estimation are ways in which environmental perception enables people to live in a city and to "read" it.

- The "imageability" of a city is a source of emotional satisfaction to individuals and groups. This imageability is related, at least in part, to the design and layout of urban settings in the context of their present use.
- The high information content of a city requires cognitive organization into a coherent pattern. The process of acquiring this coherent image brings satisfaction to the individual.
- Within cities, sub-groups with different behavioural patterns perceive the city differently. These distinct perceptions in turn help to shape their urban behaviour (especially spatial). Examples of sub-groups are: professional planners and residents; residents of different neighbourhoods; and ethnic, occupational, social and age sub-groups.

Method 1 (Lynch and Rivkin 1959)
Sampling. The walk is selected by the researchers to be reasonably characteristic of the urban area. It is not chosen by the respondents. Respondents are not selected on any statistical sampling basis as the numbers of them are small anyway.

Walk. A respondent (usually a resident) is asked to take a walk around a specific urban route with an interviewer. He is told: "We are about to take a short walk. Don't look for anything in particular, but tell me about the things you see, hear or smell; everything and anything you notice." A microphone is attached to the respondent and everything he says is recorded. There should be a minimum of talking by the interviewer. Afterwards these verbatim impressions are transcribed and content analysed (see page 75). An alternative procedure is for the interviewer to take as full notes as possible during and immediately after the walk.

Interview. Within 2-3 days after the walk, the respondent is interviewed. He is asked to recall the walk and the things and events he noticed. His verbal description is recorded. After this open-ended question on recall, specific questions are asked, such as:
- questions about particular buildings, sounds, traffic signs, etc.;
- how many definite areas he had passed by;
- if he felt the areas had any order of continuity and if so, why;
- whether the part of the city visited seemed to fit into his picture of the city as a whole;

- what were his feelings on the walk;
- what made the greatest impression on him.
The respondent is shown a set of photographs of buildings, street views, etc. He is asked to say which ones he noticed during his walk. These responses are compared with his observations at the time of the walk.

Method 2 (Lowenthal and Riel 1972)
Sampling. Respondents are recruited from various groups to be reasonably homogeneous with respect to several principal background characteristics and large enough to provide statistical validity. Ten walks are selected as representing the "quintessence" of the city rather than its overall character. Each route is designed to provide a change in direction and a well defined beginning and end. Each respondent is asked to cover all ten walks.

Walks. The walks can be taken in any order but only in the prescribed direction because views and impressions are obviously influenced by the direction taken. Respondents have to be by themselves and walks have to be taken on specified days of the week, during daylight hours when it is not raining. No more than two of the walks can be taken in any one day.

Questionnaire: Table 11 (from Lowenthal 1972). The structured questionnaire is completed by the respondent immediately after the walk, often at locations suggested in the walk itinerary. It includes a semantic differential test (see page 45) to find out which traits, among twenty-five pairs, respondents feel are most significant in each walk and a description in their own words of the area or of their feelings about it.

Interview. A few days after the last walk is taken, the respondents are interviewed about their recall and asked to elaborate on their written questionnaires. Background data on the respondents and their impressions of the city are obtained.

Evaluation
Both methods of urban walks are heavily dependent upon content analysis as a means of structuring the free impressions provided by the respondents. Lowenthal and Riel (1972) also make use of the semantic differential test to provide comparative ratings across walks and respondents for twenty-five pairs of descriptions or verbal labels. This makes possible the statistical handling of data, but has been criticized for the selection of non-standard semantic pairs which does not allow valid com-

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Walk Questionnaire

1. Name _____ Date and Time of Day _____ Path No. _____

2. Weather conditions   a. warm _____   a. windy _____   a. bright _____
   (check 1 of each pair)   b. cool _____   b. still _____   b. cloudy _____

3. Your own condition _____

4. Experience: Have you previously been: Often   Sometimes   Never

       a) in this neighborhood   ___   ___   ___
       b) along much of this path   ___   ___   ___

Question 1.

On the next page you will find twenty-five pairs of opposing words, each pair separated by a line with five spaces. On each line, check the space that best describes what you saw on the walk you have just taken. For instance, if you feel the walk is very clean, check the space farthest to the left:

      clean   X   _____   _____   _____   _____   dirty

If it is somewhat more clean than dirty, check here:

      clean   _____   X   _____   _____   _____   dirty

If it is equally clean and dirty or neither, check the middle space:

      clean   _____   _____   X   _____   _____   dirty

If it is somewhat more dirty than clean, check here:

      clean   _____   _____   _____   X   _____   dirty

If it is very dirty, check the space farthest to the right

      clean   _____   _____   _____   _____   X   dirty

Table 11. *Questionnaire and semantic differential test for urban walks (reprinted with permission from Lowenthal 1972)*

A	natural	___	___	___	___	___	artificial
B	contrast	___	___	___	___	___	uniform
C	people	___	___	___	___	___	things
D	ugly	___	___	___	___	___	beautiful
E	appearance (shape, texture, color)	___	___	___	___	___	meaning (use, associations, symbols)
F	smelly	___	___	___	___	___	fresh
G	vertical	___	___	___	___	___	horizontal
H	ordered	___	___	___	___	___	chaotic
I	moving	___	___	___	___	___	motionless
J	smooth	___	___	___	___	___	rough
K	poor	___	___	___	___	___	rich
L	open	___	___	___	___	___	bounded
M	boring	___	___	___	___	___	interesting
N	old	___	___	___	___	___	new
O	quiet	___	___	___	___	___	noisy
P	vivid	___	___	___	___	___	drab
Q	self-awareness	___	___	___	___	___	awareness of surroundings
R	pleasant	___	___	___	___	___	unpleasant
S	business use	___	___	___	___	___	living use
T	clean	___	___	___	___	___	dirty
U	dense	___	___	___	___	___	empty
V	suburban	___	___	___	___	___	urban
W	individual features (details)	___	___	___	___	___	overall views (wholes)
X	like	___	___	___	___	___	dislike
Y	dark	___	___	___	___	___	light

Question 2.
What are the most significant qualities of this path? Circle the five words on the list which best apply to this path.

Question 3.
Describe this path or your feelings about it, using four words which are not on the list above.
a. _____ b. _____ c. _____ d. _____

Question 4.
Please look over the questionnaire, and when you are certain you have completed each question, check here _____

Table 11. *Continued.*

parison with other semantic differential stud-
ies and linguistic models (see page 46). The
semantic differential technique also empha-
sizes the walk as a whole unit rather than
allowing respondents to refer to particular
parts of it. It removes the "particularity"
of environmental elements and constrains the
description of the area into twenty-five pre-
selected categories.

The urban walks provide vivid descriptions
which can be presented as maps to graphically
illustrate differences in urban images be-
tween different groups.

Content analysis of Lynch's respondents
provided five main design elements in the
ways they organized their perceptions of the
city: paths, edges, districts, nodes and land-
marks. Using these categories, trained obser-
vers then surveyed the urban area to produce
"imageability" maps. These maps have obvious
implications for urban planners but do not
seem to have been taken up as practical plan-
ning tools. Similarly, Lowenthal and Riel's
conclusions for environmental design are un-
likely to be implemented since they largely
imply "non-designable" elements such as am-
biguity, contradiction, variety and unexpected
juxtaposition.

So far urban walks have not proved to be
an important technique for urban design, but
they are a valuable and flexible research
tool to reveal differences in environmental
perceptions and images between urban areas
and urban groups. They are also a useful tech-
nique for comparing respondents' (residents')
images of their neighbourhood as obtained in
interviews, with the researcher's (stranger's)
own view. Thus it is useful for the research-
er himself to take an urban walk around the
area in which he will interview others.

These walks have usually been made in ur-
ban areas by researchers interested in the
design aspects of cities, taking advantage of
the concentrated source of environmental stim-
uli in urban settings to study environmental
"legibility". Apart from practical problems
of distances required to provide a variety of
stimuli, there is no reason why the method
cannot be used to study perception of other,
non-urban environments.

Time diaries

Time diaries, or time budgets, are simply
means of recording what a respondent has done
during a recent period of time - usually a
day or a week. They differ from oral histories
in that they are more specific to particular
times and are usually more factual in terms of
what a person did - when, where, for how long
and with whom. The significance of events for
people and their feelings about what they have
done are given more attention in an oral his-
tory approach than in the usual time diary.

Time diaries are most commonly used to
simply find out the total amount of time de-
voted to particular activities, the variation
of these allocations of time for different
days, months, seasons or other significant
stages and cycles, and the characteristic pro-
file of activity for a particular respondent
or group of respondents.

The usefulness of time diaries for record-
ing behaviour should not be underestimated.
How people behave and allocate their time re-
flects attitudes and values as well as per-
sonal, social and environmental constraints
under which they live. Time diaries also pro-
vide information about environmental and so-
cial needs and the demand for facilities (e.g.
community, transport, recreation).

Interest in how people allocate their time
arose partly through time and motion studies
in factories in the 1930s in industrial coun-
tries, including the Soviet Union and the
United States. Time diaries have since been
widely used in urban and land use planning and
in architectural design. They have also been
used to obtain communication networks - to
find out who met whom and when, and to design
the scheduling of meetings and management ac-
tivities in complex organizations. The time
diaries method can be usefully extended to
environmental management problems especially
where interdepartmental or interagency col-
laboration is needed.

A major cross-cultural investigation into
time budgets has been undertaken by social
scientists in twelve different countries by
the European Coordination Centre for Research
and Documentation in the Social Sciences.

Method

Time diaries can be included as part of
an interview schedule, although they take
considerable time to complete and although
it is difficult for respondents to recall ac-
curately even one day's activities in detail
once that day is over. Some interviewers are
uneasy about probing for details on people's
activities or become bored with the repeti-
tiveness of the task.

Perhaps a better method in literate socie-
ties is to ask the respondent himself to keep
a diary of his activities either by following
a structured format provided by the research-
er, as in the example in Table 12, or by al-
lowing him to keep a diary of events that he

A. TODAY IS:

| Mon | Tues | (Wed) | Thurs | Fri | Sat | Sun | (circle one) |

a (workday) rest day other_____ (circle one)

(typical) not typical (explain why)_____ (circle one)

B. Please fill in the diary for each activity that takes more than 15 minutes. Where more than one activity takes place together, record each of them. Waiting time, travelling time and doing-nothing time are all separate activities and should be individually recorded.
Please try to fill the diary in at several points throughout the day in order to make it as accurate as possible. Put both starting and finishing times and try to account for the whole 24 hours.

Time	Activity	Where did it take place?	Alone or with someone else?	Other simultaneous activities	Typical activity for this time
7:15 a.m.	Got up and ready for work	Home	Alone		
7:45 8:10	Ate breakfast	Home	Alone	Read newspaper	Same
8:15 8:25	Left house to walk to work	Between home and shoe factory	With next-door neighbours	Talked about local election. Bought bread at local shop.	Usually alone
8:30 10:30	Begin work	Shoe factory inspection department	With 6 others in inspection room	Listening to radio	Same
10:30 10:50	Rest time	Factory cafeteria	With two work mates	Talking to friends Having snack.	Same

Table 12. *Example of a structured time diary format*

considers significant. The time diary can be a highly accurate record of behaviour and can maintain this reliability over longer periods of time than any other method.

Diarists are often asked to cover periods of 24 hours to include at least one workday and one weekend day. If the researcher is particularly interested in certain aspects of time budgeting or behaviour he should make this clear to the respondent either through briefing sessions or by the format of the diary to be filled in. The minimum time period to be individually specified should also be made clear to the respondent - 15 to 30 minute periods are commonly used units. He should also be made aware of how to record activities carried out simultaneously (e.g. reading and travelling, collecting edible plants while hunting or walking to work).

Coding the information contained in a diary is a problem similar to that faced by observers who need to code behaviour. Attempts at providing respondents with precoding categories are most successful when the respondents or their activities being researched are relatively homogeneous, so that the number of categories required to cover the range of behaviour is not too large. For general populations, experience has shown that about 100 categories are required to cover the population's range of activity, but individually most respondents find it difficult to classify their own activities according to such a large number of categories (Michelson and Reed 1975). The ninety-nine categories devised by the Multinational Comparative Time

Budget Research Project (Szalai 1966, 1972) have been subsequently used by several researchers but there are no universally agreed codes for activity time budgets (Table 13).

Respondents keep time diaries most conscientiously when their purpose is understood and when they are personally distributed and collected. This is particularly true if the researcher takes time to discuss the diary with the respondent. Such social interaction, however brief, cannot be replaced by asking respondents to mail their diaries or by written requests to fill them in.

Oral history

Oral history is a method whereby oral evidence is taken from people who have usually directly experienced the events they talk about or who are relating accounts that have been personally handed down to them. Historians have used this listening technique to record from older people their stories, impressions and memories of events that occurred when they were younger and before the major social and technological changes of this century took place. In both rural and urban environments the use of oral history methods has captured vivid descriptions and otherwise unknown detail of the immediate past. Oral evidence is obviously of importance where documentary material is absent either because it never existed or because written records were later destroyed. The South Wales Miners' Library and Coalfield Project at University College, Swansea in the United Kingdom demonstrates the significant contribution that oral evidence can make in a situation where the documentation - colliery records - was systematically destroyed by the coal owners when the mines were nationalized in 1947 (Evans 1976).

Oral evidence is also of particular importance to the study of environmental perception because it reveals not only the facts of environmental experience and behaviour but also the feelings and meanings for people that are associated with them. In respondents' own accounts of events, people and places, they reveal their perceptions, attitudes and values as well as convey the spirit and sense of actually having been present.

Oral evidence can also document the "minutiae of change" which occur progressively so that each step is considered too trivial to record formally but is remembered by those who were present. Evans (1975, 1976) exemplified this in his studies of rural and urban England and Wales where the social revolu-

tion that followed the First World War is closely documented in his respondents' accounts of new social habits that arose in dress and behaviour, changes often initiated by one individual in the community and soon followed by others.

Method

Taking oral evidence requires time, some means of recording what is said (tape recorder, written notes), and above all an interested and sympathetic listener. The success of the method depends to a great extent on the researcher as a person, his knowledge of the topic and the relationship he can establish with the respondent. This is stressed by oral historians who emphasize the value of intuition and imagination over a set of tools and techniques.

With these caveats in mind, a few guidelines should be noted in addition to those mentioned in the discussion on "unstandardized interviewing' (page 37), and "interviewer-respondent effects" (page 38).

- Do as much background research as possible into the research topic and if possible have an initial exploratory interview to discuss the research project with the respondent.
- Do not try to rush the interview or do more than one or two interviews in a single day. Take time and ask to meet the respondent again at a later date rather than exhaust either the respondent or the researcher.
- Explain to the respondent how you are going to record what he says, and why. Make sure that he agrees at the outset, especially if tape recordings are to be made.
- Let the respondent set the pace and the direction of the conversation with as little interruption as possible from the researcher. Even if the account seems haphazard and rambling, it may have value that the researcher cannot necessarily predict at the time.
- Phrase your questions carefully and leave them open-ended without suggesting definite alternatives which might constrain the respondent's answers.
- Ask the more difficult or sensitive questions towards the end of the meeting after some rapport has been established. If there are several difficult issues, try to space them out so that the respondent can talk about topics he enjoys between them. Phrase difficult questions in the third person, such as "Some people say that..." to avoid any sense of researcher-respondent confron-

Complete two-digit activity code	Abbreviation
Code Working time and time connected to it (00-09)	

00	Normal professional work (outside home)	Regular work
01	Normal professional work at home or brought home	Work at home
02	Overtime if it can be specifically isolated from 00	Overtime
03	Displacements during work if they can be specifically isolated from 00	Travel for job
04	Any waiting or interruption during working time if it can be isolated from work (e.g. due to supply shortage, breakdown of machines, etc.)	Waiting, delays
05	Undeclared, auxiliary, etc. work	Second job
06	Meal at the workplace	Meals at work
07	Time spent at the workplace before starting or after ending work	At work, other
08	Regular breaks and prescribed non-working periods etc. during worktime	Work breaks
09	Travel to (resp. from) workplace, including waiting for means of transport	Travel to job

	*Domestic work (10-19)**	
10	Preparation and cooking of food	Prepare food
11	Washing up and putting away the dishes	Meal cleanup
12	Indoor cleaning (sweeping, washing, bed-making)	Clean house
13	Outdoor cleaning (sidewalk, disposal of garbage)	Outdoor chores
14	Laundry, ironing	Laundry, ironing
15	Repair or upkeep of clothes, shoes, underwear	Clothes upkeep
16	Other repairs and home operations	Other upkeep
17	Gardening, animal care*	Gardening, animal care
18	Heat and water supplies-upkeep	Heat, water
19	Others (e.g. dealing with bills and various other papers, usual care to household members, etc.)	Other duties

	Care to children (20-29)	
20	Care to babies	Baby care
21	Care to older children	Child care
22	Supervision of school work (exercises and lessons)	Help on homework
23	Reading of tales or other non-school books to children, conversations with children	Talk to children
24	Indoor games and manual instruction	Indoor playing
25	Outdoor games and walks	Outdoor playing
26	Medical care (visiting the childrens' doctor or dentist, or other activities related to the health of children)	Child health
27	Others	Other, babysit
28	Not to be used	Blank
29	Travel to accompany children including waiting for means of transport	Travel with child

	Purchasing of goods and services (30-39)	
30	Purchasing of everyday consumer goods and products	Marketing
31	Purchasing of durable consumer goods	Shopping
32	Personal care outside home (e.g. hairdresser)	Personal care
33	Medical care outside home	Medical care
34	Administrative services, offices	Administrative service
35	Repair and other services (e.g. laundry, electricity, mechanics)	Repair service
36	Waiting, queueing for the purchase of goods and services	Waiting in line
37	Others	Other service
38	Not to be used	Blank
39	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, service

	Private needs: meals and sleep etc. (Private and non-described activities) (40-49)	
40	Personal hygiene, dressing (getting up, going to bed, etc.)	Personal hygiene
41	Personal medical care at home	Personal medical
42	Care given to adults, if not included in household work	Care to adults
43	Meals and snacks at home	Meals, snacks
44	Meals outside home or the canteen*	Restaurant meals
45	Night sleep (essential)	Night sleep
46	Daytime sleep (incidental)	Daytime sleep
47	Nap or rest	Resting
48	Private activities, non-described, others	Private, other
49	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, personal

Table 13. *Coding for time budget activities by Multinational Comparative Time-Budget Research Project (reprinted with permission from Szalai 1972)*

Table 13. *Continued.*

Adult education and professional training (50-59)

50	Full time attendance to classes (undergraduate or post-graduate student), studies being the principal activity	Attend school
51	Reduced programs of professional or special training courses (including after work classes organized by the plant or enterprise in question)	Other classes
52	Attendance to lectures (occasionally)	Special lecture
53	Programs of political or union training course	Political courses
54	Homework prepared for different courses and lectures (including related research work and self-instruction)	Homework
55	Reading of scientific reviews of books for personal instruction	Read to learn
56	Others	Other study
57-58	Not to be used	Blank
59	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, study

Civic and collective participation activities (60-69)

60	Participation as member of a party, of a union, etc.)	Union, politics
61	Voluntary activity as an elected official of a social or political organization	Work as officer
62	Participation in meetings other than those covered by 60 and 61	Other participation
63	Non-paid collective civic activity (e.g. volunteers)	Civic activities
64	Participation in religious organizations	Religious organization
65	Religious practice and attending religious ceremonies	Religious practice
66	Participation in various factory councils (committees, commissions)	Factory council
67	Participation in other associations (family, parent, military, etc.)	Misc. organization
68	Others	Other organization
69	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, organization

Spectacles, entertainment, social life (70-79)

70	Attending a sports event	Sports events
71	Circus, music-hall, dancing, show, night-club (including a meal in the entertainment local)	Mass culture
72	Movies	Movies
73	Theatre, concert, opera	Theatre
74	Museum, exhibition	Museums
75	Receiving visit of friends or visiting friends	Visiting with friends
76	Party or reception with meal offered to or offered by friends	Party, meals
77	Café, bar, tearoom	Cafe, pubs
78	Attending receptions (other than those mentioned above)	Other social
79	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, social

Sports and active leisure (80-89)

80	Practice a sport and physical exercise	Active sports
81	Excursions, hunting, fishing	Fishing, hiking
82	Walks	Taking a walk
83	Technical hobbies, collections	Hobbies
84	Ladies'work (confection, needle work, dressmaking, knitting, etc.)	Ladies hobbies
85	Artistic creations (sculpture, painting, pottery, literature, etc.)	Art work
86	Playing a musical instrument, singing	Making music
87	Society games	Parlor games
88	Others	Other pastime
89	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, pastime

Passive leisure (90-99)

90	Listening to the radio	Radio
91	Watching television	TV
92	Listening to records	Play records
93	Reading books	Read book
94	Reading review, periodicals, pamphlets etc.	Read magazine
95	Reading newspaper	Read paper
96	Conversations, including telephone conversation	Conversation
97	Writing private correspondence	Letters, private
98	Relaxing, reflecting, thinking, planning, doing nothing, no visible activity	Relax, think
99	Travelling connected to the above mentioned activities, including waiting for means of transport	Travel, leisure

tation.
- At the end of the respondent's discussion, what has been said should be reviewed and supplementary questions asked to clarify or obtain more detail about points already discussed. Important topics can be introduced several times from different points of view and each time it is likely to produce new, useful information.
- Reliability in oral evidence can be increased by asking respondents' advice on what other evidence or people could help to document their talk and by finding out indirectly whether the respondent experienced the events he is discussing firsthand or only heard about them. Respondents themselves may have kept diaries or have pertinent written documents such as letters and newspaper cuttings.
- The notes or tape recording should be transcribed by the person who has met with the respondent as soon as possible after the interview, preferably the same day, as in the case in classic anthropological field work. Only a person who was present at the discussion or interview can annotate a transcription adequately. Having been present when the respondent was talking enables the researcher to understand what is conveyed through the same kind of osmosis that enables the respondent to re-create his first-hand experiences. Although transcription is laborious and slow, it enables the researcher to re-live the conversation and see nuances he earlier missed, nuances that would have perhaps escaped him altogether if the transcription had been done by someone else. It is worth considering showing the written record of the interview to the respondent in a follow-up interview for further amplification or correction.

Example: Perception of the effect of mechanization on mining and the mining community in South Wales (United Kingdom)
This example and the quotations which follow are drawn from the work of George Evans (1975, 1976) in England and Wales, where people's perceptions of vanishing urban and rural environments were studied. The first quotation concerns the effect of mechanization in the mines on the miners' perception of their physical environment in terms of their awareness of danger and their ability to discriminate between different parts of the coalfield.

    I felt very unsafe when I went on a conveyor. There was something you said, Ifan,

about the noise of the conveyers: I didn't realize how much we were depending on our ears when we were working: little cracks in the top, or little flakes dropping by here - things like that, rumbling. So much easier when you were working in a stall. You could say when a place was squeezing, when it was preparing to collapse, settling down or something. You were careful when you heard that. And you could listen for the coal working, and find exactly where was the easiest place to go and pull out a dram of coal. This business of listening: when you are knocking the top. We used to have to hold the mandril firm and tap the top with it; and we could say whether that top was safe or not, just by the sound. The only thing we had to watch for were the balls - balls of iron ore that would give a solid sound, and still drop without any warning (Evans 1976, p. 167).
The second and third quotations provide evidence for Evans' argument that social structure and material culture are intimately linked, and that therefore, to understand the changing social relations in the mining community above ground, it is necessary to know the changes that occurred in the working conditions of the miners below ground.
The following quotation refers to the situation just before mechanization began in the 1920s and 30s.

    The first time you'd see this kind of order was in the morning when you went underground. The boy would go along, and he'd pick up the powder-tin, and he'd go to the blacksmith shop, and he'd pick up any drills that had been sharpened. And then you went underground. You had your lamp, of course, with you then; and you'd have to wait at the 'locking-station' then. The men congregated together and the boys congregated together: it was unheard of then for a boy to go and sit with the men. Or if - as I was telling you - if a boy even ventured an opinion in amongst the men, it was the biggest crime you could commit. And this was the order of things. When you went to the face and you were having your morning break perhaps only you and your 'butty' [friend] would be together, and you'd sit with him. But if there were - if you were like I was: in a heading with a lot of boys, the boys would sit together and the men would sit together. And it stayed like that and it never altered. Walking out afterwards the boys would walk out together, and the men would walk out together. The boys never fraternized with the men: they

were always kept strictly in their place.
During the time that I was there I can't
remember an occasion when the boys were
allowed to join in with the men in any-
thing; until he had a collier's number.
Then he'd be a man then. And he could join
in the jaw: he could talk with the men.
He changed his status! (Evans 1976, p.
160).

The third quotation refers to the social im-
pact of mechanization.

Now there is another thing that mechani-
zation has done. It was virtually impos-
sible [under the old stall system] to be
a cheeky boy underground. Now, under mech-
anization, the boys are put to work in
groups; so the boys themselves create
their own sort of society; and they can
pick on one man and be quite rude to him –
an old man. But when the boy – it's true
he was in a group to start with, but then
he had to go on his own with a man. And
they had various ways of putting you in
order: they could see your father in the
lamp-room; or on a Saturday, if you came
in to work and your 'butty' wasn't there,
the other men wouldn't take you; and you
had to walk home and you wouldn't have
any pay. There were no set rules. That was
the way it was done. Nobody ever wrote the
rules. But they soon put cheeky people in
their places; and this was the kind of re-
lationship between man and boy in the col-
liery (Evans 1976, p. 173).

Evaluation

The type of information contained in these
oral accounts cannot be found in written doc-
uments and would escape the net of structured
questionnaires. The collection of this type
of information depends on long, unhurried con-
versations between respondent and researcher
who share a mutual trust and interest in the
topic.

As a method, recording oral evidence has
the advantages of high validity and low re-
searcher domination with disadvantages of
high time requirements and few checks on re-
liability. Since the narratives can be vivid
recreations, it is often wisest to minimize
coding and numerical analysis, and let the
words speak for themselves.

CODING ANSWERS

Content analysis of verbal material

Content analysis is a general term used to
cover a set of techniques for objectively

and systematically describing the content of
messages. Messages in this sense include doc-
umentary material, folk-tales, the contents
of diaries, speeches, answers to open ques-
tions and the stories elicited by the var-
ious projective techniques described in the
discussion on projective techniques.

As a systematic method, content analysis
was first used in the United States by stud-
ents of journalism to study the contents of
newspapers during the 1920s. Simple techniques
of tabulating frequencies of occurrence for
straightforward categories such as foreign af-
fairs, domestic affairs, politics and sports
were used. During the same period, content
analysis began to be applied to literature to
describe stylistic and linguistic character-
istics.

From the late 1930s the focus of the tech-
nique became both more political and more con-
cerned with mass media, especially through the
work of Lasswell (1960). During the Second
World War it advanced rapidly as a technique
for analysing propaganda material.

Since that time content analysis has been
widely used in many fields including history,
linguistics, mass media studies and psychol-
ogy. Its techniques have become more sophis-
ticated and there is now a computer process
called the "General Inquirer" which can ra-
pidly analyse content material and perform
required frequency counts and statistical
tests (Stone *et al.* 1966).

Content analysis has not only been applied
to many fields of inquiry but also used to
answer very different types of questions.
Messages have both form and meaning. Tradi-
tionally message "form" was studied within
linguistics and message "meaning" by content
analysis. This distinction is no longer va-
lid since the structural analysis of messages
is now the concern of content analysis. For
example, whether an invitation is internally
structured in formal or informal phrases af-
fects the "meaning" it imparts to the receiv-
er. Similarly the exact structure of a ma-
gical chant or folk-tale may determine its
intended effect, and thus its meaning.

In addition to describing message struc-
ture, two major aims of content analysis are
description of message content and inference
from message content to the senders and re-
ceivers of messages. Typical questions posed
of message content description are:
 – What is the subject matter of the message?
 – What trends in content occur over time?
 – How do different messages or communication
   channels differ in content?
 – How readable is the message?

- What stylistic features, characteristics and patterns can be seen for sets of message (e.g. for the writings of one author or one newspaper)?

Questions about what inferences can be made from the content of messages by the people involved in sending or receiving them rest on assumptions about the relationships between individuals and their verbal messages. Two types of relationship exist: explicit meaning, such as in propaganda which is politically or commercially motivated; and implicit meaning, such as may be revealed about people's attitudes through projective tests or free conversation. The difference between the two may be roughly characterized as explicit meaning assuming that the sender "means what he says" and implicit meaning requiring the analyst to "read between the lines".

The assumption of implicit meaning in messages is a cornerstone in much psycho-analytic theory. For example, a highly anxious person would be expected to reveal his state of anxiety in the way he speaks and writes. From this it is also argued that this anxious state can be isolated and systematically described from verbal evidence. Questions concerning inference are generally, but not exclusively, directed towards the sender or producer of messages. For example, mass media research has used content analysis to identify the attitudinal and behavioural responses of audiences of messages. The characteristics of senders, especially their intentions, attitudes, and psychological states, as well as the intensity and direction of these attributes, are probably the most common inferences made from verbal messages by content analysis.

Frequency counts

The basic logic of counting frequencies in content analysis is that the greater the source's interest in, concern with or knowledge of a given topic, the greater will be the relative frequency with which that topic will be mentioned, as compared to other topics. The principle is thus a simple one of counting frequencies within categories.

The method involves several preparatory steps which are common to other, more sophisticated techniques of content analysis:
- select hypotheses to be tested;
- select material to be content analysed;
- select units for measuring frequency, e.g. column inches, key words, literary forms, conversational exchange, scientific papers;

- construct categories for coding (see below), e.g. by subject matter, positive and negative statements, people mentioned;
- read through or listen to material and code the occurrence of each item into the appropriate category, using more than one coder wherever possible;
- revise categories and units if there is poor inter-coder agreement (poor reliability);
- tabulate frequencies of occurrence between material being compared;
- interpret data.

The keys to successful content analysis are the selection of units, construction of categories, and good interpretation. For the other aspects, frequency counting involves only systematic coding and careful tabulation.

The assumption that greater frequency of an item is directly related to its significance or importance is valid for many, but not all, situations. For example, in material which has an explicit motivation, the absence of a particular item may be significant for deducing the source's intentions. Similarly, in analysing a person's psychological state, it may be the repression of a topic that will identify his most important feeling. In these cases, better techniques may be either non-frequency analysis, which uses simply the presence or absence of a particular item, or structural analysis, which is concerned not with frequency of occurrence but with the possibility of occurrence for given items.

Example 1: content analysis of Ozark superstitions

The material used in this study (Miller 1972) consisted of 1715 orally recounted superstitions collected by Randolph (1947) between 1899 to 1947 from people, some of whom had been original settlers in the Ozark Mountains (an area in the states of Missouri and Arkansas in the United States), having moved from Kentucky and Tennessee. The objective was to establish what these early pioneers considered the most significant characteristics of their environment as reflected in their everyday sayings. Examples of the units (superstitions) used are:

Category

- "Cattle will not fatten properly unless there is an un- ANIMALS even number in the herd."
- "The first frost occurs ninety days after the first at- WEATHER tack of hay fever in the autumn."

- "If you soak the cobs from seed corn in water, there will be an abundance of rain for the crop, but if you burn them, there will be a drought." CROPS
- "At midnight on January 5 some well water becomes wine." WATER

The superstitions were simply coded into six broad environmental categories (Table 14). From her content analysis, Miller concludes that the Ozark environment in which these traditional sayings developed was a well watered, humid and forested one where environmental hazards such as tornadoes and hailstones were known and feared.

Evaluation. The rich material on oral superstitions collected by Randolph is worthy of much more content analysis than is presented here, as Miller's study itself indicates. The study is, however, a useful example of the material which can be used in environmental perception and which can be collected and analysed in many traditional societies throughout the world. The hypotheses that such material can be used to test can vary from those concerned with environmental perceptions and beliefs in general, to specific studies of traditional knowledge about, for example, the use of herbs in medicine.

Example 2: American perceptions of the "Great American Desert" between 1800 and 1870

False images of unknown places have characterized oral and written geographies of many different societies, and have been the motivation behind much early geographic exploration. Bowden (1969) used content analysis to evaluate the hypothesis that in the first half of the nineteenth-century, the American public image of the western United States between the Mississippi and the Rockies was that of an uninhabitable desert. This myth is supposed to have remained predominant until about 1870 when a more informed image was established of the "Great Western Prairies" or the "Great Plains" with pastoral and agricultural potential. The effect such widely held environmental images might have on migration and economic exploitation of an area is obviously far-reaching.

> Looking out from his forests, the American of the generation before the Civil War pictured on his map of the continent a blank space before the Rocky Mountains. It was labeled The Great American Desert. As long as he pictured it there, he would not settle it (Hart 1957, p. 31).

	Frequency %
Environmental feature	
Animals (domestic and wild)	27.11
Natural vegetation	16.55
Weather, seasons, heavenly bodies	14.63
Crops	3.32
Water	1.34
	62.95
Non-environmental or combined (e.g. witchcraft, death, dreams)	37.05

Table 14. *Environmental perceptions of early Ozark settlers in the USA as revealed in their oral superstitions (based on Miller 1972).*

Bowden included in his units American geographies and school textbooks published between 1800 and 1880 having more than 120 words describing the geography of the Western Interior. He found 184 such books. The categories used to code the material were subdivisions of desert and non-desert (Table 15).

Using content analysis, Bowden found that the Great American Desert as a name and image was predominant in textbooks only in the 1840s and early 1850s, and not throughout the period, even until after the American Civil War (1861-1865), as had been argued by some historians. The term first appeared in New England on the eastern coast of the United States between 1814 and 1830 and from there spread to the rest of the continent. Bowden also found that the more elementary geographies, which were most likely to have been read by potential settlers, did not carry the desert image but that the books with a more educated readership did. He also compared the content of books published in the eighteenth-century with contemporary newspapers which carried letters from western travellers and found no mention of the area as a desert. Similarly, settlers' diaries do not mention a desert (Jackson 1972).

Evaluation. Bowden's study is a good example of the diverse material which can be content analysed and compared to examine a particular research question. He used textbooks, newspapers, settlers' diaries, explorers' journals, and accounts of military expeditions that were available for the period 1800 to 1880. By comparing the frequency of occurrence of the desert image he was able to isolate the perception of the desert to the elite and educated people of New England who were not potential migrants. He was thus able to refute the idea that the desert image was a psychological barrier to westward migration

	Name of Desert			General Characteristics of Non-Desert Lands						
Dates	Great American or. American	No Name	Total Desert	Total Non-Desert	Fertile	Fertile with Large Prairies	Vague General	Prairies	Prairies and Plains	Plains
1800-1804	0	0	0	8	8					
1805-1809	0	0	0	12	4	6	2			
1810-1814	0	1	1	17	2	8	7			
1815-1819	0	0	0	14	3	1	7	3		
1820-1824	1	3	4	11	1	0	6	2	0	2
1825-1829	1	5	6	7	0	0	3	0	2	2
1830-1834	1	8	9	8	2	0	0	1	0	5
1835-1839	1	8	9	8	0	0	0	2	0	1
1840-1844	5	7	12	1	0	0	0	1	0	0
1845-1849	2	2	4	5	0	0	0	3	2	0
1850-1854	2	4	6	2	0	0	0	0	2	0
1855-1859	1	3	4	4	0	0	0	0	3	1
1860-1864	1	4	5	5	1	0	0	0	2	2
1865-1869	1	5	6	5	1	0	0	0	2	2
1870-1874	2	4	6	5	0	0	1	1	2	
1875-1880	0	1	1	4	0	0	0	0	1	3
	18	55	73	111						

Source: "Geographies" - Libraries of Clark University and American Antiquarian Society

Table 15. *Descriptions of the western interior of the USA in textbooks and geographies published in 1800-1870 (reprinted with permission from Bowden 1969)*

in the United States.

Evaluative assertion analysis

The purpose this technique is to measure the evaluations of significant concepts contained in a message in a way that is objective, and distinct from the evaluations that the coder or analyst would himself make. It involves reducing raw messages to standard forms and scaling the simplified assertions obtained, usually along a positive-negative, favourable-unfavourable dimension.

Assumption

The technique is based on several assumptions about the judgements that coders are able to make. First it is assumed that coders can distinguish between "attitude objects" and "common-meaning material". The former are objects to which individuals will differ in attitude and the latter are objects or concepts which can be reasonably assumed to be culturally shared. Examples are: "my father is a bad man" (attitude object) and "murderers are bad" (common-meaning).

Second, it is assumed that coders can reliably judge when two alternative constructions are equivalent or non-equivalent in meaning. For example, they would agree that there is equivalence between "the area is physically homogeneous in housing" and "in

my neighbourhood you see street after street all the same".

The third assumption is that coders can agree on the direction and intensity of assertions. For example, they would agree that "the mountain clans despised the lowlanders" is a dissociative assertion of high intensity while "newcomers gradually became accepted as villagers" is an associative assertion of weak intensity.

Fourth, one assumption is that coders can agree on the direction and degree of evaluations made for common-meaning terms. For example, "content analysis is a method" has zero evaluation, while "content analysis is a complete fabrication" is strongly negatively evaluated in the message.

While these assumptions can be verified to some extent by using several coders and testing for inter-coder reliability, there remain problems of objectivity in making the required judgements. For example, is "science is limited" an individual attitude or a commonly shared view? And is it equivalent to "science has its uses"? Many of these difficulties seem to be resolved by common sense rather than by formulating rules. The experience of content analysts using this technique is that the judgements can be reliably and validly made if the coders are intelligent, well trained and share or are thoroughly familiar with the same language and culture as the sources of

	ENVIRONMENTAL FEATURES (examples)	PEOPLE INVOLVED	PLANNING PROPOSALS
POSITIVE EVALUATION 3	Opera Flower market St. Paul's church		Inigo Jones' master plan Les Halles author's proposal
2	Drury Lane Bow Street most houses	dossers Convent Garden Community Association	
1	tea-stand Albert's café Strand	drifters (vagrants)	
0	trolleys of fruit boxes	coppers (police)	conservation proposal
-1			

-2		radicals
		Architectural
		  Association
		politicians
		developers
			Architectural
			  Association's pro-
			  posal

NEGATIVE -3 EVALUATION		Greater London Council speculators	Greater London Council Plan

Table 16.
Example of an evaluative assertion scale: analysis of one author's argument in a planning dispute over Covent Garden (the old flower and vegetable market) in London, England (based on Mazis 1975)

the material being analysed.

Method

Osgood (Osgood 1959; Osgood, Saporta and Nunnally 1956) has been the principal developer of the technique. He describes four stages. Stage 1 involves identification, isolation and masking of attitude objects. The coder reads through the message and substitutes symbols (usually letters) for everything which would elicit attitudes from a subsequent reader, i.e. any information about who, what, when and where. For example, "The Nile was Egypt's lifeline according to the early Greek scholars" would become "A was B's lifeline according to the earliest Cs".

Stage 2 is the translation of the message into an assertion form. The message is recast into a set of commonly constructed assertions which are equivalent in meaning to the original. The linguistic form most used in English has been commonly adopted for this technique, i.e. the "actor-action-complement" construction. The actor is usually a noun, the action a verb, and the complement either a noun or an adjective.

Thus Osgood defines an evaluative assertion as a linguistic construction in which an actor (attitude object) is associated with, or dissociated from, a complement (attitude object or common-meaning) via a verbal connector. Only those assertions are counted which include at least one attitude object and some evaluation. Osgood, Saporta and Nunnally give detailed translation rules for converting raw messages into assertions.

In Stage 3 directions and intensities are assigned to connectors and evaluators. Using a chart of commonly formulated assertions, the coder assigns each connector (verb phrase) and each common-meaning evaluator a direction and value in terms of a seven-step scale running from -3 to +3.

Stage 4 involves obtaining an evaluative scale of attitude objects. The coder determines the average evaluation score for each attitude object as it appears in all types of assertions and places each one on a single seven-step evaluative scale (Table 16).

Evaluation

This technique is very time-consuming even with trained coders who are generally able to process only one page of triple-spaced material (133 words) per hour. A shortened form of the technique has been shown to increase the speed to three pages per hour, but inter-coder reliability fell to 0.75 from 0.85 (Osgood, Saporta and Nunnally 1956). The translation of the material into assertions also means that it loses considerable flavour and nuances of meaning. On the other hand, translation of material into a uniform format eases the task of the coders who scale the assertions. Holsti (1963) points out three main sources of low reliability: ambiguity of categories selected, confusion over varying roles played by an attitude object within one sentence and difficulty in giving numerical values to complex sentences.

The strengths of the method lie in its ability to greatly minimize the potential bias of the analyst's own attitudes by word-masking, and in its comparability across both messages and sources. Thus it is possible to use evaluative assertion analysis to say which of several sources best corresponds to a particular criterion (e.g. law, norm, ethic) in the assertions made. It is also readily adaptable to computer processing since the message has already been put into standardized form.

Osgood (1959) stresses that the technique is aimed at obtaining evaluations of what the message actually says, and not of what the source may have really intended. Thus where one is interested mainly in inference from the message to the source, other techniques in content analysis would be more appropriate.

Contingency analysis

Contingency analysis is a technique used to measure the co-occurrences of items in a message and to establish whether the number of times two or more items appear together is greater or less than would be expected by chance. From the co-occurrences found in a message, inferences can be made about the "association structure" in the mind of the sender. The associations between items may be positive (e.g. references to "environmentalist" and "conservationist" appearing together with a greater than chance frequency) or negative (e.g. references to "tourism and air pollution" appearing in conjunction less frequently than expected by chance). One difficulty arises immediately with words used

as synonyms, such as "rural" and "country". Unless these are placed together in the same category, a contingency analysis is likely to find them highly dissociative, because where one appears the other does not, i.e. they are substitutes for one another.

The assumption linking message contingency structure with the sender's cognitive association structure has received some experimental verification (Osgood 1959). Inferences about association structure are largely independent of either item frequency or evaluations made of items. Contingency analysis is thus a complementary technique in content analysis in that a property of messages different from that obtained in frequency counts or evaluative assertion analysis is measured.

Method

Selection of units. Messages to be analysed are first divided into units. These units are often natural ones such as individual letters, diary entries, newspaper articles, or responses to a particular interview question. Where the message is continuous, arbitrary units appropriate to the research needs have to be set up. Obviously, contingency values are partly dependent on the size of units selected, since if the units are as small as individual words there will be no contingencies, and if the units are too large most items contained in the message will be contingent on others. Theoretically some criterion should be used which separates units, for example on the basis of time elapsed between them, thus taking into account the possibility of cause and effect between units. Often the information required to establish such theoretically appropriate units is not available within the message itself.

Construction of categories. Categories are set up so that their number, breadth and nature are appropriate to the particular research objectives. The finer the categories used, the larger the sample of messages that must be analysed in order to obtain significant contingencies.

Coding the messages. The coder examines each unit of the material and scores it for each content category on a data table such as that shown in Table 17. Each row represents a different unit (e.g. questionnaire response) and each column a different category.

Two possible scoring methods are used. If the units are small, the coder does not need to score how many times a category is used in a message, but merely indicates its presence

Table 17. *Construction of contingency matrix from raw.data: raw data matrix (hypothetical example for responses to question on neighbourhood characteristics)*

Units (responses)	Content Categories					
	Housing types	People	Economics	Natural environ.	Change	etc.
1	—	+	—	—	+	
2	+	—	+	—	—	
3	—	+	—	—	+	
:	:					
:	:					
n	etc.					
Per cent						

or absence with a plus or minus sign. Where the units are large and where many categories occur in each unit, a simple presence or absence score shows everything contingent on everything else.

Therefore, frequencies of categories used per unit are entered and the median frequencies are calculated for each category as it appears across all units. Comparison of the category frequency for each unit with its median, enables the coder to assign a positive or negative sign to each cell in the table, according to whether its frequency is above or below this median.

Constructing a contingency matrix. The expected or chance contingency for each pair of columns is obtained by multiplying together the sheer rates of occurrence of these two categories (row labelled "per cent" in Table 17). The expected contingencies are then placed in the upper right hand cells of the contingency table (Table 18). In the corresponding lower cells of the matrix, the actual obtained contingencies are entered. These are the percentages of units where plusses occur in both of the columns tested in Table 18.

Where items co-occur with a greater than chance frequency, the obtained contingency will be greater than the expected value, and vice versa. Calculations can then be made for the significance of the differences between expected and obtained contingencies by standard statistical tests, establishing a table of significant contingencies or cluster analysis (Osgood 1959).

Evaluation

When contingencies in a set of messages are found to be significantly above or below chance, there is evidence for message structure. As Osgood points out, however, inference from this to the cognitive association structure of the sender is at least partly dependent on the sender's motives for producing the message. When the messages are purposeful and deliberately worded – such as in propoganda, advertising or organizational memoranda – any structure in the message is more likely to reflect policy and strategy than cognitive association of an individual. Thus the inferences made from a contingency analysis need to be carefully considered in the light of the total context of the message.

Table 18. *Construction of contingency matrix from raw data: contingency matrix*

	Housing types	People	Economics	Natural environ.	Change	Nth category
Housing type						
People						EXPECTED (CHANCE) CONTINGENCIES
Economics						
Natural environ.	OBTAINED (ACTUAL) CONTINGENCIES					
Change						
Nth category						

This technique is less time-consuming than evaluative assertion analysis, especially where only presence and absence of categories used are scored. But it is of course measuring a different aspect of message content. How far the associations obtained from contingency analysis can be related to the pattern of cognitive constructs that are obtained by repertory grid techniques (page 59) has not yet been systematically studied. Contingency analysis is the technique in content analysis closest to methods of structural linguistics. Interchange between the two fields is increasing.

Construction of categories

The task of constructing good categories is common to all coding procedures as well as to content analysis itself. Any subsequent interpretation of data or inference from coded and scaled responses to human perception and behaviour can only be as good, and no better, than the categories chosen for analsis.

Much content analysis has used *ad hoc* categories which rely on the judgement and intuition of the researcher in the context of his research objectives. Where the research goals are highly specific, this procedure can still be used, but reliability is considerably increased if more than one coder goes through the material and categorizes it independently. Tests can be run to establish the degrees of inter-coder reliability (different coders classifying the same material) and intra-coder reliability (degree of agreement between two attempts at coding at different times by the same coder).

The units for coding can be key words or, more commonly in environmental perception research, themes or concepts. The classification should ideally be systematic in that most items can be coded somewhere (that is, the proportion of uncodable items is small) and that there are some common criteria linking the categories and rough equivalence between them. For example, the rationale of Lasswell's (1960) categories of pro-self, pro-other, anti-self and anti-other is clear, as is the non-equivalence of "reindeer" in a classification comprising "wild animals, domestic animals, edible plants, inedible plants, rocks and minerals, etc.".

While it is difficult at this time to conceive of standardized units for content anal-

ysis which could be widely shared between research projects, the use of contingency analysis to determine clusters of related items in a more rigorous fashion, does afford the possibility of having common categories between studies on similar topics.

Inter-coder agreement is also less difficult to achieve in practice than it might appear in theory or in anticipation. For example, experience in coding sentence completions (see page 49) about people's perception of air pollution in very different urban settings has shown both that inter-coder agreement is not difficult to achieve, and that the range of individual responses within one country is relatively small (A.V. Kirkby 1972).

An *ad hoc* approach to coding categories is illustrated in Table 19 where sentence completions obtained as part of a house-to-house interview in urban areas of the United Kingdom were coded into five categories representing degree of active response to the threat of air pollution.

It is best to make categories as discrete single component and explicit as possible. Reliability is increased as the number of decisions the coder has to make is decreased. Too much emphasis on reliability, however, may make coders unnecessarily conservative and increase their proportion of "uncodable" responses. The researcher may also lose the coder's insight and intuition which may bring to light more richness in the data. The construction of the best categories cannot always be carried out by the rule book, but must combine scientific method with intuition and understanding of the data and their sources.

Evaluation

Simple content analysis is widely used to code responses to questionnaires, different types of behaviour and environmental characteristics. Most researchers employing this *ad hoc* approach to coding would probably not describe what they were doing as content analysis. The descriptions of more elaborate and formal techniques are given to introduce the reader to possible ways of increasing the reliability and scope of content analysis, which in turn makes a less structured approach to research more amenable to scientific method.

Raw data (examples of responses)	Categories (intercoder agreement 0.93)	Obtained frequencies (four cities in U.K.)	
		Number	Per cent
....would die due to my chest ....wouldn't do anything ....would accept the inevitable ....would put up with it as I'm only working class	passive acceptance	83	19.76
....would close all windows ....would stay indoors ....would wear a mask ....would bring in my washing	immediate avoiding action	110	26.20
....would probably move into the country ....would go away if I could ....would move house ....would leave district	longer term avoiding action	108	25.70
....would report it ....would protest to my Member of Parliament ....would protest vigorously to all people in authority ....would complain to authorities	complaining and reporting	42	10.00
....would make a complaint and try to get others to do the same ....would campaign against it ....would make as little smoke as possible ....would stop burning coal fires	active response	42	10.00
....would quit ....wouldn't move ....don't know (no response)	uncodable	35	8.34
	Total	420	100.00

Table 19. *Constructing categories: example of coding sentence completions about response to air pollution in the United Kingdom*

SUGGESTIONS FOR FURTHER READING

Helpful suggestions on conducting unstructured interviews are given in a chapter by Morrissey (1970). Much other useful general advice on the art of listening is given in Dexter (1970). Two recent books by Evans (1975, 1976) exemplify the kind of material that can be obtained through listening to respondents and provide fascinating reading on perception of social changes in the United Kingdom. An earlier study made in 1937 (Dollard 1957) of black people's life histories in a town in southern United States is another vivid empirical example of listening as a research tool. Dollard also discusses the use of his approach in the context of escalating quantification in the social sciences.

The clearest statements of urban walk procedures are given in Lynch and Rivkin (1959) and Lowenthal and Riel (1972). Lynch (1960) is less concerned with method but is a well illustrated and well written demonstration of his perception approach to urban form and design.

Szalai (1972) is an excellent source book for methods, concepts and comparative empirical data on time budgets for twelve countries. He also includes an extensive bibliography divided into theoretical and empirical works, of the literature available in several different languages (including French, German, Japanese and Russian).

In addition to the books suggested above for further reading about the listening approach, there are also several journals devoted to oral history, including the *Oral History Review* (annual) in the United States and *Oral History* (twice yearly) in the United Kingdom.

Researchers should also look at the bibliographies in Waserman (1971) and Moss (1974).

Design of field studies

VII. SELECTION OF RESEARCH VARIABLES

A SYSTEMS APPROACH

Ecosystems and perception systems

Integrating environmental perception research with ecosystem studies is dependent on comprehensive models being developed for perception processes. These models must be comparable to the best ecosystem ones. Models in human perception and decision-making tend, of necessity, to be restricted to description of a few variables, and are often limited to either a psychological or sociological level of explanation. Nothing of the scale and sophistication of ecosystem modelling has been attempted.

This situation is due in part to the nature of systems in which human thought is a dominant variable. Cause and effect relationships are even more difficult to model in social systems, where both individual and collective perspectives must be taken into account. Also, there has been a greater concentration on measurement in the social sciences rather than a refining of concepts. This is perhaps most true of geography and social psychology where more effort has been expended on developing sophisticated measures than on evolving rigorous concepts. For example, attitude measurement is relatively advanced, whereas the concept of attitude remains a mixture of opinions, beliefs and feelings that interact to form a "state of readiness for action".

The lack of a "birds-eye" view of environmental perception is particularly critical at the research planning stage and it is for this reason that in this Technical Note, an attempt has been made to provide at least a generalized flow-chart indicating the main variables and linking processes of the over-all system.

Following the nomenclature suggested in Unesco (1972), system variables are defined as state variables, processes, output variables and driving variables.

State variables include measurable properties of the system such as biomass (ecosystem) and group characteristics (perception system). It is the changes in these state variables that are of major interest. Their values at any particular time depend on changes within the system.

Processes provoke changes in state variables, and their rates are determined by the current or previous values of these and other state variables and of driving variables. They thus constitute the mechanism by which these variables are coupled.

Output variables are the quantities which the model is required to predict. Sometimes these may constitute a sub-set of the state variables; more often they will include quantities calculated from the state variables. Clearly these are the quantities of most direct interest to the manager who proposes to make use of the model.

Once the boundaries of the research system have been defined, those variables which lie outside the system and which are not affected by processes internal to it but which impinge upon it, can be considered as driving variables. In environmental systems the most important driving variables are usually major climatological or meteorological factors which trigger the actions of erosion, disease, natural predators, etc. In environmental perception systems, a new technological discovery or government policy imposed from outside, may act as driving variables on the evolution of the system.

A simple model of environmental perception

Figure 12 represents one way of organizing the components of a general model of environmental perception. In Figure 12 and in the succeeding figures based on it, the state variables are arranged approximately in order of: distance from the decision-point at the man-environment interface; and scale of decision-maker from the individual resource manager making decisions on behalf of himself or his household, to the collective resource manager acting on behalf of many others.

Thus as one moves from the right to the left of the flow chart, the variables more directly impinge upon the output variables for a specific situation (but they may not necessarily be more influential). And as one moves from the bottom to the top of the diagram, the variables become more relevant to collective rather than individual decision-making, though they are not exclusive to either. Thus a progression can be traced from individual and group characteristics, through interviewing variables such as values and personality, to decisions and choices affecting the environment.

Linking the individual and social variables are four interdependent processes which together act as the main organizing force in the system. These are the "perception processes" which link all the components. In this model they are considered as four process elements on the pragmatic grounds of what are measurably different components of perception at the field level. Thus, categorization and judgement are grouped together in the model because they are obtained together by several field methods although they are conceptually different parts of the perception process.

The other three major divisions of perception used here are: sensory perception (e.g. sight, smell); attitudes; and communication and information flow. In the field, these processes (either separately or together) can be investigated as links between any sub-set of variables relevant to the study.

Figure 12 is a simple heuristic device to help organize the research planning task. It cannot serve as a substitute for specific hypothesis development and conceptual modelling within each research project. No constraints are placed on where the boundaries of a specific study are drawn or on the operation of the linking processes. Individual research projects can therefore trace their

own "critical paths" through it (see the section on examples of field studies). Unfortunately, many empirical studies in environmental perception do not clearly specify the variables considered in terms of their systematic relationships or wider contexts.

STATE VARIABLES

Experience

Experience is gained through time and becomes part of the attributes of an individual and of social groups. It can also be learned from other people's experience through the medium of communication. Time itself is both a resource which can be allocated in diverse ways, and a dimension which is perceived differently by separate cultures and individuals. Time and experience enter the system in three important ways:

- The model describes processes leading to choice in relation to the environment which are repetitive; i.e. the model depicts only one cycle of which there are many through time. The output of one cycle becomes part of the input for the next, through the variable of experience.
- The cyclical or developmental nature of systems and choice processes can be more formally modelled as a learning process, so that individuals and social organizations at any level can be regarded as learning systems. The variable of experience is thus ordered in terms of learning.
- To make choices and arrive at policy formulation takes time, so that in reality a decision-making model has temporal as well as spatial dimensions. This is especially true for more collective choices where communication and information flow consume much time, and are often analysed in terms of time (e.g. critical path analysis).

The idea of the time taken to arrive at the decision point at the interface of man and environment introduces the consideration of time scales. Natural processes in ecosystems commonly operate at slow rates through long time scales. Some environmental processes, even man-influenced ones such as air pollution, may develop so gradually that they operate below the threshold of human sensory perception. Without scientific monitoring they would, and have, remained undetected for long periods. The management of these slow environmental processes operates at very different, and more rapid, orders of time scale once they are recognized (categorization and

State variables

VALUE SYSTEM

GROUP
CHARACTERISTICS

DECISION-MAKING
AND POLICY

OTHER
VARIABLES

TERRITORIALITY &
ETHNOCENTRISM

Collective
Resource
Managers

HUMAN USE
SYSTEM

Scale at which decisions are taken

COMMUNICATION
AND INFORMATION

ATTITUDES

CATEGORIZATION
AND JUDGEMENT

SENSORY
PERCEPTION

EXPERIENCE

IDENTITY

INDIVIDUAL
CHARACTERISTICS

CHOICE AND
BEHAVIOUR

OTHER
VARIABLES

PERSONALITY
AND EFFICACY

Individual
Resource
Manager

Decision

Distance from decision point at man-environment interface

Figure 12. *Simplified model of environmental perception*

judgement). Institutional organizations for decision-making are usually bounded by fixed time horizons of a few years.

Time is therefore a discontinuous variable in terms of the different orders of time scales for the resource manager and for environmental processes. The different time scales available to decision-makers influence their perspective on the problem and its alternative solutions, particularly where they are aware that time is a scarce resource.

The way people perceive time has been relatively little studied. Significant differences have been shown between different cultures and societies in the perception of (1) duration, (2) simultaneity, (3) rhythm and (4) time horizons. Consideration of time perception as an important variable may be particularly relevant in studies involving two or more different cultural groups (Doob 1960, Gale 1967, Ornstein 1969, Szalai 1972).

Examples of empirical measures for the variable of experience
- Perception of time, e.g. duration, time horizons, time scarcity
- Time budgets, e.g. time taken to reach decisions and their implementation
- Time scales, e.g. of institutions, organizations and individuals
- Learning, memory and nostalgia
- Traditions, written and oral
- Previous events and case histories in the context of a particular study
- Historical and prehistorical antecedents and sequences from written and field evidence

Individual characteristics

Individual characteristics are variables by which individuals are described and classified in relation to their role and status in society. Many of the common measures are included in census statistics and they are usually a part of any social survey or questionnaire. These are attributes such as age, sex, socio-economic class, occupation, income and education. They are relatively objective measures that are not usually difficult to obtain.

There are also some more interpretative attributes several of which are measures of an individual's role and status in relation to his power and influence in his society. These range from the individual's role in the household - whether he is head of the household, youngest son, etc. - to his role within the larger social spheres of community, tribe, city or nation. Each individual will have several roles relating to the dif-

ferent groups of which he is a member and the level of society being considered. An individual's access to leadership, authority and power may stem from his possession of wealth, ownership of land, possession of special "powers" (in magic, ritual, teaching or hunting, etc.), or even from the fact that he has travelled more widely than his fellows.

These second types of measures are more individual to each investigation and require the judgement of the researcher to define which ones are appropriate. The first set should be collected in some form in any field study, whether using observation or questioning.

In the model, individual characteristics are restricted to a relatively "objective" set of measures. The way people identify themselves with groups or places, or the significance that age, social status, occupation, etc., have for them are considered as attributes of other variables such as identity and value system.

Examples of empirical measures for the variable of individual characteristics
- Age and sex
- Socio-economic level or class
- Ethnic group
- Occupation and skills
- Education
- Religion
- Physical characteristics
- Income, individual or household
- Roles, e.g. in household, work group, community, larger society
- Groups, e.g. professional, religious, interest, labour unions
- Wealth, e.g. in terms of land ownership, possessions, animals, cash
- Power and authority, e.g. position in work, political, administrative, judicial or religious spheres

Group characteristics

This variable comprises those parameters by which the population being investigated can be described, classified and grouped. In part, it consists of a set of measures parallel to those suggested for identifying the characteristics of an individual. It is likewise helpful to restrict this variable to a relatively objective set of parameters. These data can often be obtained from census and other socio-demographic survey material.

Of particular significance in this context are those aspects of a population, such as population density and mobility, rate of population changes and the pattern, size and distribution of human settlements, which can have

an impact on the biosphere. One index which has been borrowed from ecology and applied to human populations is that of "carrying capacity". Carrying capacity can be used in developing a useful normative model against which actual population characteristics in certain contexts can be compared. For example, parameters of population carrying capacity have been applied to isolated areas such as islands and mountains, or areas which are subject to significant population influx such as recreation areas (Unesco 1973b). But such a normative model should be used with caution, as attempts to make it more realistic for social systems by including some concepts of perception and choice have so far not been very successful.

Some degree of comparability is desirable between the measures selected for individual characteristics and those by which the whole population is described. The group characteristics variable is also a significant one, because in many areas population changes, particularly population increases and movement, can be considered as a driving variable in ecosystem management and man-environment relations.

Examples of empirical measures for the variable of group characteristics
- Population size and density
- Population structure - age, sex, workers/non-workers, land-owning/landless, etc.
- Population increase and decrease - net change, birth and death rates
- Population movements - migration, daily, seasonal spatial movements
- Size of groups, population clusters, settlement patterns
- Population composition, e.g. kinship, ethnic, religion, linguistic, socio-economic
- Distribution of occupation, skills, education, income, wealth, land
- Housing and living standards, e.g. water supply and sanitation, number of rooms, diet, medical services

Personality and efficacy

There is no generally agreed definition of personality. Its concepts are defined by the particular theory of personality adopted and its parameters are those scores or descriptive terms which are a part of that theory. Definitions of personality tend to stress: the social aspect of personality in relation to the response of others; the physiological aspect that is rooted deeply in the characteristics of the person; and the "wholeness" or Gestalt aspect, in that personality is the organizing centre of a person or repre-

sents the total of his being. Of these, the third definition comes closest to a "perception" view of personality.

Personality theory has been influenced by four related approaches in psychology - clinical, Gestalt, learning theory and psychometric measurement - each of which has been emphasized in the various theories and techniques developed. The differences between these theories - ranging from Freud's psychoanalytic theory, to stimulus-response theory and Skinner's reinforcement theory, to existential theory - are so great that any statement about personality would not hold with any generality across them. It is therefore, important that any researcher who wishes to use personality as a variable in his investigation should become more familiar with the alternative theories and their associated parameters and techniques of measurement.

Although most personality psychologists are concerned with personality in a social setting, some work has specifically explored the relation of personality to the physical environment as expressed by environmental preferences, attitudes to environment and, to a lesser extent, the behaviour of people towards the environment. These studies indicate that personality is a significant variable in relation to environmental choices, but adequate assessment of personality even using the scales and tests that have been developed, is a time-consuming field process.

"Efficacy" is a term that has been devised to bring together several concepts expressed in the literature as "internal-external control", "expectation theory", "powerlessness", and "alienation". It means the extent to which an individual perceives his actions and views - as expressed in speech, writing or behaviour - to be effective; that is, to carry some weight, and achieve his desired outcome.

A similar concept has been developed within the framework of personality psychology so that efficacy is placed with personality for convenience here. The personality concept is called internal-external control, which is defined as the degree to which an individual perceives the events in his own life to be largely the result of internal forces under his personal control or the result of external forces beyond his control, such as fate, God and central government. Expressed in more sociological terms "alienation" is defined as the degree to which individuals and groups feel outside the "ingroup" whose actions are efficacious, i.e.

who have power.

Efficacy or perceived effectiveness is an important variable at two levels:

- within any decision-making system, the degree to which individuals and groups believe they are effective as resource managers and as social influences on others is a significant factor in what they choose to do;

- in the larger context of man-biosphere relations, individuals and societies hold different philosophies or "world views" in which the degree of control they feel man has over nature, or nature has over man, varies.

Special attention has been paid to the variable of efficacy in the Guidelines because it is considered a particularly significant one in man-biosphere relations.

Examples of empirical measures for the variable of personality and efficacy
- Internal-external locus of control
- Risk-taking, propensity to innovate
- Environmental dispositions
- Environmental preferences
- Environmental personality inventory
- Attribution of causality, responsibility

Identity

Identity is the variable which measures an individual's self-identity and attachment or sense of belonging to a group, community or a particular place and area. It is an important variable because the ways in which the researcher classifies and codes his sample population of individuals - for example, by age and socio-economic status - may not be the significant way the individual categorizes himself. He may identify himself as conservative, a tribal leader, an artist, a countryman or an intellectual and behave in conformity with these self-categorizations or reference-groups.

In an individual's attachment to a place, the notion of identity parallels that of territoriality for the group. This latter variable is reserved for a more collective identity with land and people. The individual's attachment to a particular place is more than a sense of territory. It is also an identity with the location of his home and personal experience in his past.

In studying choices it is relevant to know on whose behalf the resource manager perceives himself to be making decisions. This consideration involves his sense of identity as a collective decision-maker and

his view of his own authority. "Acting beyond one's brief", that is, outside of other people's view of one's authority (for example in the giving or withholding of information), influences the decision-making process and may produce conflict in resource management. In any case the researcher's view of the role and status of the decision-maker may not be shared by the individual concerned, and it is important to know how the individual himself identifies them.

Examples of empirical measures for the variable of identity
- Reference groups of individual (self-defined)
- Perception of his own role, status and authority
- Attachment to places and communities
- Self-description

Territoriality and ethnocentrism

Territoriality refers to attachment to, and sense of possessiveness of, a particular place or area. For human beings, it is a perceived rather than an objective variable, although it may be expressed in real spatial terms. Territoriality operates at all scales: from the strong feeling of territory that people in old people's homes have for particular chairs, to a peasant community's deep attachment to its land and village, to the nation state's or tribe's sense of its collective territory.

Territoriality has an "exclusiveness" component similar to that for other animals, i.e. other people should not have free access to the area. This component is found, for example, at the national level and also in some urban systems which contain ghettos or marked territorial components. Territoriality also has an "attachment" component which expresses people's identity with places at the collective level - a feeling of shared identity with one's neighbours or compatriots.

An urban expression of territoriality is the "neighbourhood". This concept has both spatial and social attributes for people as a definable space containing particular features and lay-outs and as the location of their social interactions at the personal and general levels. The neighbourhood is the area people live in and where they are most likely to know and meet other people.

Ethnocentrism expresses the degree to which perceptions of the outside world are rooted in, and distorted by, a perspective in which an individual's culture or person is central and dominant. It is difficult not to have an ethnocentric view of other people

and places to some extent. Mobility and contact with other cultures may reduce the strength of an ethnocentric view by increasing the number of alternative perspectives from which to compare and evaluate new information and by thus attenuating the influence of stereotypes. Stereotypes are the generalized images (associated with attitudes) held about people or places distant in social or spatial terms.

Territoriality and ethnocentrism are significant in man-environment relations because they influence behaviour. Even within a single urban system, territoriality may strongly define and restrict spatial movements and communication. In a traditional community, a strongly ethnocentric point of view may be associated with resistance to innovations which are seen as coming from outside the culture and thus constituting a threat to it. In this type of community it is important to understand ethnocentric viewpoints in order to present an innovation or social change in a form in harmony with its world-view and set of values.

Examples of empirical measures for the variable
of territoriality and ethnocentrism
- Spatial movements
- Location of social networks
- Defensive or exclusive behaviour, e.g. street
  fighting, refusal to sell land outside the com-
  munity
- Values and attitudes towards other people and
  places
- Knowledge of other cultures and places
- Preferences for other cultures, places, countries,
  landscapes
- Expression in art, history, traditions, ritual
  and folk-tales

Value system

All social groups have a value system which is shared to some degree by each individual member. The value system provides a frame of reference by which behaviour and ideas can be evaluated and either accepted or rejected. To differing extents, it provides a normative behavioural model for the group. Each individual has his own unique constellation of values within the framework of value systems as shared by the groups to which the individual belongs.

Values are usually considered to be fundamental qualities which underlie more ephemeral attributes such as attitudes. Attitudes have been defined as a "state of mind of the individual towards a value" (Allport 1935). Thus, love of money and respect for scien-

tific method are attitudes, while money and scientific theory are values. Although values are considered as underlying attitudes, new values can be created by attitude change.

A value may be verbally expressed as a belief or an attitude. It may also be enacted in behavioural acts, especially habits and rituals. Religious and political rituals express shared values as do the ways in which friends greet one another in the street, the family members sit down to eat together, or gifts are exchanged on particular occasions. Values are expressed, therefore, in daily behaviour, in social occasions, in folktales and mythology, in literature and art. In whatever form a culture is expressed, so also are its values.

The particular significance of a value system in the context of environmental perception is the way in which it constrains, or supports and encourages, choices and actions relating to the biosphere. Traditional resource management choices, by virtue of their historical continuity, are generally in harmony with a society's value system. New uses of the biosphere are likely, at least for a short time, to be contrary or alien to the values held by the community. In this respect, an important aspect of a value system is how nature is regarded, and whether it is considered an object of exploitation or conservation.

Examples of empirical measures for values
relating to:
- Nature
- Particular places
- Different aspects of biosphere, e.g. land, water
- Environmental quality
- Social and spatial mobility
- Tradition and change
- Productivity, profit and work
- Social exchange of goods and services

PERCEPTION PROCESSES

Sensory perception

Sensory perception is the direct experience of the environment through the sense organs for sight, hearing, smell, taste and touch. A distinction is usually made between sensory perception and cognition or between sensing and knowing:

Perception can be defined as the process of immediate experience in organisms. This links perception with sensation; such primitive terms as 'seeing', 'tasting' and 'feeling' are refinable into

perceptual processes. As experience be-
comes less immediate and the amount of
inference by the organism increases, pro-
cesses of cognition have become involved.
Among the primitive terms are 'knowing'
and 'thinking' (French 1963).

The argument amounts roughly to stating
that 'perception' must have at least one
foot firmly on the ground, and that this
entails classifying as perceptual only
those responses which are at least part-
ly determined by, and directly linked to,
the sensory information received by the
organism at the time they are made (Taj-
fel 1969).
As thus defined, sensory perception precedes
any understanding and selection among alter-
natives. It is a basic input to the choice
processes but is usually distant from the
decision-point in that many other variables
intervene. Choice also entails selection
among alternatives, which is explicitly be-
yond the realm of sensory perception.

Sensory perception is always to some de-
gree a component in environmental percep-
tion, but its direct significance increases
in certain resource management situations
such as, for example, visual perception in
the design of urban complexes and motorways,
and acoustic perception in assessing the en-
vironmental impact and social disturbance
of airports and road traffic (Canter 1975).

Increasingly, scientific monitoring sys-
tems and instruments are extending and en-
dorsing human sensory perception in detect-
ing environmental states and changes that
are below sensory threshold of awareness be-
cause they are small, ambiguous or slow. In
these circumstances, information flow takes
the place of direct sensory perception in
the environmental perception process.

Many studies have revealed significant
differences in sensory perception of differ-
ent cultures. Research has been focussed on
visual perception, particularly of colour,
orientation, depth and illusions. Colour
perception illustrates, for example, the cul-
tural effect of language on the discrimina-
tions seen between colours; where there is
no word for a colour, it will not be meaning-
fully "perceived" or categorized. Depth-per-
ception in two-dimensional representations
is a learned skill, and the use of perspec-
tive to indicate three dimensions is a re-
cent discovery of the western world which is
still not shared by many cultures (Her-

skovits, Campbell and Segall 1956; Lloyd
1972).

Examples of empirical measures for the variable
of sensory perception
- Perception thresholds, e.g. of noise and smell
- Visual perception, e.g. form, colour, detail and
  variety
- Orientation perception, e.g. in urban environ-
  ments

Categorization and judgement

Categorization and judgement are inherent
processes in decisions and explanations –
both scientific and everyday. Categorization
is the means by which diverse phenomena are
arranged in some order. By creating classes
which are meaningful to the individual or
group, categorization enables: separately
known objects or events to be linked toge-
ther; new phenomena to be assimilated and
classified; objects and events, as yet un-
known, to be predicted. Categorization is
thus a cognitive process which performs the
same functions in a general way as do the
development of taxonomies and theories for
science.

The ways in which people and societies
categorize phenomena are idiosyncratic. The
need to establish some order and taxonomy is
universal, but the criteria by which phen-
omena are distinguished are personal and
cultural. The agricultural agent in a pea-
sant community may clearly differentiate be-
tween his categories of "agricultural im-
provements" (new hybrid crops and irriga-
tion); "land reform"; the "provision of med-
ical facilities" and "social security". He
may consider the first category to be with-
in his professional domain and the other two
outside it. For the peasant farmer in the
same area, low crop yields due to drought and
poor land, and to an illness in the family
(which created expenses and a loss of family
labour), may be more relevantly labelled as
a single category "poverty" or "peasant" or
"indian". The discrepancies between the
agent's and the peasant's categorization in
this example are based both on differences
in their criteria for classification and in
the content of their categories. These dif-
ferences can be the cause of misunderstanding
and non-communication.

Judgements (assessments, evaluations) are
values assigned to classes once the classes

themselves have been determined. The individual categories of any classification of phenomena, even if it is shared by many people, are likely to have quite different values for each individual according to the positive or negative values or relative importance attributed to them. These values can change through the operation of perception processes over long periods of time. For example, environments dominated by mountains and "wilderness" areas have acquired a positive value in western European society today, whereas traditionally they were regarded as places to be feared and avoided. Conversely, the city - once regarded as a pinnacle of civilization's achievements - is now becoming more negatively evaluated as "a concrete jungle" (Tuan 1974).

Within shorter time scales, judgements can be formally and informally expressed as words or numbers in terms of subjective probability, utility, cost-benefit analysis and risk assessment. Judgements of probability - how likely something is to occur - are as important as judgements of utility or cost-benefit. Several distinctions can be made in modelling judgement, particularly between judgements involving choices with or without risk and between risk-takers and risk-avoiders. These judgements are discussed further in the literature on decision-making (e.g. Edwards and Tversky 1967; Slovic, Kunreuther and White 1974; Kates 1977).

Examples of empirical measures for the variables
of categorization and judgement
- Personal constructs and criteria for categories
- Descriptions of people, places, events
- Stereotypes
- Preferences
- Subjective probability and utility
- Risk assessment
- Cost-benefit assessment

Attitude formation

The concept of attitude is one of the most empirically studied in psychology and sociology. It has been given many definitions of which that of Allport's is given here: "An attitude is a mental and neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport 1935). It thus includes opinions, beliefs, and feelings which include a preparation or readiness for response. Attitudes are usually considered to have affective

(feeling, emotional), cognitive (thinking, mentally organizing) and conative (behavioural) components, and to be sets of dispositions to act.

Attitudes are measured in terms of their direction (positive or negative towards the attitude object), their strength (the extremity to which an attitude is held) and their consistency. This last measure is related to attitude change and attitude formation, which are usually conceived of as processes operating towards achieving balance or congruence between different attitudes, and between attitudes and behaviour. Thus a strongly held attitude towards the beauty of pastoral landscape would be expected to be associated with a negative attitude towards the spread of industry into rural areas and with preserving the countryside in order to enjoy recreating there.

Attitudes have come into prominence and are relevant to field studies because much attention has been given to methods of measuring them. Some one hundred or more scales for measuring attitudes towards specific objects have been devised and collections of them are available for selection. These scales seek to measure the direction and strength of attitudes held for given objects.

While attitude scales have reached a relatively high level of sophistication which can readily be applied to empirical investigations, attitudes can also be measured in a less quantitative way by direct questions, opinion polls, and *a priori* scales. These are sets of statements which are assumed (but not constructed as in a psychometric attitude scale) to represent equal degrees of attitude strength. A widely used *a priori* scale is that devised by Bogardus (1925) for measuring social distance, in which people are asked the degree of intimacy they would willingly accept between themselves and members of other races.

Examples of empirical measures for the variable
of attitude formation (Attitudes can be measured
towards any attitude object)
- Attitude object
- Attitude strength, e.g. extreme, moderate or
  weakly held attitudes
- Attitude direction, for or against
- Attitude consistency, within and between attitudes
- Attitude change, e.g. with new information

Communication and information flow

Communication and information flow are two of the most important processes in decision-making, especially at higher levels of re-

source management. Communication is a so-
cial process operating between two or more
individuals or groups. People act as sen-
ders and receivers of information, or as
barriers and bottlenecks, for many reasons
related to their perceptions of themselves
and of others, to organizational arrange-
ments in their institutions and groups and
to their view of the information and the
decision-making process. In the broadest
sense, therefore, the study of communica-
tion includes social perception, roles and
status, personality and group dynamics.

Within the framework of resource manage-
ment choice where the outcome of communica-
tion and the ways of optimizing information
flow for decision-making are important, the
organization of communication must be con-
sidered. Analysis of information flow and
information networks is well suited to field
studies because they are often outside the
formal organization of information flow
based on institutional hierarchies and of-
ficial communication channels. In simple
terms, the aim is to understand who says
what to whom, by what channel, to what ef-
fect and for what purpose (Havelock 1971).
In such analysis, there are several pos-
sible problem foci:
- overall pattern of information flow be-
  tween a network of individuals or groups;
- critical circuit of information flow for
  decision-making;
- timing of information flow;
- locus of significant nodes in the net-
  work where information is transformed,
  blocked or disseminated;
- changes occurring in the message as it
  is passed around the network, including
  changes in content, presentation, objec-
  tivity, perceived authority or bias,
  etc.;
- the point at which information leads to
  action determined by, for example, ac-
  quiring a critical amount of informa-
  tion, timing and significance of the
  person sending the information.
Information, organization and decision-
making theories provide several formal mo-
dels for analysing communication. In em-
pirical studies, social factors such as in-
dividual roles and personalities tend to
become more prominent. In some investiga-
tions, communication must be regarded as a
system or network, while in others it is
appropriate to view it principally as a
simple one-way input.

Examples of empirical measures for the variable
of communication and information flow
- Information flow and networks, e.g. spatial and
  temporal aspects
- Organizational arrangements for communication,
  including structure and frequency
- Information content, e.g. written, spoken
- Critical path analysis
- Information transformation, e.g. in message con-
  tent
- Information overload, diffusion, diversion and
  blocking

OUTPUT VARIABLES

Choice and behaviour

Choice and behaviour, together with deci-
sion-making and policy, represent the later
stages of the perception process which lie
between cognition and action. They can be
considered as either state or output vari-
ables. Choice is the selection of one al-
ternative (or set of alternatives) in pre-
ference to others within a context that in-
cludes the other variables in the model.
Behaviour is generally a broadly defined
term which includes acts, including verbal
acts, performed in response to the choice
process. Together, choice and behaviour
represent the output of the perception pro-
cess which in turn provides feedback in the
form of input to the variable of experience.

Choice and behaviour are less clearly de-
fined than some of the other variables and
therefore can be considerably harder to mea-
sure empirically. Behaviour and choice are
continuous processes having many interlock-
ing causes which in practice may make it
difficult to isolate as a particular "act"
or moment of choice within any defined de-
cision-making system. Behaviour as mea-
sured in the field is commonly verbal be-
haviour, i.e. it is the individual's ac-
count of his past behaviour, or his in-
tended future behaviour. Behaviour as a
response to perception and choice within
the delimited context being investigated
should also be distinguished from "habit"
which extends beyond that specific con-
text. Here behaviour is used to describe
the outcome of individual choice in contrast
to the collective context of decision-
making and policy.

Examples of empirical measures for the variable
of choice and behaviour
- Alternatives, with or without consideration of
  range and number
- Reversibility of choice, both short- and long-
  term
- Effects of choice on different time scales
- Constraints on choice and behavioural situation
- Consistency of choice and behaviour; predicta-
  bility
- Time, including duration, sequence, timing
- Future, present, past choices and behaviour

Decision-making and policy

Decision-making is linked to policy to ex-
press a more collective notion of choice
and behaviour at higher levels of resource
management. Like choice and behaviour, de-
cision-making is a target variable for the
types of field studies envisaged in the
Guidelines. It lies at the interface of man
and environment and is the point through
which all the other system variables are ar-
ticulated and find expression in man's ef-
fect on the environment.

   The antecedents of the decision-making
process have already been described within
the context of perception processes. In col-
lective choice, communication and informa-
tion flow are of major importance in forming
decisions and policy. Time is also an im-
portant consideration - both the timing,
and the time taken, for decisions and the
history of previous decisions and policy.
Similarly, analysis of policy-making at
higher levels of management (e.g. national)
will entail understanding the political,
judicial and administrative institutions,
structural relationships and procedures in-
volved.

   In the context of resource management,
three types of decision-making processes
are particularly relevant and together can
define a particular "style" of management:
- preventive or curative (anticipatory or
  responsive) in relation to environmental
  impact;
- consensual (conflict avoidance), adver-
  sary (conflict resolution) and "mixed"
  decision-making in selection of alter-
  natives;
- "private", "public" and "semi-enclosed"
  decision-making in relation to public
  involvement and range of alternatives
  considered.

Examples of empirical measures for the variable
of decision and policy-making
- Administrative or political level at which de-
  cisions are taken
- Continuity or discontinuity of policy and im-
  portance of preceding policy
- Time horizons, urgency, reversibility of de-
  cisions
- Number and range of alternatives considered
- Decision-making style: conflict avoidance or
  conflict resolution
- Context of decision - political, social, his-
  torical, judicial
- Implementation of policy - by whom, when, how
- Effect of policy on alternatives for other levels
  of decision-making
- Time taken to reach decision and its timing; re-
  lationship to initiating agent
- Degree of public involvement in other levels of
  decision-making

Human use systems

These systems are the organizations of so-
cial, legal, political and economic systems
directed towards the use of ecosystems.
   Human use systems may be defined as or-
   ganizations through and by which resources
   are managed. They vary in size and compo-
   sition from the household or tribe to the
   nation state or multinational corporation.
   In their spatial expression, they are
   rarely, if ever, congruent with ecosys-
   tems. Indeed they are often expressly or-
   ganized to cut across several natural eco-
   systems in order to take advantage of the
   complementarities and contrasts of dif-
   ferent ecological zones...It is these
   multi-ecological systems which constitute
   the frame of reference and responsibility
   of most national governments and adminis-
   trative units within them...These organi-
   zational systems themselves form a nes-
   ted series, ranging in scale from the
   household unit through the community and
   local area to the national and interna-
   tional levels. The relationships between
   these different levels of social systems
   are important, as are the relationships
   between the biosphere and the social sys-
   tem at each scale (Unesco 1974, p. 10).
Human use systems do not necessarily include
all aspects of, for example, an economic
system; rather they emphasize those aspects
which bear upon choice and behaviour in re-
source use and management. Even given this
focus, the selection of possible measures
is very wide.

Each field study will be made within an existing context of social, legal, political and economic systems. The researcher will be aware of these major structures just as he is aware of the major parameters of the physical environment in which his field study is located. Together they form the framework of "objective reality" which perception shapes to make decisions possible.

For a model of environmental perception, attributes of the human use system to be selected may be of two types: they define and describe the organizational settings of the study or they have major influence on the way choices are made.

Examples of the first type of attribute are that the human use system is feudal or capitalist, has a codified legal system based on precedent, has formal procedures for planning resource use (such as environmental impact statements or public inquiries), is a chiefdom, totalitarian state or democratic government, etc. These attributes are significant in determining the characteristic ways in which choices are made but they operate less directly than communication or judgement on a particular choice. They are contextual measures rather than processes.

Examples of the second, process-oriented attributes are the ownership of land which has direct bearing on perceived power (efficacy), and value system and territoriality. Also of major importance is the system of division of labour which reflects the technological and organizational capacity of the human use system.

Examples of empirical measures for the variable of human use systems
- Resources (environmental, human, organizational) type, number and diversity
- Ownership of resources, including land, capital, labour
- Productivity of resources
- Rent, yield, return for investment
- Social organization, including division of labour
- Scale and complexity of system
- Isolation or integration with other systems: central or marginal position
- Environmental impact: scale and rate
- Rate of change

EXAMPLES OF FIELD STUDIES

Four examples of field research studies have been selected to illustrate the wide range of variables and processes that can

be measured to investigate different aspects of environmental perception. Their purpose is exemplary only and in each case other parts of the perception system could have been selected for measurement using other parameters.

Table 20 shows a summary comparison of the four investigations in terms of the number of system components (variables and processes) they were concerned with, and the main methods they used. Figures 13-16 present the models of environmental perception adopted or implicit in each investigation, arranged in the common format of Figure 13 and with the measured relationships shown linking the boxes. Comparison of the figures gives some idea of the range of different models (combinations of state variables and processes) that can be empirically tested in the field by using measures relevant to the local situation. It is thus possible to focus on the interaction of any sub-set of variables in terms of some, or all, of the perception processes that link them.

The four examples given here reflect the current state of the art in environmental perception in both the large diversity of perception models currently adopted in research studies, and the concentration on interviewing techniques for a wide variety of environmental settings. They also reflect the lack of longitudinal studies in which the operation of feedback in the model can be empirically tested.

Model for adoption of agricultural innovation by peasants in a tropical forest ecosystem

Figure 13 shows the selection of variables and the measures used for a study of innovativeness among Central American shifting agriculturalists (Feaster 1968). The sample was seventy male heads of households among the Maya Indians of Belize (formerly British Honduras). Six variables and two processes were used to study the choice of adopting an agricultural innovation. As an example of the measures obtained in the field, the two selected for communication and information processes were the number of annual visits by agricultural agents and the number of subjects discussed with others.

Interest here was focussed upon the role of agricultural agents and the Village Association in communicating new ideas to farmers. The study did not consider, for example,

FIELD STUDY	PLACE DATE	SAMPLE RESPONDENTS	SYSTEM COMPONENTS		PRINCIPAL METHODS	
			Vari-ables	Pro-cesses	Observation	Interviewing
Adoption of agricultural innovation	Belize 1968	70	6	2	Participant observation	Unstructured interview Attitude scale
Urban residential move-ment	England 1974	366	8	3		Structured interview Projective tests Semantic differential
Response to tropical cyclone floods	Bangladesh 1970	66	6	1		Structured interview Sentence completion Scenario
Planning policy for conservation area	England 1974	499	7	3	Direct observation	Structured interview Photographs Semantic differential Adjective check list

Table 20. *Comparison of four examples of field investigations in environmental perception*

their early experience with innovations or their individual personalities as major variables.

The main methods used in the study were participant observation, interview survey and attitude scale measurement.

Model for spatial movement of residents in urban and industrial systems

This example is taken from study undertaken by the North East Area Study Unit supported by the Social Science Research Council of the United Kingdom (Townsend and Taylor 1975). It was a survey study rather than an in-depth analysis and it covered eight of the twelve system variables and three processes. Each one is investigated in terms of a few measures obtained through question-naires (Fig. 14). The focus of the study was to see how far identity with a particular lo-cality or region influences the choice between local and wider patterns of spatial movement. Identity is considered in terms of the char-acteristics of the place, the characteristics of the people interviewed, and their defini-tion and strength of attachment to a subjec-tively perceived area.

In the study, 336 male and female adult residents of four urban areas in North East England were interviewed. A standard ques-tionnaire was used in an hour and a quarter face-to-face interview conducted by trained interviewers. A sample was drawn from lists of electors within each of four urban areas, i.e. a clustered random sample was used. Analysis was done using a computer.

The main methods used within the ques-

tionnaire were open-ended, multiple choice, and projective questions; Likert scaling techniques; and the semantic differential.

Model for response to coastal flooding by tropical cyclones

This study (Islam 1974) was made within the international programme of natural hazard research carried out by collaborators in some twenty-three countries (White 1974). It concerns the area of coastal Bangladesh which suffered great damage and loss of life from tropical storms and coastal flooding especially during the disaster of November 1970. The research was undertaken to inves-tigate how residents perceived the hazard of coastal floods and how these perceptions influenced their likely response to future situations, particularly in making the choice between migration and rebuilding their homes in the same locations.

The investigation consisted of a stan-dard questionnaire given in a face-to-face interview to sixty-six residents in a com-munity which was inundated to depths of 3 to 9 metres in the 1970 storm. Most of those interviewed were rice cultivators but a few were businessmen and teachers. Figure 15 outlines the six variables studied which were mainly in the context of risk assess-ment of future hazard, together with the measures used.

The investigation was concerned with in-dividual choice and behaviour, as the con-centration in the lower half of the diagram indicates. "Individual characteristics", such as education and land tenure, is the
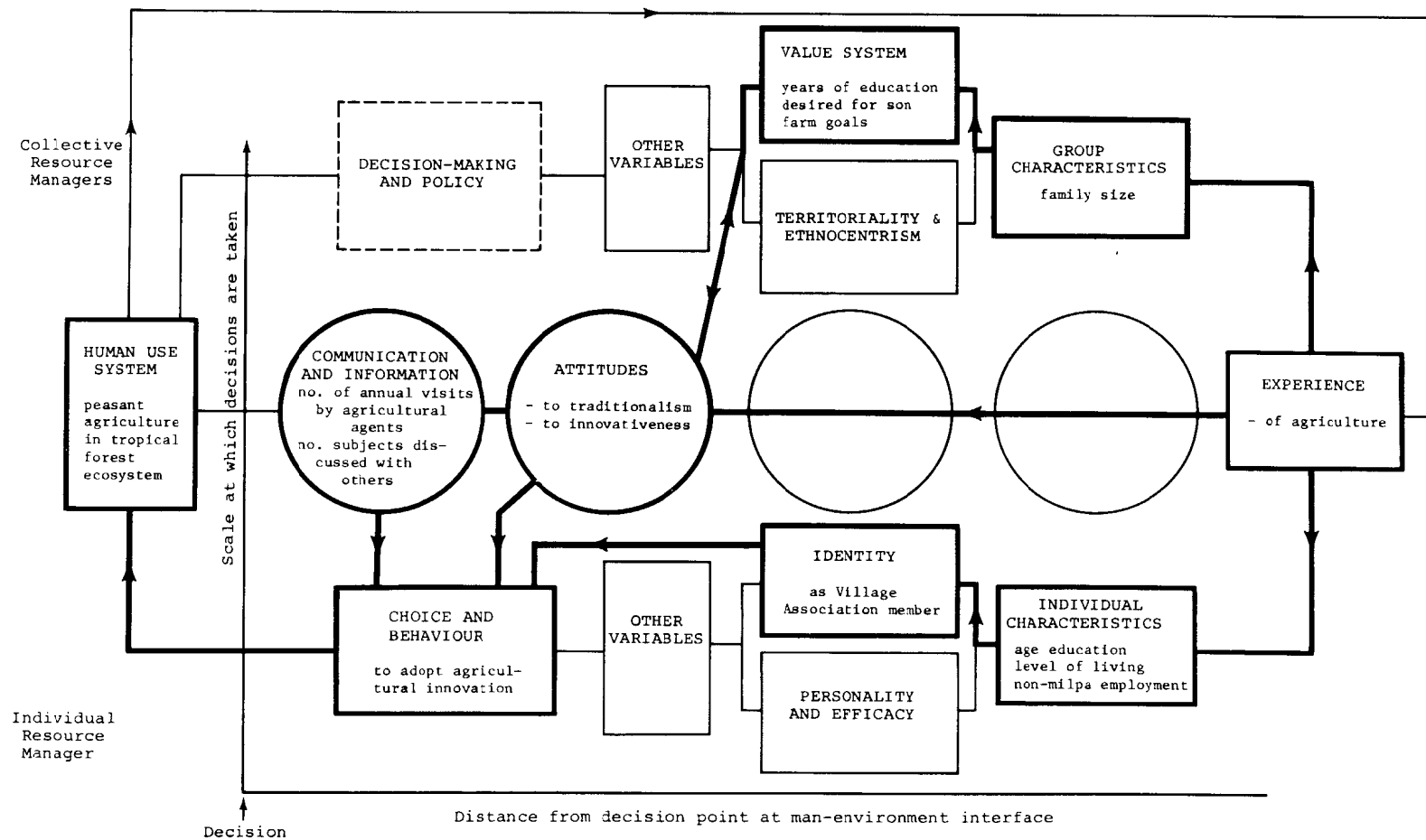
Figure 13. *Research model for adoption of agricultural innovation by peasants in tropical ecosystems*
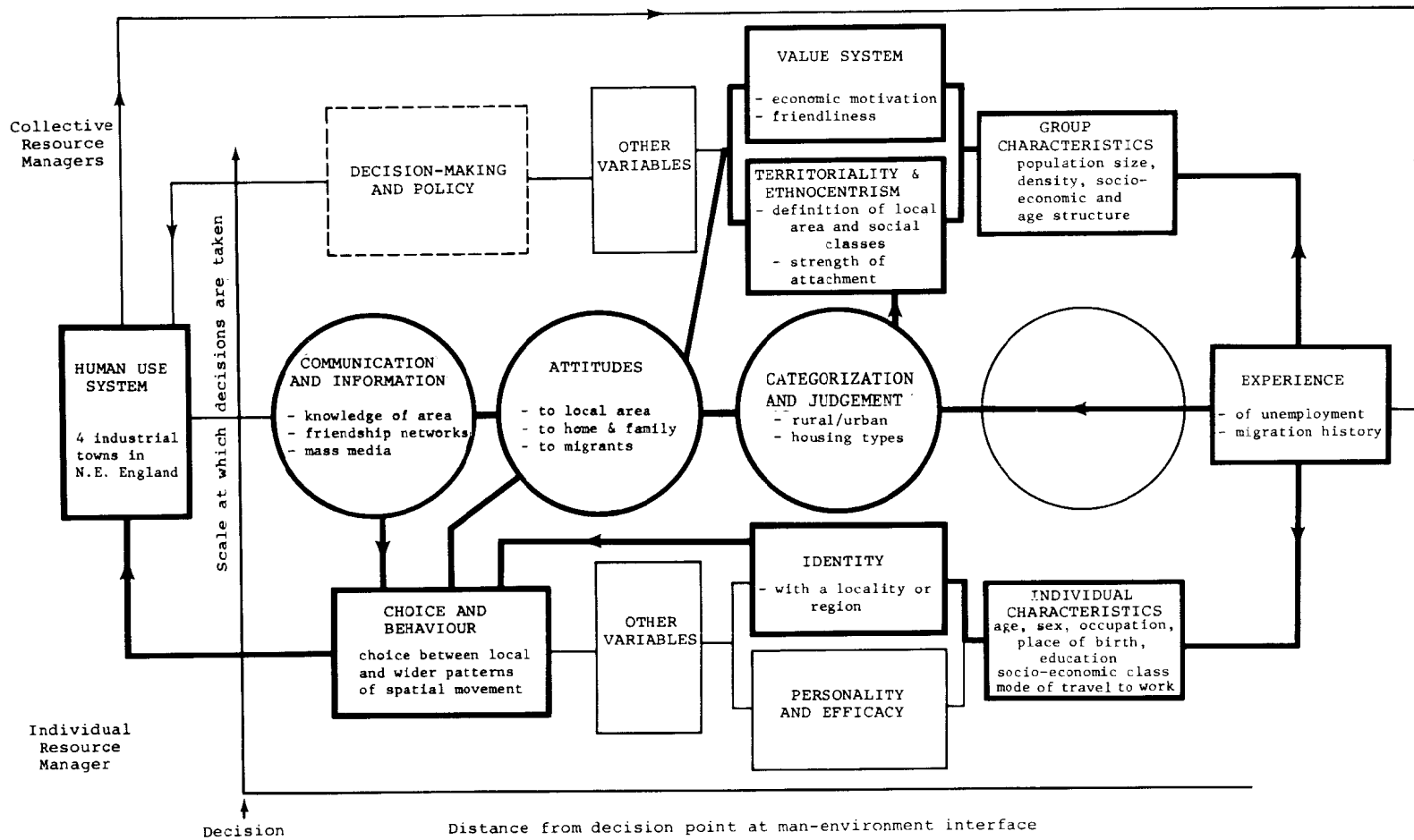
Figure 14. *Research model for spatial movement of residents in urban and industrial systems*

Selection of research variables

VALUE SYSTEM

DECISION-MAKING
AND POLICY

OTHER
VARIABLES

GROUP
CHARACTERISTICS

Collective
Resource
Managers

TERRITORIALITY &
ETHNOCENTRISM

HUMAN USE
SYSTEM
-trade centre
in coastal
hazard zone
-inflow of
disaster
relief

COMMUNICATION
AND INFORMATION

ATTITUDES

CATEGORIZATION
AND JUDGEMENT

risk assessment

EXPERIENCE

of past cyclones

Scale at which decisions are taken

IDENTITY

with community
and land

INDIVIDUAL
CHARACTERISTICS
age, income, educa-
tion, socio-economic
class, land tenure

CHOICE AND
BEHAVIOUR
-to avoid 1970 floods
-to avoid future floods
-choice of settlement
and migration

PERSONALITY
AND EFFICACY

internal-external
control

Individual
Resource
Manager

Distance from decision point at man-environment interface

Decision

Figure 15. *Research model for response to tropical cyclone hazard in coastal zones*

main variable by which other variables are coded and analysed. The amount of uniformity within the sample found for some of the other variables (e.g. risk assessment of future floods, fatalism in terms of internal-external control, choice to remain rather than migrate) enabled the researcher to make some generalizations about the sample population as a whole.

The principal method used was that of the structured questionnaire in a face-to-face interview, within which were included a projective story test to determine future risk assessment and a sentence completion test to measure internal-external control (efficacy).

Model for planning policy for natural conservation areas

Figure 16 shows the seven variables examined together with their empirical measures for a field investigation of visitor use and perception of a natural conservation area (Burton 1974). The area studied was in Cannock Chase, an area which consists largely of heathland given over to recreational use in the Western Midlands region of England.

The study sought to define the ecological carrying capacity of the area with the perceptual capacity. The ecological carrying capacity was measured in terms of recreational damage, particularly the effect of trampling on vegetation changes and soil erosion. The perceptual capacity part of the study was focussed upon visitors' perception of crowding in terms of their tolerance for other cars and other people. Perception of crowding was found to be related to home environment (type of house), size of group, attitudes to crowds, and general socio-economic and demographic characteristics.

The behaviour of visitors was measured in terms of the frequency of visits, their motivation for visiting the area and their activity patterns within the area. This behaviour was related to the individual and group characteristics of the visitors and to the weather.

Correlations were found between these variables and the variable of choice and behaviour which can be used as input to decision-making and policy for the area. Planning concerns included the forecasting of attendance, estimating the ecological impact of visitors, and the recreational carrying capacity of the conservation area on any day, or in any season, in ecological and

visitor-enjoyment terms.

The study consisted of direct observation of people and cars, and 499 interviews with visitors lasting twenty minutes each, in the recreation area. Visitors were spatially sampled by interviewing in different parts of the conservation area having different recreational facilities. The interview and questionnaire part of the study included the use of photographs as environmental surrogates, semantic differential and adjective checklist techniques.

Evaluation

As has been stated earlier, these four case studies have been selected as examples to illustrate the range of empirical investigations being undertaken on environmental perception. They are neither demonstration projects nor should they be individually criticized outside the context of their own research goals. Taken together they do, however, illustrate some of the possibilities and limitations of field studies in environment perception.

The sample sizes in the four studies (66-499 respondents) are larger than in many other empirical field investigations, but compared to the demands of statistical significance in social science data, they are small. Inadequacies in sample size and random sampling have been two major limitations to statistical inference in many environmental perception field studies carried out so far. The statistically significant relationships all too often seem to be confirmations of the obvious, while more theoretically interesting associations remain elusive to a statistical inference. Hence the emphasis in this report on alternative scientific methods to the accumulation of computer analysed cross-tabulations of questionnaire responses.

Dollard expresses the issue with reference to his own work as a psychologist working in the "real world".

> I came under pressure of the experimentalists on methodological grounds. I had to amplify my mathematical and statistical background. I had to learn something of psycho-physical methods as applied to scaling and rating, and hence to test and scale construction. The importance of reliable and valid data was greatly raised up in my mind.
>
> I should like to be able to testify that were I to do this study of Southerntown

VALUE SYSTEM

Collective
Resource
Managers

DECISION-MAKING
AND POLICY
forecasting of at-
tendance; ecologi-
cal impact of vis-
itors; recreational
carrying capacity

OTHER
VARIABLES

TERRITORIALITY
ETHNOCENTRISM
spatial distribu-
tion of cars and
pedestrians

GROUP
CHARACTERISTICS
visitor group size
and composition
journey origin

HUMAN USE
SYSTEM

Recreational
heathland;
Cannock
Chase

Scale at which decisions are taken

ATTITUDES

- to crowding

CATEGORIZATION
AND JUDGEMENT

- of crowding

SENSORY
PERCEPTION
- of temperature,
sunshine and
rainfall
- of other cars
and people

EXPERIENCE
date of previous
visit
frequency of visits

CHOICE AND
BEHAVIOUR
frequency of visits
purpose of visits
activity patterns
in area

OTHER
VARIABLES

IDENTITY

PERSONALITY
AND EFFICACY

INDIVIDUAL
CHARACTERISTICS
age, socio-economic
class, income, edu-
cation, type of
house occupied

Individual
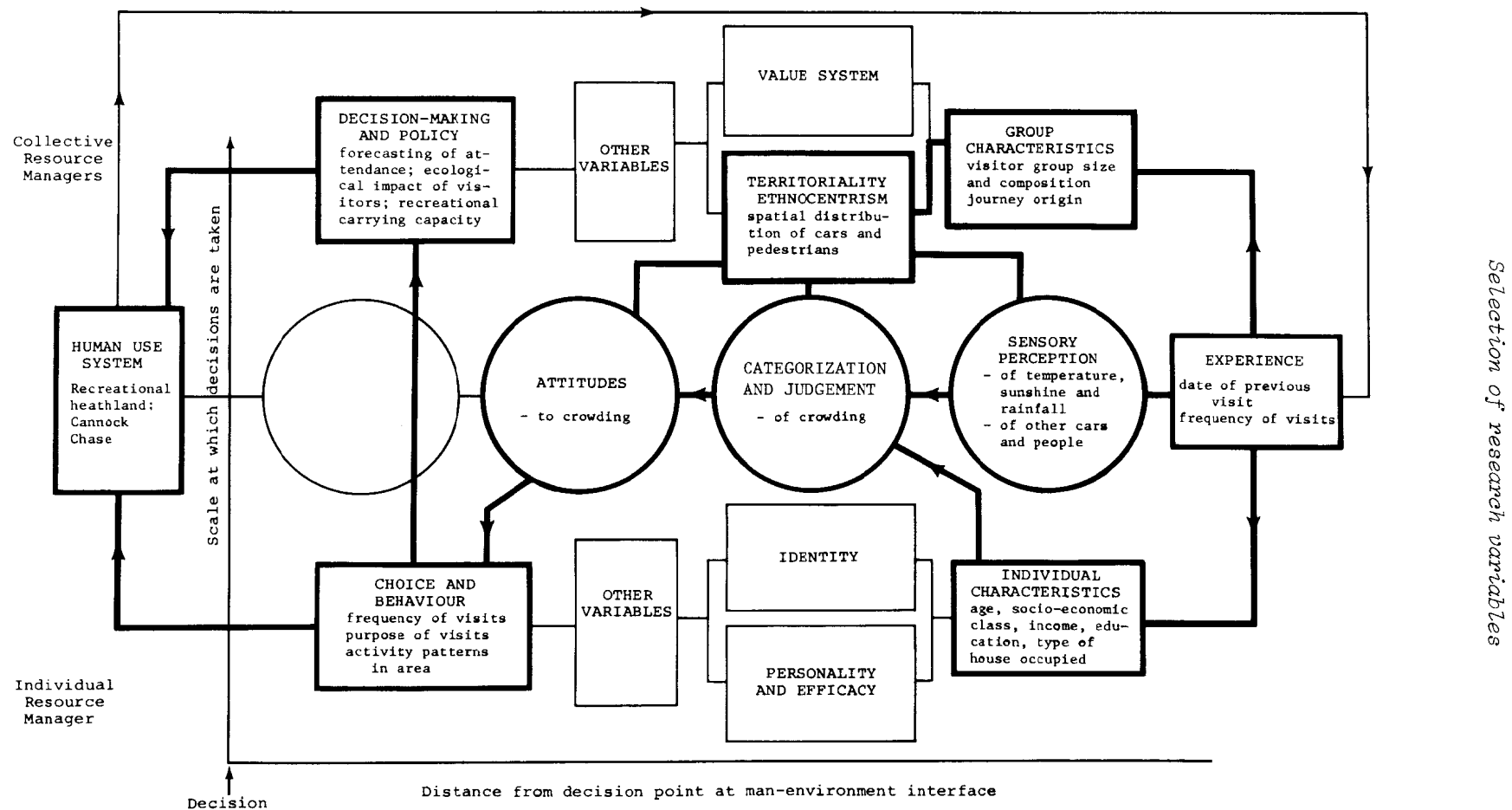Resource
Manager

Decision

Distance from decision point at man-environment interface

Figure 16. *Research model for planning policy in a natural conservation area*

over, now that I have better tools, I
could do it much better. I am not so sure.
The significant, and truly explanatory,
data on the South is hidden behind great
sets of defensive habits. Much of the rel-
evant material can appear only in inti-
mate relations where fear is reduced. The
relation of friendship is such a one; the
psychoanalytic relation, another. Where
friendships must be formed or patients ac-
quired in order to sample adequately, the
difficulties are grave indeed. Not every
nth person can be a friend (Dollard 1957).
Related to the problem of sampling is that
of method. All four case studies used inter-
viewing as a principal method; three used
structured interviews and one used a less
structured approach. Only two of the studies
used observation to collect specific data
and none used listening as a main tool. This
emphasis on asking questions that arise di-
rectly from prior research objectives is
characteristic of many field studies in en-

vironmental perception.
　　Figures 13-16 illustrate a third charac-
teristic of present empirical work: its con-
ceptual "looseness" and tendency to wander
all over the field, measuring variables in
the hope that later analysis will reveal
some significant relationships. Hypotheses
which have led to the research design rath-
er than the other way round often remain im-
plicit and the selection of empirical mea-
sures to test them appears arbitrary rather
than theoretically determined.
　　To some extent, therefore, environmental
perception research as a whole has fallen
between the two paths of statistical infer-
ence and understanding people's perception
and behaviour at deeper, more meaningful
levels. In the context of responding to spe-
cific environmental management questions,
however, the role that can be played by em-
pirical investigations using a perception
approach is becoming more clearly defined
in models and procedures.

VIII. CRITERIA FOR SELECTION OF METHODS

The selection of suitable field methods is
generally a search for an acceptable com-
promise between the conflicting demands of
theory and field conditions, and the sup-
ply of manpower. Some studies are designed
as experiments to test methods; other stud-
ies begin with a theory and proceed to those
methods that are specifically related to
it. Another group of studies are problem-
oriented. They are designed to answer cer-
tain environmental management questions
about human perception and behaviour and
are located in a particular place at a par-
ticular time. For these projects, empirical
realities tend to define what techniques
can be used. It is to this third, problem-
oriented group of studies, in which many per-
ception studies undertaken within the MAB
Programme fall, that this section is ad-
dressed. Such studies are likely to be part
of larger scientific investigations, the
overall structures of which may be already
decided, in terms of location, purpose, and
scale.
　　The designer of an environmental percep-
tion component within such a larger collab-
orative effort will have to work within a
partly determined framework in which some
options are already eliminated because, for
example, they require a longer time or more
highly trained research assistance than can
be made available. For the designer of such

field perception studies, the range of tech-
niques described in the Guidelines (as well
as others not specifically discussed here)
can be considered as a resource pool on
which he can draw. Each technique can then
be evaluated according to his own set of
criteria. The questions he might ask of each
technique include:
 - For what variables is it a good measure?
 - Does it tell me more about the system as
   a whole or about specific interrelation-
   ships between variables?
 - Is it unobtrusive or does it help to
   educate and inform people?
 - What data base does it require?
 - Can it be carried out in the given field
   conditions?
 - What are its requirements in time and
   manpower in developing any research in-
   struments, actual field work and later
   analysis?
 - What level of explanation can be reason-
   ably expected from the results?
 - What sampling strategy and sample sizes
   are involved?
 - What, if any, models and assumptions
   about human perception and behaviour are
   implicit in the technique?
 - Can its results be built upon, and added
   to, in later research efforts?
It would be ideal if this chapter could pro-
vide the detailed evidence on which the re-

searcher could base his own specific an-
swers to these questions, but unfortunately
the information available about most tech-
niques does not allow detailed comparative
evaluation. The trade-offs that occur be-
tween, for example, reliability and validity
when techniques are changed in format or
procedure for local field conditions have
not been systematically tested. This is a
major methodological obstacle to interna-
tional comparative research in environmen-
tal perception, and in the social sciences
in general.

What is possible at this time is a more
qualitative comparative evaluation of tech-
niques in terms of the system variables they
can best measure; their manpower and time
requirements; their suitability for surveys,
more detailed case studies, and educational
research approaches; their usefulness with
people with limited educations; and the ex-
tent to which changes in format and pro-
cedure can be made without lowering stan-
dards of validity and reliability. The eval-
uations that follow, together with the tables
based on them (Tables 21-24), are necessarily
only one person's perspective based on the
weight of evidence so far. The evaluations
are thus intended as guidelines only, and in
each case the researcher is urged to fur-
ther explore the relevant literature before
developing or adapting a particular tech-
nique for his own study.

MATCHING FIELD METHODS TO SYSTEM VARIABLES

Table 21 is a summary chart of the system
variables described in the previous sect-
ion together with the field methods that
are suggested to be suitable for measuring
them under the proper conditions. Thus sev-
eral possible methods are indicated for each
variable, irrespective of their relative
field and data requirements or level of ex-
planation. Those methods which are not sug-
gested for a certain variable are excluded
according to one or more of the following
criteria:
- They are largely irrelevant (e.g. land-
  scape evaluation is not recommended to
  measure communication patterns).
- They tend to yield inferences rather
  than direct measurement and more direct
  means are available (e.g. personality
  scales are not recommended for measuring
  choice and behaviour).
- There are simpler, more economic means
  of obtaining the same data (e.g. the sen-
  tence completion test is not recommended

for measuring individual characteristics
such as age, sex, education).
- The degree of explanation they provide on
  the variable is generally too poor or
  superficial to justify their use and bet-
  ter methods are available (e.g. adjec-
  tive check-lists are not recommended for
  measuring values).

Table 21 shows that for obtaining information
on some variables, for example attitudes,
there are as many as nine methods available
in addition to the standard technique of
constructing attitude scales. For other vari-
ables, such as sensory perception, the range
of suggested alternatives is reduced to di-
rect observation and direct questions, to-
gether with two specialized techniques for
landscape and urban environments. Techniques
such as content analysis and expert judge-
ment are not included in the table because
they are components in many of the methods
listed and can be applied in the measurement
of any variable.

Some methods can be generally applied to
many variables (for example, direct ques-
tions and unstructured listening) while oth-
ers are highly variable-specific, such as
repertory grid tests and landscape evalua-
tion. The suggested methods are also clus-
tered in terms of the variables for which
they are recommended; direct methods are
suggested for measuring the more objective
characteristics of individuals, society and
environment; indirect techniques of asking
questions are associated with measuring the
process of perception and choice; and obser-
vation techniques are generally recommended
for measuring behaviour.

MATCHING METHODS TO LOCAL FIELD CONDITIONS

The likely field conditions under which many
MAB research projects will be carried out
do not in any way resemble the standardized
situations in which most specialized tech-
niques in environmental perception have been
developed. In addition, many techniques are
based on highly specific verbal forms and
usages whose meaning and significance (and
thus validity) are lost when translated into
other languages and cultural contexts. Some
techniques are less exacting in their re-
quirements for trained personnel and stan-
dardized formats and procedures, while oth-
er methods may become invalid through a
change in use to meet local conditions. The
"local conditions" criteria which have been
applied to the methods in the Guidelines are:
- the time taken to use a method; although

Key

x method suggested for each variable

FIELD METHODS

SYSTEM VARIABLES

System Variable	Direct observation p. 21	Landscape evaluation p. 24	Behavioural mapping p. 28	Behaviour-setting survey p. 29	Indirect observation p. 33	Participant observation p. 35	Structured questionnaire p. 37, 39	Open questions p. 40	Adjective check-lists p. 45	Semantic differential p. 45	Sentence completion test p. 48	Structured scenarios p. 51	Unstructured scenarios p. 51	Environmental Apperception Tests p. 52	Mental maps p. 55	Attitude scales p. 57	Multidimensional scales p. 58	Repertory grid p. 59	Personality measures p. 61	Internal–External control scale p. 61	Structuring listening p. 65	Urban walks p. 65	Time diaries p. 69	Oral histories p. 71
Experience						x	x	x												x			x	x
Individual characteristics	x						x	x																
Group characteristics	x				x		x	x																
Personality and efficacy						x			x		x	x	x					x		x				x
Identity								x				x	x		x				x	x				x
Territoriality and ethnocentrism	x		x	x		x		x						x						x		x		
Value system						x						x	x					x		x				x
Sensory perception	x	x						x													x			
Categorization and judgement								x	x	x						x	x			x				
Attitudes						x		x		x	x	x				x	x			x				x
Communication and information			x	x	x	x		x												x			x	
Choice and behaviour	x		x	x		x	x	x			x	x								x			x	x
Decision-making and policy	x			x	x	x	x	x				x	x							x			x	x
Human use system	x	x		x	x																			

Table 21. *System variables and suggested field techniques for studying them*

this includes time taken in the devel-
opment stage such as designing local re-
search instruments, time taken in car-
rying out the main field research, and
time required for analysis, the emphasis
here is on time required in the field;
- the need for trained personnel to apply
the method in the field area;
- the usefulness of the method with both
literate and illiterate populations;
- the tolerance of the method to local
variations in format, procedure and
analysis to maintain validity and reli-
ability.

Time requirements

The time required by different field me-
thods to obtain data varies from a few mi-
nutes to several days, months and in some
cases, years. The kind of data they are
able to collect vary correspondingly from
objective, simple statistics to revelations
about a respondent's individual personality
and experience, and to complex information
about social interaction.

In environmental perception research,
there has been a trend towards using in-
creasingly sophisticated or experimental
research techniques and adapting them for
use in natural field settings. The adap-
tation has usually involved considerable
developmental work to produce a new re-
search instrument to meet specific needs,
and a streamlining of the technique as
used in the field to reduce time and man-
power needs. Techniques which fall into
this group (particularly projective tests)
may therefore appear to have low time re-
quirements in terms of field time. However,
in their shortened forms there are serious
doubts as to their usefulness, and their
research instruments are highly specific
to particular places, and social and cul-
tural groups. They therefore require new
research instruments to be developed,
tested and validated for each study area.

Table 22 sets out the average time re-
quirements for carrying out the field work
of a project using different methods. Es-
timated average times are given for each
data point, which may be an individual re-
spondent, a group of respondents, a site
or viewpoint. The data are obtained from
studies using the methods as they are des-
cribed in the Guidelines. Some methods can
obviously be redesigned to take longer or
shorter times.

For researchers contemplating a survey

approach, methods involving relatively
short times per data point are probably of
most interest. These include the most di-
rect and most structured methods such as
direct observation, direct questions, check-
list scales and structured questionnaires.
Some variables cannot be studied through
quicker survey methods and these require
longer times, different methods, and usually
a case study approach. For example, in Table
22 the study of social or personal values
is best achieved by participant observation,
unstructured listening and in-depth pro-
jective tests which all require from sev-
eral hours' to several months' field work.
Table 22 indicates a rough division of the
suggested methods on the basis of field
time requirements into survey and case study
methods.

Manpower and training

The manpower required for a study of en-
vironmental perception depends on the study
objectives and the research design. It can
range from an extremely large group con-
sisting of hundreds of field interviewers
and involving many more data coders and
analysts as, for example, in national sur-
veys, to the single scientist conducting a
small study and carrying out all the oper-
ations himself.

The same range is found in the "gener-
ality" of the manpower or the amount of
training required. For some tasks a high
degree of professional training and exper-
ience is needed. Other tasks can be per-
formed by relatively inexperienced persons
given a few days', or in extreme cases, a
few hours' training only.

Ideally the manpower is obtained in the
quality and with the training requisite to
carry out the study as designed. In reality
the study usually has to be designed with
the manpower availability (together with
funds for training and time limitations)
very much in mind. In fact, the availability
of manpower, funds and time, more often than
not determines or greatly influences the
design of the research.

It should not be assumed that a percep-
tion study will necessarily be expensive,
time-consuming, or exact a heavy drain on
limited supplies of trained manpower or
skilled organizers. Much can be done, as
the literature makes abundantly clear, with
short-term or temporary assistance. Stu-
dents, high school teachers, sub-profes-
sional and technical trainees often make

Key

Average time required per data point (respondent, site etc.)

1 = less than 1/2 hour
2 = 1/2 hour – 1 hour
3 = 1 – 5 hours
4 = 5 – 10 hours
5 = more than 10 hours
* = suitable for surveys

FIELD METHODS

SYSTEM VARIABLES

System Variables	Direct observation p. 21	Landscape evaluation p. 24	Behavioural mapping p. 28	Behaviour-setting survey p. 29	Indirect observation p. 33	Participant observation p. 35	Structured questionnaire p. 37, 39	Open questions p. 40	Adjective check-lists p. 45	Semantic differential p. 45	Sentence completion test p. 48	Structured scenarios p. 51	Unstructured scenarios p. 51	Environmental Apperception Tests p. 52	Mental maps p. 55	Attitude scales p. 57	Multidimensional scales p. 58	Repertory grid p. 59	Personality measures p. 61	Internal-External control scale p. 61	Structuring listening p. 65	Urban walks p. 65	Time diaries p. 69	Oral histories p. 71
Experience						5	2*	1*													1-5		2-3	4-5
Individual characteristics	1*						2*	1*																
Group characteristics	1*				1*		2*	1*																
Personality and efficacy						5			1*		1*	3	3-4					1-2		1	3-5			4-5
Identity								1*				2	2-3							1	2-5	2-3		4-5
Territoriality and ethnocentrism	3-5		2-5	5		5		1*							1-2						2-5	2-3		
Value system						5						3	3-4					2			3-5			4-5
Sensory perception	1-2*	1*						1*														2-3		
Categorization and judgement								1*	1	2							2-3	2-3			2-5			
Attitudes						5		1*		2		1*	1*			1-2	2-3				1-5			4-5
Communication and information			2-5	5	1*	5		1*													1-5		2-3	
Choice and behaviour	1-5		2-5	5		5	2*	1*				1*	1*								1-5		2-3	4-5
Decision-making and policy	1-5			5	1*	5	2*	1*				1*	2								2-5		2-3	4-5
Human use system	1-3	2-3		5	1*																			

Table 22. *Average time requirements for carrying out fieldwork*

excellent field workers and bring to the tasks of data collection a good combination of enthusiasm, willingness to be trained for the job, capacity for hard and sustained effort, and sympathy with both the research objectives and the views of the people being studied.

Normally a perception study should be under the direction of a social scientist with field experience in dealing with local populations. On occasion it might be necessary for him to be able to draw upon particular specialized skills where he himself may lack knowledge. A good perception study may well require, for example, sociological or psychological training in the use and interpretation of some of the more projective methods described in the Guidelines. It will also require a good social/anthropological knowledge of the local populations as well as expertise in sample design, data coding and analysis, ranging from the most sophisticated computer-oriented techniques to simple methods of analysis by hand.

Table 23 presents the methods suggested for measuring each variable according to whether they can be carried out in the field by trained assistants or whether it requires professional field investigators qualified in the use of social science techniques. The concern here is with field time only since professional input is always necessary to the design, development, analysis and interpretative aspects of field work.

In each case, there is at least one suggested method for measuring a variable which can be executed by trained personnel in the field. This makes the mounting of a perception study more feasible in many areas where professional social scientists are not available to play more than a supervisory or coordinating role in the field work itself. Even so, it is generally true that the better methods for obtaining valid data on perceptions and behaviour require more highly trained investigators and longer inputs of research time in the field.

Tolerance and flexibility

Table 24 compares the suggested methods in terms of their usefulness with illiterate as well as literate populations, and in terms of how exacting they are in their requirements for standardized formats and procedures. The flexibility of field methods is particularly important when a study includes very different populations (e.g. a cross-cultural study or one comparing different socio-economic

groups' perceptions). In these situations, a standard format is often inappropriate to all groups being studied. For example, language uses and the meaning of everyday expressions can vary not only between cultures and societies but within different parts of one city. Where terminology is critical to the reliability of the technique, as in attitude scales, it cannot readily be changed to accommodate local needs. The same problem is faced in a field study in which several assistants are working, who may inadvertently reduce the validity of their findings by changing the order in which a series of questions or tests are asked, or by modifying the wording sufficiently to alter its meaning.

These difficulties are most severe with verbal techniques and with highly structured techniques. The margins of tolerance inherent in many verbal tests, such as attitude scales and sentence completion tests, have not yet been properly determined, but preliminary indications suggest that they are not very wide. Accurate recording of directly observed behaviour together with oral descriptions and narratives are approaches with the widest margins of flexibility in the field but they do not altogether escape the need for selectivity on the part of the researcher. It is not possible to record fully the streams of behaviour and conversation. Thus the researcher is always dependent upon his ability to selectively record what is significant and hope that only what is trivial is lost.

IMPACT OF ENVIRONMENTAL PERCEPTION RESEARCH

As perception studies are planned and implemented, the question of their impact and utility has to be satisfactorily answered for each field project. In general, the utility of the studies can be of two kinds. First, the results, in the form of findings or conclusions usually presented in written reports, can be used in the formulation of policy and management strategy. Second, and less appreciated, the carrying out of the studies themselves can at best serve a mutual educational function, and at the very least have some impact on the researchers and on those who are studied.

It is important to consider at the design stage of a perception study the impact of the study on respondents asked to participate. A perception study can be used as an appropriate vehicle for an exchange of information between the researchers (or the research organization or government body) and those who participate in the study as respondents. As noted earlier,

Key

x = can be carried out by trained field assistance

i = requires professional field investigator

FIELD METHODS

SYSTEM VARIABLES	Direct observation p. 21	Landscape evaluation p. 24	Behavioural mapping p. 28	Behaviour-setting survey p. 29	Indirect observation p. 33	Participant observation p. 35	Structured questionnaire p. 37, 39	Open questions p. 40	Adjective check-lists p. 45	Semantic differential p. 45	Sentence completion test p. 48	Structured scenarios p. 51	Unstructured scenarios p. 51	Environmental Apperception Tests p. 52	Mental maps p. 55	Attitude scales p. 57	Multidimensional scales p. 58	Repertory grid p. 59	Personality measures p. 61	Internal-External control scale p. 61	Structuring listening p. 65	Urban walks p. 65	Time diaries p. 69	Oral histories p. 71
Experience						i	x	x												i		x		i
Individual characteristics	x						x	x																
Group characteristics	x				x		x	x																
Personality and efficacy						i				x		i	i				x	x		i				i
Identity								x					i	i				x		i		x		i
Territoriality and ethnocentrism	x		x	i		i		i							x					i		x		
Value system						i							i	i				x		i				i
Sensory perception	x	i						x														x		
Categorization and judgement								i	x	x						i	i			i				
Attitudes								x		i		x	x	x		x	i			i				i
Communication and information			x	i	x	i		x												i		x		
Choice and behaviour	x		x	i		x	x	x			x	x								i		x		i
Decision-making and policy	x				x	i	i	i				x	i							i		x		i
Human use system	x	i		i	x																			

Table 23. *Training requirements for field workers using suggested methods*

Key

x = applicable to literature population only

i = can be adapted for use with illiterate populations

* = tolerant to local variations in format and procedure

FIELD METHODS

Criteria for selection of methods

SYSTEM VARIABLES	Direct observation p. 21	Landscape evaluation p. 24	Behavioural mapping p. 28	Behaviour-setting survey p. 29	Indirect observation p. 33	Participant observation p. 35	Structured questionnaire p. 37, 39	Open questions p. 40	Adjective check-lists p. 45	Semantic differential p. 45	Sentence completion test p. 48	Structured scenarios p. 51	Unstructured scenarios p. 51	Environmental Apperception Tests p. 52	Mental maps p. 55	Attitude scales p. 57	Multidimensional scales p. 58	Repertory grid p. 59	Personality measures p. 61	Internal-External control scale p. 61	Structuring listening p. 65	Urban walks p. 65	Time diaries p. 69	Oral histories p. 71
Experience						i*	i	i*											i*			x*		i*
Individual characteristics	i*						i	i*																
Group characteristics	i*				i*		i	i*																
Personality and efficacy						i*			i		i	i	i				x	x	i*					i*
Identity								i*				i	i					x	i*	i*				i*
Territoriality and ethnocentrism	i*		i*	i		i*		i*						i*					i*	i*				
Value system						i*						i	i				x		i*					i*
Sensory perception	i*	i						i*													i			
Categorization and judgement								i*	i	x						x	i		i*					
Attitudes						i*		i*		x	i	i			x	x			i*					i*
Communication and information			i*	i	i*	i*		i*											i*			x*		
Choice and behaviour	i*		i*	i		i*	i	i*				i	i						i*			x*		i*
Decision-making and policy	i*				i*	i*	i	i*				i	i						i*			x*		i*
Human use systems	i*	i			i	i*																		

Table 24. *Tolerance and flexibility of suggested field methods for local variations in format and procedure*

perception research is not simply an extractive industry in which information is obtained from passive and naive "subjects". Rather, it involves or should involve an exchange of information, expertise and perspectives between respondents and researchers.

Those engaged in the study can gain a deeper and richer understanding of the respondent's point of view. Often this can lead to a greater appreciation of the actions or inactions of the respondent which at first seem irrational, and are subsequently understood to be deeply grounded in the traditional wisdom of the community through the accumulation of long experience.

Equally, the respondents themselves can become more fully informed by the research worker. For example, a farmer may be made more aware of the choices open to him or of ways in which his productivity might be increased. Or, he may be informed by the research team of threats to his livelihood that he had previously not known about, or had discounted. In such a case it is incumbent upon the research worker not to simply identify a threat, but to explain as precisely as possible the nature of the threat and the degree of danger. He might then also go on to explain what the respondent can do to protect himself.

What appears to be responsible action to the research team may not appear so to the respondent. In the example of soil erosion in Mexico cited in the beginning of this Technical Note, it can be appreciated that the peasants' view and the view of the soil conservation expert are likely to be far apart. A perception study in such a case can provide both groups with a greater appreciation of the other's perception and lay the basis for mutual understanding and cooperation. Effective reconciliation of perceptions is unlikely as long as the different functions and perspectives of each remain unknown to the other.

Some methods are more suitable to this cooperative approach. Structured scenarios, for example, enable the researcher to present several alternatives to respondents of which they were previously unaware and which may help to improve their management choices. Similarly, the process of keeping a time diary or completing a repertory grid is a self-revealing one for the respondent. The educational component of the process is often enhanced by conducting the investigation with groups of respondents rather than, or in addition to, individuals. The research task (categorizing, selecting alternatives) becomes a stimulus

for discussion that has been known in some studies to provide input into later community decisions.

Self-study

Unfortunately enough material could not be assembled for the Guidelines to discuss in detail the experience of using self-study methods. Often these are simply adaptations of the kinds of methods discussed in the Guidelines involving carefully prepared explanatory material and "do-it-yourself" kits. Self-study methods enable local people to study their own communities and environmental settings. They can range from national surveys of, for example, land use or public rights-of-way as has been done in the United Kingdom, to individual community-based diaries or "village-books".

These village case studies can be organized through schools, women's organizations, local unions or volunteer groups. Using centrally defined guidelines, members of the community can decide in detail on the contents and contributors to the "book" which can become an invaluable data source of local customs, beliefs, perceptions and behaviour. It also serves to invest the community with considerable pride and awareness of itself, its past, and its future alternatives.

One such village book was initiated by an anthropologist in Mexico who helped a small Indian community as listener and scribe to record freely its own perceptions (Iwanska 1971). In the United Kingdom, an educational organization (Advisory Centre for Education) has prepared clear and simple kits for surveying environmental pollution such as air, water and beach pollution. These are publicized through a national newspaper and organized through the medium of an educational club for children ("Watch"). The kits are sent by mail to children who use them in a survey of their local area and return them to the central office. When some 15,000 children become field workers for such a project, as in the case of the air pollution survey based on the presence or absence of lichen species, it can produce data far beyond the detail and scale of that which can be achieved in more researcher-based studies (Jackson and Young 1973).

A perception study can thus benefit a respondent in four ways. It can help make him aware of hitherto unknown or unappreciated opportunities. It can help prepare him for previously unrealized dangers, and it can help him to understand and appreciate the

view of others which do not coincide with his own. Most important, it can be a stimulus to new and more effective actions in biosphere management.

Rights of respondents

At the same time it should be recognized that individuals and groups participating as respondents in perception studies have rights. These include the right to privacy in their own lives and the right not to have the information that they have given the researcher disseminated without their prior approval. There is current debate about the infringement of the rights of "subjects" in social science investigations. Practices vary widely, and acceptable actions in one place are considered improper elsewhere.

Two principles can be noted briefly. First, the respondent should be looked on as a helper rather than as a subject. The dignity of the respondent should be preserved and protected at all times. In short, he should be treated equally and with respect. Second, it is important that the respondent be given as full and complete an understanding of the purposes of the study as he wishes and as he can assimilate. At an early stage it may be desirable to conceal from respondents the precise purpose of the study in order to ensure that knowledge of the purpose does not distort some responses. Before a researcher leaves a respondent, however, he should ensure that the respondent knows what the study is about and what purpose it serves.

These ethical principles are also important for another reason. Observance of them helps to improve the quality and reliability of the data obtained. It is well known that a variety of extraneous factors may influence respondents. Suspicions are bound to arise in the minds of some respondents that the information sought will be used in some way against them. If such ideas persist and a gulf of distrust separates the respondents from the research staff, then the data obtained will be highly unreliable. It has to be recognized that in some communities it is virtually impossible for any outsider to establish a strong rapport. In all field studies of environmental perception, every effort should be made to foster trust between the respondent and the research workers. This can be done to some extent by following some common sense rules of procedure, such as carefully explaining the study, indicating for whom and by whom it is being carried out, and how the results can be expected to benefit

national objectives and also how they might help the community and thus the individual respondent. There is no substitute, however, for a genuine attitude of respect towards respondents. Where this is not present, its absence is likely to be detected through non-verbal communication by most respondents.

CONCLUSION

The intention of the Guidelines is to describe methods available for field studies in environmental perception and to provide a basis for choice between them. The criteria by which researchers can evaluate alternative methods will vary according to their research problem and research area. There is, in any case, no single "best method". Nor are there easy shortcuts to doing worthwhile environmental perception studies. The road ahead seems at one and the same time to contain potential methodological pitfalls and the promise of considerable empirical reward for each step taken. The usefulness of perception field research for environmental management problems is being increasingly exploited.

As experience in the field widens and more researchers are involved, better techniques and research instruments are generated. Some of these, in which the language and norms of industrial, literate societies predominate, will inevitably need to be modified to permit a wider application of the more specialized techniques now available. Techniques which minimize cultural biases are available in the simpler, more direct and more unstructured methods discussed here.

As a rule, simplicity, honesty and diversity should be stressed. There is no evidence that more sophisticated techniques automatically produce better results. Their application to each individual situation needs careful evaluation. Time spent in developing a more elaborate way of asking a question indirectly may well be better spent in establishing sufficient rapport with the respondent to ask him the same question directly. Similarly honesty may succeed, and be more ethical, where subterfuge brings only doubt and ambiguity. Diversity in method has been a relatively little used means of increasing the amount and quality of information. Wherever and whenever possible, a combination of the three approaches (asking questions, observing and listening) should be used. Similarly, structured and unstructured methods are complementary in the kind of data they can provide. Structured approaches tend to emphasize the operations of

specific components of the system whereas unstructured approaches are more concerned with general relationships within the system as a whole.

Finally, much has been said about methods in the Guidelines and little about those who will carry them out. Yet a study stands or falls not only on the rigour of its techniques but also on the quality of its research workers. Jung quotes a Chinese aphorism: "If the wrong man uses the right means, the right means work in the wrong way"; he concluded himself that "in reality everything depends on the man, and little or nothing on the method" (Jung 1967).

Thus methods by themselves are not enough. Matching methods to the field workers who will carry them out is a further consideration in the design of projects. However methodologically and conceptually sound it is, a technique can only be as good as its practitioner. If field workers express difficulty or reluctance to carry out certain techniques, then another approach will probably be more successful.

Even where guidelines are available, the selection of field methods and research instruments remains a complex task of trying to accommodate the various, and often conflicting, needs of research problems, field areas, local populations, and research personnel. The choice is therefore one that cannot be engineered from afar, but relies also on local knowledge and initiative. The range of methods discussed in the Guidelines gives some cause for optimism that the demands of scientific method and of local situations can be methodologically reconciled. If so, environmental perception research can move rapidly from the "drawing-board" and into MAB field research to play a practical role in improving our understanding of environmental management and man-biosphere relations.

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Questionnaire

One aim of the Guidelines is to encourage the development and exploration of established and new field methods in environmental perception through their practical testing in the field. To do so and to help strengthen existing networks of communication among interested scientists, users of the Technical Note are invited to send their comments and suggestions to the MAB Secretariat, Unesco, 7 Place de Fontenoy, 75700 Paris, France.

The MAB Secretariat would also be grateful if readers would answer the following questions. If necessary use a separate sheet for each technique.

1. Which techniques have you used in the field?

2. What was the purpose of the study to which the techniques were applied? Please describe the study briefly and give references where available.

3. Please write a brief evaluation of the techniques used giving details where possible of major advantages and disadvantages, cross-cultural usefulness and time and training requirements. Please give references where available.

4. Additional comments (e.g. Would you use a given technique again in another study? In what ways could the technique used be improved or adapted?).

5. Which techniques have you *not* used but think should be included in the Guidelines? Please give references where possible.

6. Which techniques would you like more information about?

7. Do you have any suggestions as to how to make the Guidelines more useful for field research?

8. Name: Position:

   Address:

THANK YOU.

This Technical Note provides methodological guidelines for planning field investigations in environmental perception. Alternative research methods are described, including the advantages and limitations of each method for specific purposes and conditions. This Guidelines document is designed as a flexible set of suggestions which provide the basis for individual choice of both the aspects of the perception system to be investigated in the field and the methods by which to do so.

A simple model of environmental perception is presented which indicates the main variables and linking processes of the overall system. This attempt to provide a framework for the field of environmental perception is illustrated by four examples of possible field studies.

The ultimate purpose of this Technical Note is to encourage organizers and planners of national and international research projects on man-biosphere relations and ecosystem management to include perception studies as an integral part of interdisciplinary investigations at the conceptual and field levels.