This paper discusses basic aspects of perception and their influence both in environmental perception and in the development of environmental preferences. Particular reference is made to the influence of perception and preference on distance assessment and location choice. Research on 'priority evaluation' is described and the relationship between attitude and behaviour is discussed. The relevance of an understanding of perceptual and preferential processes to the designer, architect and planner, is emphasised.

The way that people perceive and use the physical environment and its resources has become a major area of concern in the light of population pressure and of increasing mobility. A basic reason for this paper lies in the fact that environmental decisions are taken by architects, planners and others about the environment as they see it, not necessarily as it is. The decisions, however, then affect the environment as it is.

The physical environment has to satisfy basic needs of survival (even its ability to continue to do this is being questioned) but it also has to meet less basic, but nonetheless important, needs in terms of the maintenance of a certain "quality of life". These needs differ in that they can, and do, change and can be changed either by necessity or design. It is important that designers are aware of these, more psychological, needs. For example, an understanding of the perceptual requirements to be met by the physical environment would seem fundamental.

The absolute amount and degree of change to which the various sensory systems are sensitive, limit and define our basic perceptual capacities. Kaplan (1972) describes how men, as a product of his evolution, still has inherent biases in perceptual information processing which were once necessary to survival.

The brain, had, and still has, a limited capacity for identi-
Dying storing and retrieving information, so we have developed strategies or classification systems to cope with as much information as is relevant most efficiently. Knowledge of objects and situations was essential, and anticipation vital. Near recognition was helped by the excellent visual capacity developed in arboreal life, and curiosity and exploration ensured that a wide range of possible or potential information was available. Kaplan describes how representations of environments stored in schematic groupings linked to pleasure and pain units and to action representations, provided the necessary basis for evaluation, prediction and action.

Precisely how we classify and the specific characteristics of the strategies and schematic groupings are the concerns of the differing theories of perception. No single theory of perception yet sufficiently explains features of 'environmental' perception but there are important implications of the perceptual process for any study of 'environmental' perception, preferences and design.

Our perception of objects is possible only because we are willing to go beyond the sensory information we are given. Within the common framework, the ways in which the perceptual capacities have been developed and used vary from person to person and from culture to culture. Our perception of the world is learnt, selective (implicit evaluation), dynamic, interactive and individual. We each structure the 'world' we live in.

For example psychological research has shown that we have to learn to make the world stand still, as it were, while we move around in it. Orientation in space is basic to movement within it and thus to communication and survival. We have to learn to see the world in three dimensions from stimulus input to the retina in two dimensions; learn to see 'space'; 'space in a philosophical sense is empty. It requires bounding and identification by an individual, an interaction between self and environment, to be recognized.' (English and Mayfield, p.218). We also need a certain level of constant, patterned, but varying sensory stimulation from the environment: we give attention to visual complexity, novelty and ambiguity. Research in environmental perception has yet to establish, however, a theoretical base for what, in terms of built form, constitutes continual stimulation but not monotony, what is complex but not chaotic and where the line comes between ambiguity and confusion.

We build up a "net of organised categories in terms of which stimulus inputs may be sorted, given identity and given more elaborated commutative meaning." (Bruner, 1957) We build up
expectations by which the most frequent or familiar items of environment are 'readily' perceived and yet, we also notice and attend to unusual and unfamiliar items. This paradox is difficult to understand unless the multiple motivations of the perceiver in any one situation are acknowledged.

Perception of the environment is a complex interaction of both physical and social factors; of individual and group factors. It is also interactive and cyclic. Perception influences behaviour which in turn influences perception.

Research in environmental perception is therefore concerned with discovering those relationships that are assumed to exist firstly between the characteristics of the physical environment and the way it is perceived and secondly, between the way it is perceived and subsequent spatial behaviour. It must therefore consider not only the factors which influence the perceptual process per se, but also the factors involved in the endowment of meaning, in the development and change of attitudes, factors affecting decision making and the relationship between all these and spatial behaviour.

This paper will attempt to forge some of the links. Firstly some studies of the perception of physical attributes of environment will be described; studies of natural environment, urban environment and of 'distance'. They illustrate the interrelationship of physical and social factors in perception in spite of the physical perspective taken. Secondly studies emphasising the social factors in environmental perception and preferences will be described and then the relationship between attitudes and behaviour will be discussed.

Physical Factors:

Natural environment

Much research in the perception of the natural environment has been carried out by geographers investigating the perception of natural 'hazards' - drought, floods, etc. Although these studies will not be discussed in detail it should be noted that 'hazard research' was one of the first areas of environmental perception research to emphasise the importance of considering perception with other factors influencing decision making and the implications of this for spatial behaviour.

Turning to preference studies, Shafar (1969) for example, has found that one can quantify aesthetic variables of natural landscape in terms of public preferences for them. Kaplan and West (1972) have compared preferences for natural
It was hypothesised that visual preference was directly related to the visual complexity of the stimulus array. They found that complexity did predict preference within each group, but it did not predict their finding that, overall, natural landscapes were preferred to urban landscapes. This finding probably reflects the social and symbolic veneration of the 'countryside' in our present culture as much as any response to inherent physical attributes.

Loomis (1963) has studied people's perceptions of 'countryside' and 'wilderness'. He found, for example, very different definitions from car owners and canoeists which reflects the differing expectations of the two groups, arising from, and giving rise to, their differing use of the physical environment. Peterson (1967) studied preference for residential neighbourhoods of different visual appearance. He found "beauty" and "safety" were highly correlated with preference and, from factor analysis found the two main components of preferred neighbourhoods were "physical reality" and "harmony with nature".

Both Egan and Wendi and Peterson presented the environments to be assessed on slides which raises one of the major problems in environmental perception research. How far do the responses or preferences expressed reflect a response to the representations as opposed to the 'real' environments they are supposed to represent? Neither of these studies relate the preferences expressed to any spatial behaviour of the respondents and in all the studies described social factors, cultural values and group factors, seem to be as influential in preference as the physical attributes identified. They do however illustrate the fact that physical features of environment are a component, albeit a complex one, of environmental preferences.

A study which links this section with the next is the layout study carried out by the Ministry of Housing and Local Government (1963). This compared six local authority housing estates on a range of both physical and social factors. A surprising finding was that the 'appearance of the estate' was the most important contributory factor to satisfaction with it. In this study 'satisfaction' was measured not only by verbal report but also with some reference to the spatial behaviour of moving. The Sociological Research Group are conducting further studies into the components of 'appearance'.

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Urban environment

In spite of a high degree of individuality in perception, it is likely, to the extent that basic information processing structures, environmental experience and language are shared, that 'group' images of environment exist. (See Whorf 1956: linguistic relativity theory.) Reference systems must be shared to some extent to enable communication (and survival) in the physical environment.

Lynch (1960) hypothesized from psychological research, that to facilitate orientation cities should be 'legible' and to be 'legible' the individual elements should be 'imagineable' and easily grouped into patterns. He set out to discover which city forms led to strong images with a view to compiling an urban design guide. He found, however, that factors governing image-ability are complex and only partly related to purely physical characteristics.

Appleyard (1970) suggests that purely physical characteristics are an important element in only one of the three characteristic types of urban perception he has identified; 'responsive' perception. The other two types 'operational' and 'inferential' perception emphasize respectively the important role of active interaction with the physical environment in shaping our perception of it, and the importance of established expectations in shaping our perception of any new experience. (Bruner 1957)

With regard to complexity, he suggests that, for example, an 'operationally' complex environment (one which can be used in many ways) is likely to be more satisfying than (i.e., noticed and preferred to) one which merely creates complex images.

Lynch's studies, and those following him, have shown that considerable agreement does exist as to the constituent features of each city studied (i.e. 'group' image) but, more importantly in the context of this paper, they show that different socio-economic groups within the city have different 'group' images. (See Hysell 1971).

The studies also show firstly that images are parochial and show a lack of awareness of the planner's wider design. (Also found by Lee (1971) Baker (1971) and others.) And secondly that the images of each city differing from each other can be seen to relate (not necessarily accurately in the strictly physical sense) to the differing physical forms of the cities: that there is some awareness of the city's natural configuration.

The parochial nature of images in the city has wide implications. In terms of design it has implications for housing layout and for the location of facilities. It also has implications for
individual spatial behaviour in the locality. Lee (1971) found that the area of individual definitions of 'neighbourhood' correlated with behaviour measures of social involvement in the local environment. A more extreme example was found by Hall (1969) in Belfast. The 'divide' identified by city characteristics, such as residential segregation of Catholics and Protestants, is reflected in activity characteristics such as shopping and visiting. Residents prefer to walk further to facilities, such as shops and bus stops, which are located in their territory, than to go to equal facilities which are 'physically' nearer but not 'subjectively' in their territory.

Distance

An important physical element in perception of the urban environment is distance. Dixon (1971) argues that the concept of 'real' or 'physical' distance may be so simple as to be meaningless. People subjectively assess the physical distance between objects in space. Distance perception is influenced by a complex of factors including the characteristics of the perceiver and of the objects as well as of the space or distance itself. Festinger (1959) argues for a distinction, referring to housing layout, between 'physical' distance and 'functional' distance, between crow fly or raw distance and the actual distance involved in using routes and pathways. Distance perception is largely 'operational' perception (Appleyard 1970) and we see distance in terms of time-distance or cost-distance, rather than distance per se. This is also in terms of 'perceived' time or cost distance, a related but not necessarily accurate assessment of the objective time or cost distance. Research has shown for example that specific kinds of spatial interaction are more sensitive than others to 'distance'. Grinker and Reckman found that the distance travelled for social contacts was greater than that for commercial contacts and Lee (1971) found that people were willing to travel further to non-vocational 'heavy' adult education classes than to 'lighter' more social educational activities. It is also known that attractive and familiar routes are perceived to be shorter, and mixed destinations are subjectively nearer. Thompson (1963) shows how time-distance estimates to preferred shops and those regularly used are more accurate than to those not used and disliked. Lee (1970) has shown that locations in a downtown direction are perceived to be nearer than equivalent locations in an out-of-town direction. He explains this in terms of the 'focal orientation built up by the satisfactions of the city centre.' (Lee 1962)
An important task for research in this area is to isolate the effects of familiarity from those of value or valence. A combination of distance estimation research with preference scaling of destinations like that of Gould (1967) would seem a possible approach.

The social influences on distance perception are illustrated by Ekman and Bratfisch's study (1965). They found an inverse square relationship between measures of perceived distance of capital cities from Stockholm and their subjects reports of the degree of emotional involvement which they would experience in events taking place in those locations.

Urban sociologists have described the subjective assessment of distance as 'the perception of opportunity, or access', (Pahl 1970) Environmental perception is influenced by 'social distance' effects which are discussed in the following section.

Social Factors

It can be argued that perception and preference studies provide a better indication of reasons behind behaviour patterns than deductions from the patterns themselves, for several reasons. Mathematical summaries give few indications of the individual preferences contributing to them and it is possible that the optimum choice in terms of either the community or the individual may not be an available alternative.

Eyles (1971) discusses the importance of the study of preferences as part of the study of behaviour patterns by planning and welfare agencies who are concerned with the distribution of resources. He argues that Funston's (1969) concept of 'revealed space preferences', (spatial behaviour exclusively determined by preferences) should be balanced by a concept of 'repressed preferences'. These are the opportunities or actions perceived as impossible by the individual, given his present social position. He also stresses the importance of the individual's image structure in spatial behaviour and re-emphasises the influence of social position both in the development of this structure, (for example through the 'restricted' and 'elaborated' codes identified by Bernstein) and in its subsequent change through environmental experience. This experience is differentially influenced by physical and social mobility. Eyles suggests that 'repressed preferences' may be representative of the poor, a point illustrated by Cama (1972) concept 'class is the most sensitive index of peoples' ability to choose', and suggests that redistribution of resources must be directed first at this group within society. (See, for example, Low's research described below.)
A recent development in the study of environmental preferences has been the 'priority evaluation' approach of Boisvill (1971). He has devised a priority evaluation 'game' whereby individuals 'trade off' their preferences for different environmental situations given that resources are limited. Participants are given a certain amount of 'wealth' to allocate to improvements to parts of the environment. The alternatives for each situation, e.g. parking facilities, amount of private/public open space, etc., range from deterioration or maintaining the status quo to graded improvements, and each are costed accordingly.

This method enables both individual preferences and the relative priority of these preferences to be studied. The study of the individual's 'ideal' combination of situations (i.e., no limit to wealth) could reveal Kyles' 'repressed preferences'. The study of the relative priority illustrates the individual's resolution of conflicting preferences, such as the time and cost of the journey to work. For example, a person with an existing journey of 50 minutes/15p fare/two changes of mode of transport might have a priority preference for a 45 minute/12p fare/one change of mode of journey. He has decided to trade of 5p against a 5 minute improvement in time and one less change of mode. (A study of this kind was carried out investigating the trade-off choices of Ministry of Transport employees in relation to their journey to work.)

The study of the priority of preferences enables complex, but realistic, choice situations to be studied, answering Bergstram's (1970) plea for the study of 'indivisible' man instead of 'shopping' man, 'leisure' man, etc. Priority scales can illustrate firstly, how preferences change under conditions of limited resources from the 'ideal' situation, secondly, how they change between limited and more limited resources, and thirdly, the relationship between the individual's existing situation and his preference structure can be studied.

A study of environmental rehabilitation using the priority approach was carried out by Low (1972). He found that residents of a local authority estate in Scotland built in 1956 could not give a verbal picture of what they would like improved in their environment, in response to a questionnaire. They had no clear idea of what could be done to improve their environment. Only when they were shown the 'game' board on which the alternatives are illustrated could they form priorities for an 'ideal' environment. This clearly illustrates Kyles' point of the role of social position in influencing environmental knowledge and experience. They had neither seen nor experienced many of the variables.
they were shown on the board. This also emphasizes at once both
the difficulties of investigating preferences, particularly of
groups with 'repressed' preferences, and the importance of
trying to do so, if designers are to understand spatial behav-
ior and if Skeffington (1963) is to be implemented at all.

Two other studies of environmental preferences which emphasize
social and cultural factors are those carried out by Sanoff (1971)
and Himshaw and Allott (1972).

Sanoff (1971) studied the relationship between family attitudes
and housing preferences. He found firstly, that within a socio-
economic group there are differing life patterns which suggest
different housing design considerations. Secondly, that the
most salient factors delineating these differences were ones of
value orientation, family solidarity in particular, rather than
factors of, for example, daily activity patterns.

Himshaw and Allott (1972) also studied housing preferences,
but chose a sample of future consumers, American youths from
varying socio-economic backgrounds. They hypothesized that
preferences would differ with race or ethnic background, and
with existing income and present housing type. They found,
however, that 70% of the whole sample wanted their own single
family detached house, preferably in the suburbs. They
conclude that society is faced with the choice of either
providing access to this type of housing or mounting a
massive attack on the "American Dream".

One needs to look no further than advertising for proof that
our perception of something can be moulded significantly by
the information we receive about it through the media, and
that this information can influence our behavior towards (or
away from) it. In a recent paper, Dooley (1972) comments on
the power of research into how far our environmental images
are influenced by the media. This has obvious implications
for holiday locations, new towns and settlements wishing to
attract tourists, industry or residents.

Decision making and location choice

Studies of location decision making and choices have been
carried out with reference to migration, (Wolpert 1965) to
industrial location, (Towrone 1972) to job mobility (Gould 1969
House 1970) and to residential preferences, (Gould and White
1968).

The study of migration behavior can provide valuable insights
into the location decision making process as a whole. As
Wolpert (1965) comments all moves are purposeful and involve a preceding evaluation process. He describes how one can measure the objective quality of search behaviour, the completeness of the information stream and, after the move, the matching of anticipated with realized utility.

Spatial decision making is influenced by a complex of factors including experience, aspirations, partial information and stress or risk. The decision making model has changed from the "rational economic man" to one of "satisficing behaviour" founded on finite knowledge, "imperfect" perceptions and a complex of goals.

Wolpert (1970) has discussed the impact of stress or threat (e.g. public vs. local interest) on policy decision making, and several researchers have emphasized the influence of another social factor, stage in the life-cycle, on migration behaviour. These include Wolpert (1965) Nagerström (1962) Reier (1960) Mostert (1970) and Sekah (1969). Sekah has identified high mobility with childbearing and child launching stage, low mobility with child rearing stage.

Birbert (1971) in a study of residential mobility and preference considers the individual household as a decision making unit. He found preferences in both private and local authority estates identified an east/west differential in Samsun and considerable local affiliation to the place of survey. These preferences were supported by behaviour measures of intra-city movement in the private sector and by applications for transfers to the local authority.

Local affiliation to the place of the survey was also found by Gold and White (1969) in their study of residential preferences and by Simmonds (1960) in his study of residential relocation patterns within the city. He found that the best predictor of the new location was the location of the former house.

Attitudes and behaviour

The relationship between preferences, attitudes and behaviour is not a simple one. Research in social psychology has long indicated that the persons verbal report of his attitude has a rather low correlation with his actual behaviour towards the object of the attitude (McGuire 1965). One can value clear air and clean air highly and yet be responsible for polluting both. Somensfield (1971) differentiates between the 'perceptual' environment, which is symbolic and value transformed and the 'behavioural' environment which involves the conscious utilization or transformation of the physical environment.
There are many reasons why this conflict between words and deeds arises. Tan (1977) explains it in terms of the differences between the authenticity of words and their cultural meaning as interpreted through behaviour. Words he sees as mainly a conventional mode of behaviour bearing little weight of actuality. Other researchers have emphasized the fact that other factors besides attitudes influence behaviour, particularly individual and situational factors, such as the presence of others and the expected or actual consequences of various acts.

Buechter (1966) has expressed concern that the conclusions of social science research, primarily based on verbal responses are guiding social action programmes (and design) which are primarily concerned with overt behaviour. O'Flordan (1971) suggests two lines of research instead of paper and pencil attitude surveys. Firstly the study of spatial behaviour itself in terms of comparing those who have done something (migrated, moved house, etc.) with those who have not. Secondly, he suggests a deeper study of the cognitive structure of the individual to understand 'how' individuals conceptualise and organise their physical environment rather than 'what' they believe about it.

It is in this area that psychology can probably most contribute. The ability of the individual to integrate complex cognitive structures and to absorb new and sometimes conflicting information is a key factor probably related to personality. Harvey et al. (1961) studies of meaning (using approaches such as Kelly) seem crucial to further understanding of the complex man-environment relationship.

In conclusion, 'seen as children learn to organize and perceive environmental patterns and to charge certain of these with meaning, both symbolic and practical', (English 1972) the designer, in co-operation with the social scientist, must discover to what extent physical or social factors influence perception and preference structures, and to what extent these structures are individual or common to particular groups.

The way that people perceive the environment infers an individual meaning and value structure, so that an understanding of spatial behaviour, both within and between buildings, can be achieved more realistically through the study of people's subjective evaluations of the real world for, 'In a very real sense the city (and environment) is what people think it is'. (Carr 1967).
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