III.

THE CITY IMAGE AND ITS ELEMENTS

There seems to be a public image of any given city which is the overlap of many individual images. Or perhaps there is a series of public images, each held by some significant number of citizens. Such group images are necessary if an individual is to operate successfully within his environment and to cooperate with his fellows. Each individual picture is unique, with some content that is rarely or never communicated, yet it approximates the public image, which, in different environments, is more or less compelling, more or less embracing.

This analysis limits itself to the effects of physical, perceptible objects. There are other influences on imageability, such as the social meaning of an area, its function, its history, or even its name. These will be glossed over, since the objective here is to uncover the role of form itself. It is taken for granted, that in actual design form should be used to reinforce meaning, and not to negate it.

The contents of the city images so far studied, which are referable to physical forms, can conveniently be classified into five types of elements: paths, edges, districts, nodes, and landmarks. Indeed, these elements may be of more general application, since they seem to reappear in many types of environmental images, as may be seen by reference to Appendix A. These elements may be defined as follows:

1. Paths. Paths are the channels along which the observer customarily, occasionally, or potentially moves. They may be streets, walkways, transit lines, canals, railroads. For many people, these are the predominant elements in their image. People observe the city while moving through it, and along these paths the other environmental elements are arranged and related.

2. Edges. Edges are the linear elements not used or considered as paths by the observer. They are the boundaries between two phases, linear breaks in continuity: shores, railroad cuts, edges of development, walls. They are lateral references rather than coordinate axes. Such edges may be barriers, more or less penetrable, which close one region off from another, or they may be seams, lines along which two regions are related and joined together. These edge elements, although probably not as dominant as paths, are for many people important organizing features, particularly in the role of holding together generalized areas, as in the outline of a city by water or wall.

3. Districts. Districts are the medium-to-large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters “inside of,” and which are recognizable as having some common, identifying character. Always identifiable from the inside, they are also used for exterior reference if visible from the outside. Most people structure their city to some extent in this way, with individual differences as to whether paths or districts are the dominant elements. It seems to depend not only upon the individual but also upon the given city.

4. Nodes. Nodes are points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is traveling. They may be primarily junctions, places of a break in transportation, a crossing or convergence of paths, moments of shift from one structure to another. Or the nodes may be simply concentrations, which gain their importance from being the condensation of some use or physical character, as a street-corner hangout or an enclosed square. Some
of these concentration nodes are the focus and epitome of a
district, over which their influence radiates and of which they
stand as a symbol. They may be called cores. Many nodes, of
course, partake of the nature of both junctions and concentra-
tions. The concept of node is related to the concept of path,
since junctions are typically the convergence of paths, events on
the journey. It is similarly related to the concept of district,
since cores are typically the intensive foci of districts, their polar-
izing center. In any event, some nodal points are to be found in
almost every image, and in certain cases they may be the domi-
nant feature.

5. Landmarks. Landmarks are another type of point-reference,
but in this case the observer does not enter within them, they
are external. They are usually a rather simply defined physical
object: building, sign, store, or mountain. Their use involves
the singling out of one element from a host of possibilities.
Some landmarks are distant ones, typically seen from many angles
and distances, over the tops of smaller elements, and used as
radial references. They may be within the city or at such a dis-
tance that for all practical purposes they symbolize a constant
direction. Such are isolated towers, golden domes, great hills.
Even a mobile point, like the sun, whose motion is sufficiently
slow and regular, may be employed. Other landmarks are pri-
marily local, being visible only in restricted localities and from
certain approaches. These are the innumerable signs, store
fronts, trees, doorposts, and other urban detail, which fill in the
image of most observers. They are frequently used clues of iden-
tity and even of structure, and seem to be increasingly relied upon
as a journey becomes more and more familiar.

The image of a given physical reality may occasionally shift
its type with different circumstances of viewing. Thus an
expressway may be a path for the driver, and edge for the pedes-
trian. Or a central area may be a district when a city is organized
on a medium scale, and a node when the entire metropolitan area
is considered. But the categories seem to have stability for a
given observer when he is operating at a given level.

None of the element types isolated above exist in isolation in
the real case. Districts are structured with nodes, defined by
edges, penetrated by paths, and sprinkled with landmarks. Ele-
ments regularly overlap and pierce one another. If this analysis
begins with the differentiation of the data into categories, it must
end with their reintegration into the whole image. Our studies
have furnished much information about the visual character of
the element types. This will be discussed below. Only to a
lesser extent, unfortunately, did the work make revelations about
the interrelations between elements, or about image levels, image
qualities, or the development of the image. These latter topics
will be treated at the end of this chapter.

Paths

For most people interviewed, paths were the predominant city
elements, although their importance varied according to the
degree of familiarity with the city. People with least knowledge
of Boston tended to think of the city in terms of topography,
large regions, generalized characteristics, and broad directional
relationships. Subjects who knew the city better had usually
mastered part of the path structure; these people thought more in
terms of specific paths and their interrelationships. A tendency
also appeared for the people who knew the city best of all to rely
more upon small landmarks and less upon either regions or paths.

The potential drama and identification in the highway system
should not be underestimated. One Jersey City subject, who can
find little worth describing in her surroundings, suddenly lit up
when she described the Holland Tunnel. Another recounted her
pleasure:

You cross Baldwin Avenue, you see all of New York in front
of you, you see the terrific drop of land (the Palisades) . . .
and here’s this open panorama of lower Jersey City in front of you
and you’re going down hill, and there you know: there’s the
tunnel, there’s the Hudson River and everything . . . . I always
look to the right to see if I can see the . . . Statue of Liberty . . .
Then I always look up to see the Empire State Building, see how
the weather is . . . . I have a real feeling of happiness because
I’m going someplace, and I love to go places.

Particular paths may become important features in a number
of ways. Customary travel will of course be one of the strongest
influences, so that major access lines, such as Boylston Street, Storrow Drive, or Tremont Street in Boston, Hudson Boulevard in Jersey City, or the freeways in Los Angeles, are all key image features. Obstacles to traffic, which often complicate the structure, may in other cases clarify it by concentrating cross flow into fewer channels, which thus become conceptually dominant. Beacon Hill, acting as a giant rotary, raises the importance of Cambridge and Charles Streets; the Public Garden strengthens Beacon Street. The Charles River, by confining traffic to a few highly visible bridges, all of individual shape, undoubtedly clarifies the path structure. Quite similarly, the Palisades in Jersey City focus attention on the three streets that successfully surmount it.

Concentration of special use or activity along a street may give it prominence in the minds of observers. Washington Street is the outstanding Boston example; subjects consistently associate it with shopping and theatres. Some people extended these characteristics to parts of Washington Street that are quite different (e.g., near State Street); many people seemed not to know that Washington extends beyond the entertainment segment, and thought it ended near Essex or Stuart Streets. Los Angeles has many examples—Broadway, Spring Street, Skid Row, 7th Street—where the use concentrations are prominent enough to make linear districts. People seemed to be sensitive to variations in the amount of activity they encountered, and sometimes guided themselves largely by following the main stream of traffic. Los Angeles' Broadway was recognized by its crowds and its street cars; Washington Street in Boston was marked by a torrent of pedestrians. Other kinds of activity at ground level also seemed to make places memorable, such as construction work near South Station, or the bustle of the food markets.

Characteristic spatial qualities were able to strengthen the image of particular paths. In the simplest sense, streets that suggest extremes of either width or narrowness attracted attention. Cambridge Street, Commonwealth Avenue, and Atlantic Avenue are all well known in Boston, and all were singled out for their great width. Spatial qualities of width and narrowness derived part of their importance from the common association of main streets with width and side streets with narrowness. Looking for, and trusting to the "main" (i.e., wide) street becomes automatic, and in Boston the real pattern usually supports this assumption. Narrow Washington Street is the exception to this rule, and here the contrast is so strong in the other direction, as narrowness is reinforced by tall buildings and large crowds, that the very reversal became the identifying mark. Some of the orientation difficulties in Boston's financial district, or the anonymity of the Los Angeles grid, may be due to this lack of spatial dominance.

Special facade characteristics were also important for path identity. Beacon Street and Commonwealth Avenue were distinctive partly because of the building facades that line them. Pavement texture seemed to be less important, except in special cases such as Olvera Street in Los Angeles. Details of planting seemed also to be relatively unimportant, but a great deal of planting, like that on Commonwealth Avenue, could reinforce a path image very effectively.

Proximity to special features of the city could also endow a path with increased importance. In this case the path would be acting secondarily as an edge. Atlantic Avenue derived much importance from its relation to the wharves and the harbor, Storrow Drive from its location along the Charles River. Arlington and Tremont Streets were distinctive because one side runs along a park, and Cambridge Street acquired clarity from its border relationship to Beacon Hill. Other qualities that gave importance to single paths were the visual exposure of the path itself or the visual exposure from the path of other parts of the city. The Central Artery was notable partly for its visual prominence as it sweeps through the city on an elevated course. The bridges over the Charles were also apparent for long distances. But the Los Angeles freeways at the edges of the downtown area are visually concealed by cuts or planted embankments. A number of car-oriented subjects spoke as if those freeways were not there. On the other hand, drivers indicated that their attention sharpened as a freeway came out of a cut and attained a wide view.

Occasionally, paths were important largely for structural reasons. Massachusetts Avenue was almost pure structure for most subjects, who were unable to describe it. Yet its relationship as
an intersection of many confusing streets made it a major Boston element. Most of the Jersey City paths seemed to have this purely structural character.

Where major paths lacked identity, or were easily confused one for the other, the entire city image was in difficulty. Thus Tremont Street and Shawmut Avenue might be interchangeable in Boston, or Olive, Hope, and Hill Streets in Los Angeles. Boston's Longfellow Bridge was not infrequently confused with the Charles River Dam, probably since both carry transit lines and terminate in traffic circles. This made for real difficulties in the city, both in the road and subway systems. Many of the paths in Jersey City were difficult to find, both in reality and in memory.

That the paths, once identifiable, have continuity as well, is an obvious functional necessity. People regularly depended upon this quality. The fundamental requirement is that the actual track, or bed of the pavement, go through; the continuity of other characteristics is less important. Paths which simply have a satisfactory degree of track continuity were selected as the dependable ones in an environment like Jersey City. They can be followed by the stranger, even if with difficulty. People often generalized that other kinds of characteristics along a continuous track were also continuous, despite actual changes.

But other factors of continuity had importance as well. When the channel width changed, as Cambridge Street does at Bowdoin Square, or when the spatial continuity was interrupted, as it is at Washington Street at Dock Square, people had difficulty in sensing a continuation of the same path. At the other end of Washington Street, a sudden change in the use of buildings may partly explain why people failed to extend Washington Street beyond Kneeland Street into the South End.

Examples of characteristics giving continuity to a path are the planting and façades along Commonwealth Avenue, or the building type and setback along Hudson Boulevard. Names in themselves played a role. Beacon Street is primarily in the Back Bay but relates to Beacon Hill by its name. The continuity of the name of Washington Street gave people a clue as to how to proceed through the South End, even if they were ignorant of this area. There is a pleasant feeling of relationship to be gained simply from standing on a street which by name continues to the heart of the city, however far. A reverse example is the attention given to the nondescript beginnings of Wilshire and Sunset Boulevards in the central area of Los Angeles, because of their special character farther out. The path bordering the Boston harbor, on the other hand, was at times fragmented simply because of the changing names it bears: Causeway Street, Commercial Street, and Atlantic Avenue.
Paths may not only be identifiable and continuous, but have directional quality as well; one direction along the line can easily be distinguished from the reverse. This can be done by a gradient, a regular change in some quality which is cumulative in one direction. Most frequently sensed were the topographic gradients; in Boston, particularly on Cambridge Street, Beacon Street, and Beacon Hill. A gradient of use intensity, such as on the approach to Washington Street, was also noted, or, on a regional scale, the gradient of increasing age on approaching the center of Los Angeles on a freeway. In the relatively gray environment of Jersey City, there were two examples of gradients based on the relative state of repair of tenements.

A prolonged curve is also a gradient, a steady change in direction of movement. This was not often sensed kinesthetically; the only citations of a bodily sense of curving motion were in the Boston subway, or on portions of the Los Angeles freeways. When street curves are mentioned in the interviews, they seem to relate primarily to visual clues. The running in Charles Street at Beacon Hill was sensed, for example, because the close building walls heightened the visual perception of curvature.

People tended to think of path destinations and origin points: they liked to know where paths came from and where they led. Paths with clear and well-known origins and destinations had stronger identities, helped tie the city together, and gave the observer a sense of his bearings whenever he crossed them. Some subjects thought of general destinations for paths, to a section of the city, for example, while others thought of specific places. One person, who made rather high demands for intelligibility upon the city environment, was troubled because he saw a set of railroad tracks, and did not know the destination of trains using them.

Cambridge Street in Boston has clear, strategic terminal points: the Charles Street rotary and Scollay Square. Other streets may have only one sharp terminal: Commonwealth Avenue at the Public Garden, or Federal Street at Post Office Square. On the other hand, the indefinite finale of Washington Street—variously thought of as going to State Street, to Dock Square, to Haymarket Square, or even to North Station (actually it formally runs to the Charlestown bridge)—prevented it from becoming as strong a feature as it might otherwise have been. In Jersey City, the never-achieved convergence of the three main streets crossing the Palisades, and their final nonsensical subsidence, was highly confusing.

This same kind of end-from-end differentiation, which is conferred by termini, can be created by other elements which may be visible near the end, or apparent end, of a path. The Common near one end of Charles Street acted this way, as did the State House for Beacon Street. The apparent visual closure of 7th Street in Los Angeles by the Hotel Statler, and of Boston’s Washington Street by the Old South Meeting House, had the same effect. Both are accomplished by a slight shift of the path direction, putting an important building on the visual axis. Elements known to be on a particular side of a path also conferred a sense of direction: Symphony Hall on Massachusetts Avenue and the Boston Common along Tremont Street were both employed in this way. In Los Angeles, even the relatively heavier concentration of pedestrians on the western side of Broadway was used to judge in which direction one was facing.

Once a path has directional quality, it may have the further attribute of being scaled: one may be able to sense one’s position along the total length, to grasp the distance traversed or yet to go. Features which facilitate scaling, of course, usually confer a sense of direction as well, except for the simple technique of counting blocks, which is directionless but can be used to compute distances. Many subjects referred to this latter clue, but by no means all. It was most commonly used in the regular pattern of Los Angeles.

Most often, perhaps, scaling was accomplished by a sequence of known landmarks or nodes along the path. The marking of identifiable regions as a path enters and leaves them also constituted a powerful means of giving direction and scaling to a path. Charles Street entering Beacon Hill from the Common, and Summer Street entering the shoe and leather district on the way to South Station, are examples of this effect.

Given a directional quality in a path, we may next inquire if it is aligned, that is, if its direction is referable to some larger...
system. In Boston, there were many examples of unaligned paths. One common cause was the subtle, misleading curve. Most people missed the curve in Massachusetts Avenue at Fal mouth Street, and confused their total map of Boston as a result. They considered Massachusetts Avenue to be straight, sensed its right-angle intersections with a large number of streets, and assumed these streets to be parallel. Boylston and Tremont Streets were difficult because, by a number of small changes, they pass over from almost parallel to almost perpendicular. Atlantic Avenue was elusive because it is a compound of two long curves and a substantial straight tangent, a path which completely reverses its direction but is straight in its most characteristic section.

At the same time more abrupt directional shifts may enhance visual clarity by limiting the spatial corridor, and by providing prominent sites for distinctive structures. Thus the Washington Street core was defined; Hanover Street was crowned by an old church at the apparent end; and the South End cross streets gained intimacy as they shifted course to cross the major radials.

Quite similarly, one was prevented from sensing the vacuum in which central Los Angeles is placed by the grid shifts which close off the outward view.

The second common cause of misalignment to the rest of the city was the sharp separation of a path from surrounding elements. Paths in the Boston Common, for example, caused much confusion: people were uncertain which walkways to use in order to arrive at particular destinations outside the Common. Their view of these outside destinations was blocked, and the paths of the Common failed to tie to outside paths. The Central Artery was a still better example, for it is more detached from its surroundings. It is elevated and does not allow a clear view of adjacent streets, but permits a kind of fast and undisturbed movement totally missing in the city. It is a special kind of automobile-land rather than a normal city street. Many subjects had great difficulty aligning the Artery to surrounding elements, although it was known to connect North and South Stations. In Los Angeles as well, the freeways were not felt to be "in" the rest of the city, and coming off an exit ramp was typically a moment of severe disorientation.

Recent research on the problems of erecting directional signs on the new freeways has shown that this disassociation from the surroundings causes each turning decision to be made under pressure and without adequate preparation. Even familiar drivers showed a surprising lack of knowledge of the freeway system and its connections. General orientation to the total landscape was the greatest need of these motorists.

The railroad lines and the subway are other examples of detachment. The buried paths of the Boston subway could not be related to the rest of the environment except where they come up for air, as in crossing the river. The surface entrances of the stations may be strategic nodes in the city, but they are related along invisible conceptual linkages. The subway is a disconnected nether world, and it is intriguing to speculate what might be used to mesh it into the structure of the whole.

The water surrounding the Boston peninsula is a basic element to which parts may be aligned. The Back Bay grid was related to the Charles River; Atlantic Avenue was linked to the harbor; Cambridge Street led clearly to the river from Scollay Square. Hudson Boulevard in Jersey City, despite its frequent twists, was aligned with the long peninsula between the Hackensack and the Hudson. The Los Angeles grid, of course, provided automatic alignment between downtown streets. It was easy to put down as a basic pattern in a sketch map, even if the individual streets were not distinguishable. Two-thirds of the subjects drew this first, before adding any other elements. However, the fact that this grid is turned through some angular distance, both from the ocean coast line and the cardinal directions, gave a number of subjects some uneasiness.

When we consider more than one path, then the path intersection becomes vital, since it is the point of decision. The simple perpendicular relationship seemed easiest to handle, especially if the shape of the intersection was reinforced by other features. The best-known intersection in Boston, according to our interviews, was that of Commonwealth Avenue and Arlington Street. It is a visually obvious tee, supported by the space, the planting, the traffic, and the importance of the elements joined. The crossing of Charles and Beacon Streets was also well known: the outlines are made visible and reinforced by the
borders of the Common and the Public Garden. Intersections of a number of streets with Massachusetts Avenue were easily understood, probably because the right-angle relationships stood out in contrast to the remainder of the central city.

Indeed, for several subjects, confused intersections with streets entering from many angles were one of their typical Boston characteristics. Crossings of more than four points almost always gave trouble. An experienced taxi dispatcher, with a near-perfect grasp of the city path structure, confessed that the five-pointed crossing at Church Green on Summer Street was one of the two things in the city that troubled him. Equally unnerving was a traffic circle with many entering paths occurring at rapid intervals around an undifferentiated curve.

But the number of entrances is not the whole story. Even a non-perpendicular, five-pointed crossing may be made clear, as has been done in Boston's Copley Square. The controlled space and the heightened character of the node serve to bring out the angled relationship between Huntington Avenue and Boylston Street. Park Square, on the other hand, is a simple perpendicular joint that in its shapelessness fails to communicate its structure. At many Boston crossings not only are the number of paths multiplied, but the continuity of the spatial corridor is completely lost when it strikes the chaotic emptiness of a square.

Nor are such chaotic crossings simply the product of past historical accident. The contemporary highway interchange is even more confusing, particularly since it must be negotiated at higher speeds. Several Jersey City subjects, for example, spoke with fear of the shape of the Tonnelle Avenue Circle.

A perceptual problem on a larger scale is raised where a path branches slightly to make alternate paths, both of relative importance. A case is the branching of Storrow Drive (after a name confusion with Charles Street) into two paths: the older Nashua Street, leading to Causeway-Commercial-Atlantic, and the recent Central Artery. These two paths were not infrequently confused with one another, producing major convulsions in the image. All subjects seemed unable to conceive both at once: maps showed either one or the other as an extension of Storrow Drive. Quite similarly, in the subway system, the successive branching of main lines was a problem, since it was hard to keep distinct the images of two slightly divergent branches and hard to remember where the branch occurred.

A few important paths may be imaged together as a simple structure, despite any minor irregularities, as long as they have a consistent general relationship to one another. The Boston street system is not conducive to this kind of image, except perhaps for the basic parallelism of Washington and Tremont Streets. But the Boston subway system, whatever its involutions in true scale, seemed fairly easy to visualize as two parallel lines cut at the center by the Cambridge-Dorchester line, although the parallel lines might be confused one with the other, particularly since both go to North Station. The freeway system in Los

![Fig. 22. The Tonnelle Avenue Circle](image)
Angeles seemed to be imaged as a complete structure, as did the Jersey City system of Hudson Boulevard intersected by three paths which go down over the Palisades, or the triad of West Side, Hudson, and Bergen Boulevards, with the regular cross streets between.

Where a subject was accustomed to travel by automobile, one-way restrictions were difficult complications in the image of a path structure. The taxi dispatcher's second mental block was due to just such an irreversibility in the system. For others, Washington Street was not traceable across Dock Square because it is one-way entering on both sides.

A large number of paths may be seen as a total network, when repeating relationships are sufficiently regular and predictable.

The Los Angeles grid is a good example. Almost every subject could easily put down some twenty major paths in correct relation to each other. At the same time, this very regularity made it difficult for them to distinguish one path from another.

Boston's Back Bay is an interesting path network. Its regularity is remarkable in contrast to the rest of the central city, an effect that would not occur in most American cities. But this is not a featureless regularity. The longitudinal streets were sharply differentiated from the cross streets in everyone's mind, much as they are in Manhattan. The long streets all have individual character—Beacon Street, Marlboro Street, Commonwealth Avenue, Newbury Street, each one is different—while the cross streets act as measuring devices. The relative width of the streets, the block lengths, the building frontages, the naming system, the relative length and number of the two kinds of streets, their functional importance, all tend to reinforce this differentiation. Thus a regular pattern is given form and character. The alphabet formula for naming the cross streets was frequently used as a location device, much as the numbers are used in Los Angeles.

The South End, on the other hand, while having the same topological form of long parallel major streets interconnected by short minor streets, and while often mentally considered as a regular grid, is much less successful in its pattern. Major and minor streets are also differentiated by width and use, and many of the minor streets have more character than those of the Back Bay. But there is a lack of differentiated character in the major streets: Columbus Avenue is hard to distinguish from Tremont Street, or from Shawmut Avenue. This interchangeability was frequent in the interviews.

The frequent reduction of the South End to a geometrical system was typical of the constant tendency of the subjects to impose regularity on their surroundings. Unless obvious evidence refuted it, they tried to organize paths into geometrical networks, disregarding curves and non-perpendicular intersections. The lower area of Jersey City was frequently drawn as a grid, even though it is one only in part. Subjects absorbed all of central Los Angeles into a repeating network, without being disturbed by the distortion at the eastern edge. Several subjects...
even insisted on reducing the street maze of Boston's financial district to a checkerboard! The sudden, and particularly the rather indiscriminable, shift of one grid system to another grid system, or to a non-grid, was very confusing. Subjects in Los Angeles were often quite disoriented in the area north of First Street or east of San Pedro.

**Edges**

Edges are the linear elements not considered as paths: they are usually, but not quite always, the boundaries between two kinds of areas. They act as lateral references. They are strong in Boston and Jersey City but weaker in Los Angeles. Those edges seem strongest which are not only visually prominent, but also continuous in form and impenetrable to cross movement. The Charles River in Boston is the best example and has all of these qualities.

The importance of the peninsular definition of Boston has already been mentioned. It must have been much more important in the 18th century, when the city was a true and very striking peninsula. Since then the shore lines have been eroded or changed, but the picture persists. One change, at least, has strengthened the image: the Charles River edge, once a swampy backwater, is now well defined and developed. It was frequently described, and sometimes drawn in great detail. Everyone remembered the wide open space, the curving line, the bordering highways, the boats, the Esplanade, the Shell.

The water edge on the other side, the harborfront, was also generally known, and remembered for its special activity. But the sense of water was less clear, since it was obscured by many structures, and since the life has gone out of the old harbor activities. Most subjects were unable to interconnect the Charles River and Boston Harbor in any concrete way. Partly this must be due to the screening of the water at the tip of the peninsula by railroad yards and buildings, partly to the chaotic aspect of the water, with its myriad bridges and docks, at the meeting of the Charles River, the Mystic River, and the sea. The lack of frequented waterside paths, as well as the drop in water level at Dam, also breaks the continuity. Farther west, few were aware of any

water in the South Bay, nor could they imagine any stop to development in this direction. This lack of peninsular closure deprived the citizen of a satisfying sense of completion and rationality in his city.

The Central Artery is inaccessible to pedestrians, at some points impassable, and is spatially prominent. But it is only occasionally exposed to view. It was a case of what might be called a fragmentary edge: in the abstract continuous, but only visualized at discrete points. The railroad lines were another example. The Artery, in particular, was like a snake lying over the city image. Held down at the ends and at one or two internal points, it elsewhere writhed and twisted from one position to the next. The lack of relation felt while driving the Artery was mirrored in its ambiguous location for the pedestrian.

Storrow Drive, on the other hand, while also felt to be "outside" by the driver, was clearly located on the map, because of its alignment to the Charles River. It was the Charles River, despite its role as the basic edge in the Boston image, which was curiously isolated from the detailed structure of the adjoining Back Bay. People were at a loss as to how to move from one to the other. We can speculate that this was not true before Storrow Drive cut off pedestrian access at the foot of each cross street.

Similarly, the interrelation of the Charles River and Beacon Hill was hard to grasp. Although the position of the hill is potentially explanatory of the puzzling bend in the river, and although the hill thereby gains a commanding enfilade view of the river edge, the Charles Street rotary seemed for most people to be the only firm connection between the two. If the hill rose sharply and immediately out of the water, instead of behind a masking foreshore covered by uses which are only doubtfully associated with Beacon Hill, and if it were more closely tied to the path system along the river, then the relation would have been much clearer.

In Jersey City, the waterfront was also a strong edge, but a rather forbidding one. It was a no-man's land, a region beyond the barbed wire. Edges, whether of railroads, topography, throughways, or district boundaries, are a very typical feature of this environment and tend to fragment it. Some of the most
unpleasant edges, such as the bank of the Hackensack River with its burning dump areas, seemed to be mentally erased.

The disruptive power of an edge must be reckoned with. The isolation of the North End in Boston by the Central Artery was glaring, in the eyes of residents and non-residents alike. Had it been possible, for example, to preserve the connection of Hanover Street into Scollay Square, this effect might have been minimized. The widening of Cambridge Street, in its day, must have done the same to the West End-Beacon Hill continuum. The broad gash of Boston’s railroad tracks seemed to dismember the city, and to isolate the “forgotten triangle” between the Back Bay and the South End.

While continuity and visibility are crucial, strong edges are not necessarily impenetrable. Many edges are uniting seams, rather than isolating barriers, and it is interesting to see the differences in effect. Boston’s Central Artery seems to divide absolutely, to isolate. Wide Cambridge Street divides two regions sharply but keeps them in some visual relation. Beacon Street, the visible boundary of Beacon Hill along the Common, acts not as a barrier but as a seam along which the two major areas are clearly joined together. Charles Street at the foot of Beacon Hill both divides and unites, leaving the lower area in uncertain relation to the hill above. Charles Street carries heavy traffic but also contains the local service stores and special activities associated with the Hill. It pulls the residents together by attracting them to itself. It acts ambiguously either as linear node, edge, or path for various people at various times.

Edges are often paths as well. Where this was so, and where the ordinary observer was not shut off from moving on the path (as he is on the Central Artery, for example), then the circulation image seemed to be the dominant one. The element was usually pictured as a path, reinforced by boundary characteristics.

Figueroa and Sunset Streets, and to a lesser extent Los Angeles and Olympic Streets, were usually thought of as the edges of the Los Angeles central business district. Interestingly enough, they were stronger in this respect than the Hollywood and Harbor Freeways, which also can be thought of as major boundaries, and are both much more important as paths and physically more imposing. The fact that Figueroa and the other surface streets are conceptually part of the general grid, and have been familiar for some time, as well as the relative invisibility of the depressed or landscaped freeways, all conspired to erase these freeways from the image. Many subjects had difficulty in making a mental connection between the fast highway and the remainder of the city structure, just as in the Boston case. They would, in imagination, even walk across the Hollywood Freeway as if it did not exist. A high-speed artery may not necessarily be the best way of visually delimiting a central district.

The elevated railways of Jersey City and Boston are examples of what might be called overhead edges. The elevated along
Washington Street in Boston, seen from below, identifies the path and fixes the direction to downtown. Where it leaves the street, at Broadway, the path loses direction and force. When several such edges are curving and intersecting overhead, as they do near North Station, the result may be quite confusing. Yet high overhead edges, which would not be barriers at the ground level, might in the future be very effective orientation elements in a city.

Edges may also, like paths, have directional qualities. The Charles River edge, for example, has the obvious side-from-side differentiation of water and city, and the end-from-end distinction provided by Beacon Hill. Most edges had little of this quality, however.

It is difficult to think of Chicago without picturing Lake Michigan. It would be interesting to see how many Chicagoans would begin to draw a map of their city by putting down something other than the line of the lake shore. Here is a magnificent example of a visible edge, gigantic in scale, that exposes an entire metropolis to view. Great buildings, parks, and tiny private beaches all come down to the water's edge, which throughout most of its length is accessible and visible to all. The contrast, the differentiation of events along the line, and the lateral breadth are all very strong. The effect is reinforced by the concentration of paths and activities along its extent. The scale is perhaps unrelievably large and coarse, and too much open space is at times interposed between city and water, as at the Loop. Yet the façade of Chicago on the Lake is an unforgettable sight.

Districts

Districts are the relatively large city areas which the observer can mentally go inside of, and which have some common character. They can be recognized internally, and occasionally can be used as external reference as a person goes by or toward them. Many persons interviewed took care to point out that Boston, while confusing in its path pattern even to the experienced inhabitant, has, in the number and vividness of its differentiated districts, a quality that quite makes up for it. As one person put it:

Each part of Boston is different from the other. You can tell pretty much what area you're in.

Jersey City has its districts too, but they are primarily ethnic or class districts with little physical distinction. Los Angeles is markedly lacking in strong regions, except for the Civic Center area. The best that can be found are the linear, street-front districts of Skid Row or the financial area. Many Los Angeles subjects referred with some regret to the pleasure of living in a place that has strongly characteristic areas. Said one:

I like Transportation Row, because it's all there together. That's the main thing: all these other things are spotty . . . There's transportation right there. And all the people have the same thing in common working there. It's very nice.

Subjects, when asked which city they felt to be a well-oriented one, mentioned several, but New York (meaning Manhattan) was unanimously cited. And this city was cited not so much for its grid, which Los Angeles has as well, but because it has a number of well-defined characteristic districts, set in an ordered frame of rivers and streets. Two Los Angeles subjects even referred to Manhattan as being "small" in comparison to their central area. Concepts of size may depend in part on how well a structure can be grasped.

In some Boston interviews, the districts were the basic elements of the city image. One subject, for example, when asked to go from Faneuil Hall to Symphony Hall, replied at once by labeling the trip as going from North End to Back Bay. But even where they were not actively used for orientation, districts were still an important and satisfying part of the experience of living in the city. Recognition of distinct districts in Boston seemed to vary somewhat as acquaintance with the city increased. People most familiar with Boston tended to recognize regions but to rely more heavily for organization and orientation on smaller elements. A few people extremely familiar with Boston were unable to generalize detailed perceptions into districts: conscious of minor differences in all parts of the city, they did not form regional groups of elements.

The physical characteristics that determine districts are thematic continuities which may consist of an endless variety of components: texture, space, form, detail, symbol, building type, use, activity, inhabitants, degree of maintenance, topography. In a closely built city such as Boston, homogeneities of façade—
material, modeling, ornament, color, skyline, especially fenestration—were all basic clues in identifying major districts. Beacon Hill and Commonwealth Avenue are both examples. The clues were not only visual ones: noise was important as well. At times, indeed, confusion itself might be a clue, as it was for the woman who remarked that she knows she is in the North End as soon as she feels she is getting lost.

Usually, the typical features were imaged and recognized in a characteristic cluster, the thematic unit. The Beacon Hill image, for example, included steep narrow streets; old brick row houses of intimate scale; inset, highly maintained, white doorways; black trim; cobblestones and brick walks; quiet, and upper-class pedestrians. The resulting thematic unit was distinctive by contrast to the rest of the city and could be recognized immediately. In other parts of central Boston, there was some thematic confusion. It was not uncommon to group the Back Bay with the South End, despite their very different use, status, and pattern. This was probably the result of a certain architectural homogeneity, plus some similarity of historical background. Such likenesses tend to blur the city image.

A certain reinforcement of clues is needed to produce a strong image. All too often, there are a few distinctive signs, but not enough for a full thematic unit. Then the region may be recognizable to someone familiar with the city, but it lacks any visual strength or impact. Such, for example, is Little Tokyo in Los Angeles, recognizable by its population and the lettering on its signs but otherwise indistinguishable from the general matrix. Although it is a strong ethnic concentration, probably known to many people, it appeared as only a subsidiary portion of the city image.

Yet social connotations are quite significant in building regions. A series of street interviews indicated the class overtones that many people associate with different districts. Most of the Jersey City regions were class or ethnic areas, discernible only with difficulty for the outsider. Both Jersey City and Boston have shown the exaggerated attention paid to upper-class districts, and the resulting magnification of the importance of elements in those areas. District names also help to give identity to districts even when the thematic unit does not establish a striking contrast with other parts of the city, and traditional associations can play a similar role.

When the main requirement has been satisfied, and a thematic unit that contrasts with the rest of the city has been constituted, the degree of internal homogeneity is less significant, especially if discordant elements occur in a predictable pattern. Small stores on street corners establish a rhythm on Beacon Hill that one subject perceived as part of her image. These stores in no way weakened her non-commercial image of Beacon Hill but merely added to it. Subjects could pass over a surprising amount of local disagreement with the characteristic features of a region.

Districts have various kinds of boundaries. Some are hard, definite, precise. Such is the boundary of the Back Bay at the Charles River or at the Public Garden. All agreed on this exact location. Other boundaries may be soft or uncertain, such as the limit between downtown shopping and the office district, to whose existence and approximate location most people would testify. Still other regions have no boundaries at all, as did the South End for many of our subjects. Figure 25 illustrates these.

![Variable boundaries of Boston districts](image-url)
Some well-known Boston districts were unstructured in the public image. The West End and North End were internally undifferentiated for many people who recognized these regions. Even more often, thematically vivid districts such as the market area seemed confusingly shapeless, both externally and internally. The physical sensations of the market activity are unforgettable. Faneuil Hall and its associations reinforce them. Yet the area is shapeless and sprawling, divided by the Central Artery, and hampered by the two activity centers which vie for dominance: Faneuil Hall and Haymarket Square. Dock Square is spatially chaotic. The connections to other areas are either obscure or disrupted by the Artery. Thus the market district simply floated in most images. Instead of fulfilling its potential role as a mosaic link at the head of the Boston peninsula, as does the Common farther down, the district, while distinctive, acted only as a chaotic barrier zone. Beacon Hill, on the other hand, was very highly structured, with internal sub-regions, a node at Louisburg Square, various landmarks, and a configuration of paths. Again, some regions are introverted, turned in upon themselves with little reference to the city outside them, such as Boston's North End or Chinatown. Others may be extroverted, turned outward and connected to surrounding elements. The Common visibly touches neighboring regions, despite its inner path confusions. Bunker Hill in Los Angeles is an interesting example of a district of fairly strong character and historical association, on a very sharp topographical feature lying even closer to the city's heart than does Beacon Hill. Yet the city flows around this element, buries its topographic edges in office buildings, breaks off its path connections, and effectively causes it to fade or even disappear from the city image. Here is a striking opportunity for change in the urban landscape.

Some districts are single ones, standing alone in their zone. The Jersey City and Los Angeles regions are practically all of this kind, and the South End is a Boston example. Others may be linked together, such as Little Tokyo and the Civic Center in Los Angeles, or West End-Beacon Hill in Boston. In one part of central Boston, inclusive of the Back Bay, the Common, Beacon Hill, the downtown shopping district, and the financial and mar-
nodes are the strategic foci into which the observer can enter, typically either junctions of paths, or concentrations of some characteristic. But although conceptually they are small points in the city image, they may in reality be large squares, or somewhat extended linear shapes, or even entire central districts when the city is being considered at a large enough level. Indeed, when conceiving the environment at a national or international level, then the whole city itself may become a node.

The junction, or place of a break in transportation, has compelling importance for the city observer. Because decisions must be made at junctions, people heighten their attention at such places and perceive nearby elements with more than normal clarity. This tendency was confirmed so repeatedly that elements located at junctions may automatically be assumed to derive special prominence from their location. The perceptual importance of such locations shows in another way as well. When subjects were asked where on a habitual trip they first felt a sense of arrival in downtown Boston, a large number of people singled out break-points of transportation as the key places. In a number of cases, the point was at the transition from a highway (Storrow Drive or the Central Artery) to a city street; in another case, the point was at the first railroad stop in Boston (Back Bay Station) even though the subject did not get off there. Inhabitants of Jersey City felt they had left their city when they had passed through the Tonnelle Avenue Circle. The
transition from one transportation channel to another seems to mark the transition between major structural units.

Such points as Scollay Square, the Charles Street rotary, and South Station, are examples of strong junction nodes in Boston. The Charles Street rotary and Scollay Square are both important junction nodes, since both are the switch points at which one flanks the obstacle of Beacon Hill. The rotary itself is not a handsome place, but it clearly expresses the transfer between river, bridge, Storrow Drive, Charles Street, and Cambridge Street. Moreover, the open river space, the elevated station, the trains popping in and out of the hillside, the heavy traffic, all can be clearly visualized. The nodes can be important even when the physical form is shapeless and slippery, as it is in Journal Square in Jersey City.

The subway stations, strung along their invisible path systems, are strategic junction nodes. Some, like Park Street, Charles Street, Copley, and South Station, were quite important in the Boston map, and a few subjects would organize the rest of the city around them. Most of these key stations were associated with some key surface feature. Others, such as Massachusetts, were not prominent. This may be because this particular transfer was rarely used by these particular subjects, or because of unfavorable physical circumstances: the lack of visual interest, and the disassociation of the subway node from the street crossing. The stations themselves have many individual characteristics: some are easy to recognize, like Charles Street, others difficult, like Mechanics. Most of them are hard to relate structurally to the ground above them, but some are particularly confusing, such as the utter directionlessness of the upper-level station at Washington Street. A detailed analysis of the imageability of subway systems, or of transit systems in general, would be both useful and fascinating.

Major railroad stations are almost always important city nodes, although their importance may be declining. Boston's South Station was one of the strongest in the city, since it is functionally vital for commuter, subway rider, and intercity traveler, and is visually impressive for its bulk fronting on the open space of Dewey Square. The same might have been said for airports, had our study areas included them. In theory, even ordinary street intersections are nodes, but generally they are not of sufficient prominence to be imaged as more than the incidental crossing of paths. The image cannot carry too many nodal centers.

The other type of node, the thematic concentration, also appeared frequently. Pershing Square in Los Angeles was a strong example, being perhaps the sharpest point of the city image, characterized by highly typical space, planting, and activity. Olivera Street and its associated plaza was another case. Boston had quite a number of examples, among them the Jordan-Filene corner and Louisburg Square. The Jordan-Filene corner acts secondarily as a junction between Washington Street and Summer Street, and it is associated with a subway stop, but primarily it was recognized as being the very center of the center.
of the city. It is the "100 per cent" commercial corner, epitomized to a degree rarely seen in a large American city, but culturally very familiar to Americans. It is a core: the focus and symbol of an important region.

Louisburg Square is another thematic concentration, a well-known quiet residential open space, redolent of the upper-class themes of the Hill, with a highly recognizable fenced park. It is a purer example of a concentration than is the Jordan-Filene corner, since it is no transfer point at all, and was only remembered as being "somewhere inside" Beacon Hill. Its importance as a node was out of all proportion to its function.

Nodes may be both junctions and concentrations, as is Jersey City's Journal Square, which is an important bus and automobile transfer and is also a concentration of shopping. Thematic concentrations may be the focus of a region, as is the Jordan-Filene corner, and perhaps Louisburg Square. Others are not foci but are isolated special concentrations, such as Olvera Street in Los Angeles.

A strong physical form is not absolutely essential to the recognition of a node: witness Journal Square and Scollay Square. But where the space has some form, the impact is much stronger. The node becomes memorable. If Scollay Square has a spatial shape commensurate with its functional importance, it would undoubtedly be one of the key features of Boston. In its present form, it could not be remembered in any concrete way. It got such epithets as run-down, or disreputable. Seven out of thirty subjects remembered that it had a subway station; nothing else could be agreed upon. Evidently it made no visual impression, and the connections of various paths to it, which is the basis of its functional importance, were very poorly understood.

A node like Copley Square, on the contrary, which is of less functional importance and has to handle the angled intersection of Huntington Avenue, was very sharply imaged, and the connections of various paths were eminently clear. It was easily identified, principally in terms of its unique individual buildings: the Public Library, Trinity Church, the Copley Plaza Hotel, the sight of the John Hancock Building. It was less of a spatial whole than a concentration of activity and of some uniquely contrasting buildings.

Nodes such as Copley Square, Louisburg Square, or Olvera Street, had sharp boundaries, identifiable within a few feet. Others, such as the Jordan-Filene corner, were only the highest peak of some characteristic that had no sharp beginning. In any event, the most successful node seemed both to be unique in some way and at the same time to intensify some surrounding characteristic.

Nodes, like districts, may be introvert or extrovert. Scollay Square is introverted, it gives little directional sense when one
is in it or its environs. The principal direction in its surroundings is toward or away from it; the principal locational sensation on arrival is simply "here I am." Boston's Dewey Square, on the other hand, is extroverted. General directions are explained, and connections are clear to the office district, the shopping district, and the waterfront. For one person, South Station in Dewey Square was a huge arrow pointing to the heart of downtown. Approach to such a node seems to come from a particular side. Pershing Square has a similar directional quality, primarily because of the presence of the Biltmore Hotel. In this case, however, exact location in the path grid was uncertain.

Many of these qualities may be summed up by the example of a famous Italian node: the Piazza San Marco in Venice. Highly differentiated, rich and intricate, it stands in sharp contrast to the general character of the city and to the narrow, twisting spaces of its immediate approaches. Yet it ties firmly to the major feature of the city, the Grand Canal, and has an oriented shape that clarifies the direction from which one enters. It is within itself highly differentiated and structured; into two spaces (Piazza and Piazzetta) and with many distinctive landmarks (Duomo, Palazzo Ducale, Campanile, Libreria). Inside, one feels always in clear relation to it, precisely micro-located, as it were. So distinctive is this space that many people who have never been to Venice will recognize its photograph immediately.

**Landmarks**

Landmarks, the point references considered to be external to the observer, are simple physical elements which may vary widely in scale. There seemed to be a tendency for those more familiar with a city to rely increasingly on systems of landmarks for their guides—to enjoy uniqueness and specialization, in place of the continuities used earlier.

Since the use of landmarks involves the singling out of one element from a host of possibilities, the key physical characteristic of this class is singularity, some aspect that is unique or memorable in the context. Landmarks become more easily identifiable, more likely to be chosen as significant, if they have a clear form; if they contrast with their background; and if there is some prominence of spatial location. Figure-background contrast seems to be the principal factor. The background against which an element stands out need not be limited to immediate surroundings: the grasshopper weather-vane of Faneuil Hall, the gold dome of the State House, or the peak of the Los Angeles City Hall are landmarks that are unique against the background of the entire city.

In another sense, subjects might single out landmarks for their cleanliness in a dirty city (the Christian Science buildings in Boston) or for their newness in an old city (the chapel on Arch Street). The Jersey City Medical Center was as well known for its little lawn and flowers as for its great size. The old Hall of Records in the Los Angeles Civic Center is a narrow, dirty struc-
ture, set at an angle to the orientation of all the other civic buildings, and with an entirely different scale of fenestration and detail. Despite its minor functional or symbolic importance, this contrast of siting, age, and scale makes it a relatively well-identified image, sometimes pleasant, sometimes irritating. It was several times reported to be "pie-shaped," although it is perfectly rectangular. This is evidently an illusion of the angled siting.

Spatial prominence can establish elements as landmarks in either of two ways: by making the element visible from many locations (the John Hancock Building in Boston, the Richfield Oil Building in Los Angeles), or by setting up a local contrast with nearby elements, i.e., a variation in setback and height. In Los Angeles, on 7th Street at the corner of Flower Street, is an old, two-story gray wooden building, set back some ten feet from the building line, containing a few minor shops. This took the attention and fancy of a surprising number of people. One even anthropomorphized it as the "little gray lady." The spatial setback and the intimate scale is a very noticeable and delightful event, in contrast to the great masses that occupy the rest of the frontage.

Location at a junction involving path decisions strengthens a landmark. The Telephone Building at Boston's Bowdoin Square was used, for example, to help people to stay on Cambridge Street. The activity associated with an element may also make it a landmark: an unusual case of this was the Symphony Hall in Los Angeles. This auditorium is the very antithesis of visual imageability: housed in rented quarters in a nondescript building, whose sign simply says "Baptist Temple," it is completely unrecognizable to the stranger. Its strength as a landmark seemed to derive from the contrast and irritation felt between its cultural status and its physical invisibility. Historical associations, or other meanings, are powerful reinforcements, as they are for Faneuil Hall or the State House in Boston. Once a history, a sign, or a meaning attaches to an object, its value as a landmark rises.

Distant landmarks, prominent points visible from many positions, were often well known, but only people unfamiliar with Boston seemed to use them to any great extent in organizing the city and selecting routes for trips. It is the novice who guides himself by reference to the John Hancock Building and the Custom House.

Few people had an accurate sense of where these distant landmarks were and how to make one's way to the base of either building. Most of Boston's distant landmarks, in fact, were "bottomless"; they had a peculiar floating quality. The John Hancock Building, the Custom House, and the Court House are all dominant on the general skyline, but the location and identity of their base is by no means as significant as that of their top.

The gold dome of Boston's State House seems to be one of the few exceptions to this elusiveness. Its unique shape and function, its location at the hill crest and its exposure to the Com-
mon, the visibility from long distances of its bright gold dome, all make it a key sign for central Boston. It has the satisfying qualities of recognizability at many levels of reference, and of coincidence of symbolic with visual importance.

People who used distant landmarks did so only for very general directional orientation, or, more frequently, in symbolic ways. For one person, the Custom House lent unity to Atlantic Avenue because it can be seen from almost any place on that street. For another, the Custom House set up a rhythm in the financial district, for it can be seen intermittently at many places in that area.

The Duomo of Florence is a prime example of a distant landmark: visible from near and far, by day or night; unmistakable; dominant by size and contour; closely related to the city’s traditions; coincident with the religious and transit center; paired with its campanile in such a way that the direction of view can be gauged from a distance. It is difficult to conceive of the city without having this great edifice come to mind.

But local landmarks, visible only in restricted localities, were much more frequently employed in the three cities studied. They ran the full range of objects available. The number of local elements that become landmarks appears to depend as much upon how familiar the observer is with his surroundings as upon the elements themselves. Unfamiliar subjects usually mentioned only a few landmarks in office interviews, although they managed to find many more when they went on field trips. Sounds and smells sometimes reinforced visual landmarks, although they did not seem to constitute landmarks by themselves.

Landmarks may be isolated, single events without reinforcement. Except for large or very singular marks, these are weak references, since they are easy to miss and require sustained searching. The single traffic light or street name demands concentration to find. More often, local points were remembered as clusters, in which they reinforced each other by repetition, and were recognizable partly by context.

A sequential series of landmarks, in which one detail calls up anticipation of the next and key details trigger specific moves of the observer, appeared to be a standard way in which these people traveled through the city. In such sequences, there were trigger cues whenever turning decisions must be made and reassuring cues that confirmed the observer in decisions gone by. Additional details often helped to give a sense of nearness to the final destination or to intermediate goals. For emotional security as well as functional efficiency, it is important that such sequences be fairly continuous, with no long gaps, although there may be a thickening of detail at nodes. The sequence facilitates recognition and memorization. Familiar observers can store up a vast quantity of point images in familiar sequences, although recognition may break down when the sequence is reversed or scrambled.

Element Interrelations

These elements are simply the raw material of the environmental image at the city scale. They must be patterned together to provide a satisfying form. The preceding discussions have gone as far as groups of similar elements (nets of paths, clusters of landmarks, mosaics of regions). The next logical step is to consider the interaction of pairs of unlike elements.

Such pairs may reinforce one another, resonate so that they enhance each other's power; or they may conflict and destroy
themselves. A great landmark may dwarf and throw out of scale a small region at its base. Properly located, another landmark may fix and strengthen a core; placed off center, it may only mislead, as does the John Hancock Building in relation to Boston's Copley Square. A large street, with its ambiguous character of both edge and path, may penetrate and thus expose a region to view, while at the same time disrupting it. A landmark feature may be so alien to the character of a district as to dissolve the regional continuity, or it may, on the other hand, stand in just the contrast that intensifies that continuity.

Districts in particular, which tend to be of larger size than the other elements, contain within themselves, and are thus related to, various paths, nodes, and landmarks. These other elements not only structure the region internally, they also intensify the identity of the whole by enriching and deepening its character. Beacon Hill in Boston is one example of this effect. In fact, the components of structure and identity (which are the parts of the image in which we are interested) seem to leapfrog as the observer moves up from level to level. The identity of a window may be structured into a pattern of windows, which is the cue for the identification of a building. The buildings themselves are interrelated so as to form an identifiable space, and so on.

Paths, which are dominant in many individual images, and which may be a principal resource in organization at the metropolitan scale, have intimate interrelations with other element types. Junction nodes occur automatically at major intersections and termini, and by their form should reinforce those critical moments in a journey. These nodes, in turn, are not only strengthened by the presence of landmarks (as is Copley Square) but provide a setting which almost guarantees attention for any such mark. The paths, again, are given identity and tempo not only by their own form, or by their nodal junctions, but by the regions they pass through, the edges they move along, and the landmarks distributed along their length.

All these elements operate together, in a context. It would be interesting to study the characteristics of various pairings: landmark-region, node-path, etc. Eventually, one should try to go beyond such pairings to consider total patterns.

Most observers seem to group their elements into intermediate organizations, which might be called complexes. The observer senses the complex as a whole whose parts are interdependent and are relatively fixed in relation to each other. Thus many Bostonians would be able to fix most of the major elements of the Back Bay, the Common, Beacon Hill, and the central shopping, into a single complex. This whole area, in the terms used by Brown in his experiments referred to in Chapter 1, has become one locality. For others, the size of their locality may be much smaller: the central shopping and the near edge of the Common alone, for example. Outside of this complex there are gaps of identity; the observer must run blind to the next whole, even if only momentarily. Although they are close together in physical reality, most people seem to feel only a vague link between Boston's office and financial district and the central shopping district on Washington Street. This peculiar remoteness was also exemplified in the puzzling gap between Scollay Square and Dock Square which are only a block apart. The psychological distance between two localities may be much greater, or more difficult to surmount, than mere physical separation seems to warrant.

Our preoccupation here with parts rather than wholes is a necessary feature of an investigation in a primitive stage. After successful differentiation and understanding of parts, a study can move on to consideration of a total system. There were indications that the image may be a continuous field, the disturbance of one element in some way affecting all others. Even the recognition of an object is as much dependent on context as on the form of the object itself. One major distortion, such as a twisting of the shape of the Common, seemed to be reflected throughout the image of Boston. The disturbance of large-scale construction affected more than its immediate environs. But such field effects have hardly been studied here.

The Shifting Image

Rather than a single comprehensive image for the entire environment, there seemed to be sets of images, which more or less overlapped and interrelated. They were typically arranged in a
series of levels, roughly by the scale of area involved, so that the observer moved as necessary from an image at street level to levels of a neighborhood, a city, or a metropolitan region.

This arrangement by levels is a necessity in a large and complex environment. Yet it imposes an extra burden of organization on the observer, especially if there is little relation between levels. If a tall building is unmistakable in the city-wide panorama yet unrecognizable from its base, then a chance has been lost to pin together the images at two different levels of organization. The State House on Beacon Hill, on the other hand, seems to pierce through several image levels. It holds a strategic place in the organization of the center.

Images may differ not only by the scale of area involved, but by viewpoint, time of day, or season. The image of Faneuil Hall as seen from the markets should be related to its image from a car on the Artery. Washington-Street-by-night should have some continuity, some element of invariance, with Washington-Street-by-day. In order to accomplish this continuity in the face of sensuous confusion, many observers drained their images of visual content, using abstractions such as "restaurant" or "second street." These will operate both day and night, driving or walking, rain or shine, albeit with some effort and loss.

The observer must also adjust his image to secular shifts in the physical reality around him. Los Angeles illustrated the practical and emotional strains induced as the image is confronted with constant physical changes. It would be important to know how to maintain continuity through these changes. Just as ties are needed between level and level of organization, so are continuities required which persist through a major change. This might be facilitated by the retention of an old tree, a path trace, or some regional character.

The sequence in which sketch maps were drawn seemed to indicate that the image develops, or grows, in different ways. This may perhaps have some relation to the way in which it first develops as an individual becomes familiar with his environment. Several types were apparent:

a. Quite frequently, images were developed along, and then outward from, familiar lines of movement. Thus a map might be drawn as branching out from a point of entrance, or beginning from some base line such as Massachusetts Avenue.

b. Other maps were begun by the construction of an enclosing outline, such as the Boston peninsula, which was then filled in toward the center.

c. Still others, particularly in Los Angeles, began by laying down a basic repeating pattern (the path gridiron) and then adding detail.

d. Somewhat fewer maps started as a set of adjacent regions, which were then detailed as to connections and interiors.

e. A few Boston examples developed from a familiar kernel, a dense familiar element on which everything was ultimately hung.

The image itself was not a precise, miniaturized model of reality, reduced in scale and consistently abstracted. As a purposeful simplification, it was made by reducing, eliminating, or even adding elements to reality, by fusion and distorsion, by relating and structuring the parts. It was sufficient, perhaps better, for its purpose if rearranged, distorted, "illogical." It resembled that famous cartoon of the New Yorker's view of the United States.

However distorted, there was a strong element of topological invariance with respect to reality. It was as if the map were drawn on an infinitely flexible rubber sheet; directions were twisted, distances stretched or compressed, large forms so changed from their accurate scale projection as to be at first unrecognizable. But the sequence was usually correct, the map was rarely torn and sewn back together in another order. This continuity is necessary if the image is to be of any value.

Study of various individual images among the Bostonians revealed certain other distinctions between them. For example, images of an element differed between observers in terms of their relative density, i.e., the extent to which they were packed with detail. They might be relatively dense, as a picture of Newbury Street which identifies each building along its length, or relatively...
thin, when Newbury Street is characterized simply as a street bordered by old houses of mixed use.

Another distinction could be made between concrete, sensuously vivid images, and those which were highly abstract, generalized, and void of sensuous content. Thus the mental picture of a building might be vivid, involving its shape, color, texture, and detail, or be relatively abstract, the structure being identified as "a restaurant" or the "third building from the corner."

Vivid does not necessarily equate with dense, nor thin with abstract. An image might be both dense and abstract, as in the case of the taxicab dispatcher's knowledge of a city street, which related house numbers to uses along block after block, yet could not describe those buildings in any concrete sense.

Images could be further distinguished according to their structural quality: the manner in which their parts were arranged and interrelated. There were four stages along a continuum of increasing structural precision:

a. The various elements were free; there was no structure or interrelation between parts. We found no pure cases of this type, but several images were definitely disjointed, with vast gaps and many unrelated elements. Here rational movement was impossible without outside help, unless a systematic coverage of the entire area was to be resorted to (which meant the building up of a new structure on the spot).

b. In others, the structure became positional; the parts were roughly related in terms of their general direction and perhaps even relative distance from each other, while still remaining disconnected. One subject in particular always related herself to a few elements, without knowing definite connections between them. Movement was accomplished by searching, by moving out in the correct general direction, while weaving back and forth to cover a band and having an estimate of distance to correct overshooting.

c. Most often, perhaps, the structure was flexible; parts were connected one to the other, but in a loose and flexible manner, as if by limp or elastic ties. The sequence of events was known, but the mental map might be quite distorted, and its distortion might shift at different moments. To quote one subject: "I like to think of a few focal points and how to get from one to another, and the rest I don't bother to learn." With a flexible structure, movement was easier, since it proceeded along known paths, through known sequences. Motion between pairs of elements not habitually connected, or along other than habitual paths, might still be very confusing, however.

d. As connections multiplied, the structure tended to become rigid; parts were firmly interconnected in all dimensions; and any distortions became built in. The possessor of such a map can move much more freely, and can interconnect new points at will. As the density of the image builds up, it begins to take on the characteristics of a total field, in which interaction is possible in any direction and at any distance.

These characteristics of structure might apply in different ways at different levels. For example, two city regions may each possess rigid internal structures, and both connect at some seam or node. But this connection may fail to interlock with the internal structures, so that the connection itself is simply flexible. This effect seemed to occur for many Bostonians at Scollay Square, for example.

Total structure may also be distinguished in a still different way. For some, their images were organized rather instantaneously, as a series of wholes and parts descending from the general to the particular. This organization had the quality of a static map. Connection was made by moving up to the necessary bridging generality, and back down to the desired particular. To go from City Hospital to the Old North Church, for example, one might first consider that the hospital was in the South End and that the South End was in central Boston, then locate the North End in Boston and the church within the North End. This type of image might be called hierarchical.

For others, the image was put together in a more dynamic way, parts being interconnected by a sequence over time (even if the time was quite brief), and pictured as though seen by a motion picture camera. It was more closely related to the actual experience of moving through the city. This might be called a continuous organization, employing unrolling interconnections instead of static hierarchies.
One might infer from this that the images of greatest value are those which most closely approach a strong total field: dense, rigid, and vivid; which make use of all element types and form characteristics without narrow concentration; and which can be put together either hierarchically or continuously, as occasion demands. We may find, of course, that such an image is rare or impossible, that there are strong individual or cultural types which cannot transcend their basic abilities. In this case, an environment should be geared to the appropriate cultural type, or shaped in many ways so as to satisfy the varying demands of the individuals who inhabit it.

We are continuously engaged in the attempt to organize our surroundings, to structure and identify them. Various environments are more or less amenable to such treatment. When reshaping cities it should be possible to give them a form which facilitates these organizing efforts rather than frustrates them.

IV.

CITY FORM

We have the opportunity of forming our new city world into an imageable landscape: visible, coherent, and clear. It will require a new attitude on the part of the city dweller, and a physical reshaping of his domain into forms which entrance the eye, which organize themselves from level to level in time and space, which can stand as symbols for urban life. The present study yields some clues in this respect.

Most objects which we are accustomed to call beautiful, such as a painting or a tree, are single-purpose things, in which, through long development or the impress of one will, there is an intimate, visible linkage from fine detail to total structure. A city is a multi-purpose, shifting organization, a tent for many functions, raised by many hands and with relative speed. Complete specialization, final meshing, is improbable and undesirable. The form must be somewhat noncommittal, plastic to the purposes and perceptions of its citizens.

Yet there are fundamental functions of which the city forms may be expressive: circulation, major land-uses, key focal points.
A.

SOME REFERENCES TO ORIENTATION

We can look for references to the environmental image in many places: in literature ancient and modern, in books of travel or exploration, in newspaper accounts, or in psychological and anthropological studies. Such references are generally scattered, but are frequent and revealing. While skimming through them, we will learn something about how such images are formed, what some of their characteristics are, and how they seem to play a social, psychological, and esthetic, as well as a practical, part in our lives.

From the accounts of anthropologists, for example, we infer that primitive man is normally deeply attached to the landscape he lives in; he distinguishes and names its minor parts. Observers refer to the multitude of place names, even in uninhabited country, and to the extraordinary interest in geography. The environment is an integral part of primitive cultures; the people work, create, and play in harmony with their landscape. Most often, they feel completely identified with it, are loath to leave it; it stands for continuity and stability in an uncertain world. The people of Tikopia (Santa Cruz Islands) say:

The land stands, but man dies; he weakens and is buried down below. We dwell for but a little while, but the land stands in its abiding-place.
These environments are not only highly meaningful, but their image is a vivid one.

Certain holy areas may become very highly charged, so that there is a strong focusing of attention, a fine differentiation of parts, a high density of names. The Athenian Acropolis, saturated with a long cultural and religious history, was evidently named and parcelled to the gods small area by small area, almost stone by stone, making renovations extremely difficult. The Emily Gap, a small gorge 100 yards long by 30 yards wide in the MacDonnell ranges of central Australia, is to the native people a veritable gallery of legendary locations. In Tikopia, the Marae, a sacred cleared space in the forest, was used ritually only once a year. It was a small rectangle, yet contained over twenty locations with regular fixed names. Among more advanced cultures an entire city may be holy, such as Meshel in Iran, or Lhasa in Tibet. These cities are full of names and memories, distinctive forms, and holy places.

Our environmental image is still a fundamental part of our equipment for living, but for most people it is probably much less vivid and particular today. In a recent story of fantasy, C. S. Lewis imagines that he has entered someone else's mind, and is moving about in her image of the outside world. There is a grey light, but nothing that could be called a sky. There are vague, dingy green shapes, blob-like, without anatomy, that he peers at and finally identifies as Shoddy Trees. There is soft stuff underneath, of a dull grassy color but without separate blades. The closer he looks, the more vague and smudged it all becomes. The environmental image has its original function in permitting purposeful mobility. A correct map might mean life or death to a primitive tribe, as when the Luritja of central Australia, driven from their territory by four years of drought, survive by the precise topographic memory of the oldest men. These elders, from experience gained years before, and from the instructions of their grandfathers, knew the chain of tiny water holes that led them out across the desert to safety. The value of being able to distinguish stars or currents or sea-colors is obvious to the South Sea navigator, for when he sets out to strike his tiny goal he engages in a gamble with death. Knowledge of this kind allows mobility, which may make possible a better standard of living. On Puluwar (Caroline Islands), for example, there was a famous native school of navigation. Because of this skill the people of Puluwar were pirates, able to raid the islands within a wide circle.

Although such skills might seem unimportant today, we see things in a different light if we consider the cases of men who, through brain injury, have lost the ability to organize their surroundings. They may be able to speak and think rationally, even to recognize objects without difficulty, but they cannot structure their images into any connected system. These men cannot find their own rooms again after leaving them, and must wander helplessly until conducted home, or until by chance they stumble upon some familiar detail. Purposeful movement is accomplished only by an elaborate memorization of sequences of distinctive detail, so closely spaced that the next detail is always within close range of the previous landmark. Locations normally identified by many objects in context may be recognizable only by virtue of some distinctive, separate symbol. One man recognizes a room by a small sign, another knows a street by the tram car numbers. If the symbols are tampered with, the man is lost. The whole situation parallels, in a curious fashion, the way in which we proceed in an unfamiliar city. In the case of brain injury, however, the situation is inescapable, and its practical and emotional significance is manifest.

The terror of being lost comes from the necessity that a mobile organism be oriented in its surroundings. Jacquard quotes an incident of native Africans who became disoriented. They were stricken with panic, and plunged wildly into the brush. Withkin tells of an experienced pilot who lost his orientation to the vertical, and who described it as the most terrifying experience of his life. Many other writers, describing the phenomenon of temporary disorientation in the modern city, speak of the accompanying emotions of distress. Biner mentions a man who took care to arrive at one particular railroad depot in Lyons when coming from Paris, because, although it was less convenient, it concurred with his (mistaken) image of the side of Lyons which lay toward Paris. Another subject felt a slight dizziness throughout his stay in a small town, because of the persistence of a mistaken orientation. The uncomfortable tenacity of an original and incorrect organization of the environment is attested in many sources. On the other hand, in the highly artificial and seemingly neutral situation of a laboratory maze, Brown reports that subjects developed affection for such simple landmarks as a rough board, which they recognized as familiar.

Way-finding is the original function of the environmental image, and the basis on which its emotional associations may have been founded. But the image is valuable not only in this immediate sense.
in which it acts as a map for the direction of movement; in a broader sense it can serve as a general frame of reference within which the individual can act, or to which he can attach his knowledge. In this way it is like a body of belief, or a set of social customs: it is an organizer of facts and possibilities.

The differentiated landscape may simply exhibit the presence of other groups or symbolic places. Malinowski, in discussing agriculture in the Trobriand Islands off the New Guinea coast, describes the tall groves which rise above the jungle brush and clearings, and which indicate villages or tabooed tree clumps.46 In a similar way, tall canopies mark the locations of towns throughout the flat Venetian plain, or grain elevators the settlements of the American Midwest.

The environmental image may go further, and act as an organizer of activity. Thus, on the island of Tikopia, there were several traditional resting-places on a trail that the people used to and from their daily work.49 Such locations gave form to the daily "commute." In the sacred Marae on this island, a small clearing packed with place-names, the minuteness of distinction of locale was an essential feature of the complexly organized rituals. In central Australia, since the legendary heroes of the natives moved along certain "dreamtime" roads, these channels are strong parts of the landscape image, and the natives feel safe in traveling them.51 In Pratolini's autobiographical novel, he gives a striking example of people who in their daily walks continued to follow streets that no longer existed but were only imaginary tracks through a razed and empty section of Florence.56

At other times, distinguishing and patterned the environment may be a basis for the ordering of knowledge. Radway speaks with great admiration of the Ashanti medicine men who strove to know every plant, animal, and insect in their forests by name, and to understand the spiritual properties of each. They were able to "read" their forests as a complex and ever-unfolding document.51

The landscape plays a social role as well. The named environment, familiar to all, furnishes material for common memories and symbols which bind the group together and allow them to communicate with one another. The landscape serves as a vast mnemonic system for the retention of group history and ideals. Porteous denies that the Arunta tribes of Australia have any special memory ability, although they can repeat extremely long traditional tales. Every detail of the countryside is a cue for some myth, and each scene prompts the recollection of their common culture.53 Maurice Halb-
names—we often miss this quality of vivid concreteness, of
unmistakable form. Wohl and Strauss give many examples of the
effort of people to find a shorthand physical symbol for the city they
live in, both to organize their impressions of it and in order to carry
on their daily activity.\footnote{The feeling and value of an imageable environment are well
summed up in Proust’s moving description (in “Du Côté de chez
Swann”) of the church steeple in Combray, where he spent many
childhood summers. Not only does this piece of landscape symbolize
and locate the town, but it enters deeply into every daily activity,
and remains in his mind as an apparition for which he still searches
in later life:}

\textit{It was always to the steeple that one must return, always it which
dominated everything else, summing up the houses with an unexpected
pinnacle.\footnote{Later he mentions the case of French commission
merchants who have business in a succession of cities strange to them.
They assert that they pay little attention to names or landmarks,
but simply keep a continuous mental record of the direction back to
the railroad station, and strike out for it directly when their work
is done. Australian grave-mounds, as another example, are shaped
with reference to the direction toward the individual’s totem center,
or spiritual home.}}

\section*{Types of Reference Systems}

These images may be organized in different ways. There may
be an abstract and generalized system of reference, at times explicit,
at times rather a habitual manner of referring to the locations or
relations of features. The Chukchee of Siberia distinguish 22
compass directions, three-dimensional and tied to the sun. They include
the zenith and the nadir, midnight (north) and midday (south),
all of which are fixed, plus 18 others which are defined by the sun
positions at various times of the day or night, and therefore change
with the seasons. This system is of sufficient importance to control
the orientation of all sleeping rooms. The Micronesian voyagers
of the Pacific used a precise directional system, which was not,
however, symmetrical but was tied to constellations and to island
directions. The number of directions varied up to 28 or 30.\footnote{The system used on the North China plain is a strictly regular one.
It has deep magical connotations: north being equated with black
and evil, south with red, joy, life, and the sun. It controls very
strictly the placing of all religious objects and permanent structures.
Indeed, the chief use of the “south-pointing needle,” a Chinese inven-
tion, was not for navigation at sea, but for the orientation of
buildings. So pervasive is this system that the country people on
this flat land give directions by compass points, and not by right or
left, as would be natural to us. The organizing system does not
center on the individual, moving and turning with him, but is fixed,
universal, and outside the person.}

The Arunta of Australia, in referring to an object, habitually give
its proximity, orientation, and visibility with reference to the
speaker. An American geographer, on the other hand, once pre-
sented a paper on the necessity for orientation to our own four
cardinal points, and was surprised to find from his audience that
for many city people, accustomed to orient to conspicuous urban
features, this is no necessity at all. He himself was brought up in
open country, in the sight of mountains.\footnote{For an Eskimo or an
inhabitant of the Sahara, constant directions may be recognized, not
by heavenly objects, but by prevailing winds, or by sand or snow
formations which are the products of such winds.} In parts of Africa the key direction may not be an abstract, con-
tant one, but rather the direction toward the home territory. Thus
Jaccard cites a joint encampment of several tribes, who spontane-
ously grouped themselves into sectors which pointed toward their
own territories.\footnote{Later he mentions the case of French commission
merchants who have business in a succession of cities strange to them.
They assert that they pay little attention to names or landmarks,
but simply keep a continuous mental record of the direction back to
the railroad station, and strike out for it directly when their work
is done. Australian grave-mounds, as another example, are shaped
with reference to the direction toward the individual’s totem center,
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with reference to the direction toward the individual’s totem center,
or spiritual home.}

The island of Tikopia is an example of another sort of system,
which is neither universal, egocentric, nor directed toward a base
point, but is tied to a particular edge in the landscape. The island
is small enough so that one is rarely out of sight or sound of the sea,
and the islanders use the expressions \textit{inland} or \textit{seaward} for all
kinds of spatial reference. An axe lying on a house-floor is local-
ized in this way, and Firth reports overhearing one man say to anoth-
er: “There is a spot of mud on your seaward cheek.” This reference pattern is so strong that they have difficulty in conceiving
of any really large land mass. The villages are strung along the
edge of the beach, and the traditional terms of guidance refer only
to the “next village” or the one beyond the next, and so on. This
is an easily referenced, one-dimensional series.\footnote{Sometimes the environment is organized, not by a general direc-
tional system, but by one or more intensive loci, toward which
other things seem to “point.” In Meshed (Iran) extreme sacred-
ness attaches to every object near the central shrine, including the
dust which falls on the precinct. The high point on the approach
to the city, from which the traveler first sees this mosque, is in itself}
important, and within the city it is proper to bow when crossing every street that leads to the shrine. This sacred focus polarizes and organizes the entire surrounding area. This is comparable to the custom of genuflecting in a Roman Catholic Church when crossing the axis of the altar, which orients the church interior.

The city of Florence was organized this way in its centuries of greatness. At that time, description and locational references were made in terms of the ‘canti,’ that is, the focal points, which were such things as loggias, lights, coats of arms, tabernacles, important family houses, and key stores, especially pharmacies. Only later, the names of the canti attached themselves to the streets, which were subsequently regularized and signposted in 1785. Progressive house numbering was introduced in 1808, and the city shifted over to reference by paths.11

Imaging and referencing by districts was very common in older cities, where quarters and their populations were relatively stable, isolated and distinctive. In Imperial Rome, addresses were given solely by small defined districts. Presumably, arrival at such a district allowed one to proceed to one’s final destination by personal inquiry.33

The landscape may be patterned by the lines of movement. In the case of the Arunta in Australia the entire territory is magically organized by a network of mythical paths linking together a series of isolated totemic “countries” or clan estates, and leaving waste areas between. There is normally only one correct trail to the sacred storehouse containing totemic objects, and Pink tells of the long detour made by one of his guides to approach a sacred place properly.34

Jaccard speaks of a famous Arab guide in the Sahara, who could follow the faintest trail, and for whom the entire desert was a network of paths. In one instance he followed painstakingly the continuous twists of the scarcely-marked way, even while his destination was clearly visible to him across the open desert. This reliance was habitual, since storms and mirages often made distant landmarks unreliable.37 Another author writes of the Saharan Medjeb, the transcontinental path worn by camels that goes for hundreds of kilometers over the empty land from water hole to water hole, marked by piles of stones at crossing points. It may mean death to lose it. He speaks of the strong personality, the almost sacred character, that this trace acquires. In quite another landscape, the seemingly impenetrable African forest, the tangle is intersected by elephant paths, which natives learn and traverse as we might learn and traverse city streets.37

Proust gives a vivid example of the sensation of a path reference system in his description of Venice:

My gondola followed the course of the small canals; like the mysterious hand of a Genie leading me through the maze of this oriental city, they seemed, as I advanced, to be carving a road for me through the heart of a crowded quarter which they clove asunder, barely dividing with a slender fissure, arbitrarily carved, the tall houses with their tiny Moorish windows; and, as though the magic guide had been holding a candle in his hand and were lighting the way for me, they kept casting ahead of them a ray of sunlight for which they cleared a path.38

Brown, in his experiments in putting subjects blindfolded through a maze for the feet, found that even in this very restricted situation subjects seemed to use at least three different kinds of orientation: a memorization of the sequence of movements, usually difficult to reconstruct except in correct sequence; a set of landmarks (rough boards, sound sources, rays of sunlight that gave warmth) which identified localities; and a general sense of orientation in the room space (for example, the solution might be imaged as a general movement around the four sides of the room, with two excursions into the interior).39

Formation of the Image

The creation of the environmental image is a two-way process between observer and observed. What he sees is based on exterior form, but how he interprets and organizes this, and how he directs his attention, in its turn affects what he sees. The human organism is highly adaptable and flexible, and different groups may have widely different images of the same outer reality.

Sapir gives an interesting example of this differential focus of attention, in the language of the southern Paiute. They have single terms in their vocabulary for such precise topographical features as a “spot of level ground in mountains surrounded by ridges” or “canyon wall receiving sunlight” or “rolling country intersected by several small hill-ridges.” Such accurate reference to topography is necessary for definite locations in a semi-arid region. He goes on to note that the characteristic Indian vocabulary does not contain the English lumping-word, “weeds,” but has separate terms for these sources of food and medicine, terms which for each species distinguish whether the specimen is raw or cooked, as well as its color and stage of growth: as in the English calf, cow, bull, veal, and beef.
He mentions, on the other hand, one Indian tribe whose vocabulary does not distinguish between the sun and the moon.\textsuperscript{66}

The Aleuts have no native names for the great vertical features of their landscape: the ranges, peaks, volcanoes, and the like. Yet the tinier horizontal aqueous feature—rill, streamlet, or pond—had its own name. Presumably this is because the tiny waterways are the environmental features which are vital for travel.\textsuperscript{26} The attention of the Netsilik Eskimo seems also to be riveted on the aqueous features. In a group of twelve sketch maps done by natives for Rasmussen, there are 532 place names indicated by the draftsmen. Of these, 498 designate islands, coasts, bays, peninsulas, lakes, streams, or fords. Sixteen refer to hills or mountains, and only 18 make scattered reference to rocks, ravines, swamps, or settlement sites.\textsuperscript{60} Yung makes an interesting reference to a trained geologist who was able to march unhastening through foggy Alpine country, simply by his recognition of the patterning of the geologic type of the exposed rocks.\textsuperscript{63}

Still another, and rather unusual, area of attention is eye reflection. Steffanson says that in the Arctic low-hanging clouds of uniform color reflect the map of the earth below: those above open water being black, above sea-ice white, above solid land-ice somewhat darker, and so on. This is of great value in crossing wide bays, where the landmarks are below the horizon.\textsuperscript{23} These sky reflections are commonly used in the South Seas, not only to locate an island below the horizon but even to identify it by the color and shape of the reflection. Some idea of the great range of forms which are available for orientation may be gained by a reading of Gatty’s latest book on navigation.\textsuperscript{23}

These cultural differences may extend not only to the features receiving attention but also to the way in which they are organized. The Aleutian Islands have no generic name in the native tongue, since the Aleuts do not recognize what to us appears to be the obvious unity of the chain.\textsuperscript{17} The Arunta group the stars quite differently than we do, frequently putting bright, close stars in different groups, while linking faint and distant ones.\textsuperscript{55}

So adaptable is our perceptual mechanism, moreover, that every human group can distinguish the parts of its landscape, can perceive and give meaning to significant detail. This occurs no matter how undifferentiated that world may seem to an outside observer. This is true of the endless grey mulga thicket which is part of the Australian landscape; the flat snow-covered land of the Eskimo, where even the distinction between land and sea is lost; the foggy, shifting Aleutians; or the open "trackless" ocean of the Polynesian navigator.

Two primitive groups developed a science of direction-finding and geography which was only recently surpassed by western map-making. These are the Eskimo and the navigators of the South Seas. The Eskimo are able to construct usable maps, freehand, covering territories sometimes 400 or 500 miles in one dimension. This is a feat of which few people anywhere are capable, without prior reference to constructed maps.

Similarly, the trained navigators of the Caroline Islands in the Pacific had an elaborate system of sailing directions which were carefully related to constellations, island locations, winds, currents, sun positions, and wave directions.\textsuperscript{18,44} Arago stated that a celebrated pilot once represented all the islands in the archipelago for him by grains of maize, marked their relative position, named each one, and stated the accessibility and products of each. This archipelago is some 1500 miles from east to west! Furthermore, he made a compass from bamboo, and indicated the prevailing winds, constellations, and currents by which he guided himself.

Both cultures producing these triumphs of abstract ability and perceptual attention had two things in common: first, their environments of snow or water were essentially featureless or differentiated only subtly, and second, both groups were forced to be mobile. The Eskimo must travel seasonally from one type of hunting to another, if he is to survive. The best seafarers in the South Seas did not come from the fertile high islands but from the tiny low islands, where natural resources were scanty and famine was always close. The nomad Touareg, in the empty Sahara, are a similar group, and have an almost equal ability. On the other hand, Jaccard notes that native Africans, of sedentary agricultural habit, easily become lost in their own forests.\textsuperscript{37}

The Role of Form

Nevertheless, having said so much about the flexibility and adaptability of human perception, we must now add that the shape of the physical world plays its part, as well. The very fact that skilled navigation arose in what would seem to be perceptually difficult environments indicates the influence of these outward shapes.
The ability to distinguish and orient in these resistant environments is not achieved without cost. The knowledge was usually limited to specialists. Rasmussen’s informants who drew his maps were chiefs—many other Eskimos could not do it. Cornetz remarks that there were only a dozen good guides in all south Tunisia. The navigators in Polynesia were the ruling caste. Knowledge was transmitted from father to son, and there was, as mentioned above, a formal school in the subject on the island of Puluwat. It was customary for the navigators to eat at a separate mess, where the talk was constantly of directions and currents. This is reminiscent of Mark Twain’s Mississippi River pilots, who were constantly discussing and riding up and down the river, and thus keeping abreast of its treacherous shifting landmarks. Admiring as this skill is, it is some distance from an easy and familiar relation with the environment. Polynesian sea voyages were evidently accompanied by real anxiety, a usual sailing formation being a long row of canoes abreast to aid in finding land. Among the Arunta of Australia, as another example, it is only the old men who can lead from water-hole to water-hole or who can correctly locate the proper sacred path in the mulga thicket. On the well-differentiated island of Tikopia, the problem could hardly come up.

We have frequent accounts of native guides who lose orientation in featureless surroundings. Strehlow describes floundering for hours in the Australian mulga thicket with an experienced native, who repeatedly climbed trees in the effort to get his bearings from distant landmarks. Jaccard recites the tragic cases of lost Touaregs. At the other end of the scale, there are visual qualities in some landscape features which make them the inevitable subjects of attention, despite the selective power of the eye. Most often, sacredness is concentrated in the more striking natural features, such as the connection of the Ashanti gods with the great lakes and rivers, or the common reverence attached to great mountains. So in Assam there is a famous hill which is the legendary site of Buddha’s death. It is described as bold and picturesque by Waddell, rising directly from a plain to which it is in sharp contrast. He then notes that it was worshipped by the aborigines long before, and has become holy for Brahmins and Mohammedans as well.

For physical reasons, the great mountain on Tikopia Island is the central organizing feature. It is the crowning point of the island, both sociologically and topographically, the place of descent of the gods. It marks the location of home from far out to sea, and has an aura of the supernatural. Since the crest is rarely cleared and planted to taro, there is a peculiar flora here which is lacking down below, and this reinforces the special interest of the place.

Occasionally, a landscape may be so fantastically differentiated as to compel attention. Kawaguchi describes the banks of a river near Lake Kholgyal in Tibet:

... rocks piled up here and there, some yellow, some crimson, others blue, still others green, and some others purple ... the rocks were highly fantastic, some sharp and angular, others protruded over the river. The nearer bank ... was full of queerly shaped rocks, and each of those rocks bore a name ... all these were objects of veneration to the common people.

To take a humbler example, the territories defended by nesting birds in a meadow have been mapped over a succession of years. These territories show wide fluctuations and reorganizations, as might be expected from their occupation by different individuals. But certain perceptually strong boundaries of fence or brush remain stable throughout the shifts. Migrating birds, advancing in a general direction over a broad front, are known to direct their flight and follow along major “leading lines,” or edges formed by topographic features such as seacoasts. Even swarms of locusts, who maintain cohesion and direction with reference to the wind, become disorganized and scattered when they move out over featureless water surfaces.

Other features may not only be noticeable and distinguishable but even have a “presence,” a sort of animation or peculiarly vivid reality, that is felt by peoples of utterly different cultures. Kawaguchi speaks of a holy mountain in Tibet, seen for the first time as “sitting with an air of great solemnity,” and likens it to his own Buddha Vairochana, flanked by Bodhisattvas.

A similar experience, closer to home, was the original impact of a particular escarpment along the Oregon Trail:

... as the west-bound party drew abreast of the bluffs a wave of astonishment swept through it. Numerous observers discovered lighthouses, brick kilns, the capitol at Washington, Beacon Hill, shot towers, churches, spires, cupolas, streets, workshops, stores, warehouses, parks, squares, pyramids, castles, forts, pillars, domes, minarets, temples, Gothic castles, ‘modern’ fortifications, French cathedrals, Rhineland castles, towers, tunnels, walkways, mausoleums, a Temple of Belus, and hanging gardens. Taken at a glance the rocks had the appearance of Cities, Temples, Castles, Towers, Palaces, and every variety of great and magnificent structures ... splendid edifices, like beautiful white marble, fashioned in the style of every age and country.
Many observers are quoted, to indicate the common and overwhelming impact of these special geological shapes.

Therefore, while noting the flexibility of human perception, it must be added that outer physical shape has an equally important role. There are environments which invite or reject attention, which facilitate or resist organization or differentiation. This is analogous to the ease or difficulty with which the adaptable human brain can memorize associated or unassociated material.

Jaccard mentions several "classical locations" in Switzerland where people are consistently unable to maintain direction. Peterson notes that the organization of his image of Minneapolis typically breaks down each time the street gridiron changes its orientation. Trowbridge finds that most people are unable to point to distant cities from New York without gross errors, but that Albany is an exception, since it is visibly linked by the Hudson River.

In London, a small development called Seven Dials was built about 1695, consisting of seven streets which converged on a circular junction containing a Doric pillar bearing seven sun dials, each facing one of the radiating streets. Gay refers to the confusing shape of this area in his Trivia, although he implies that it is only the peasant, the stupid outsider, who could be befuddled by it. Malinowski draws a sharp distinction between the differentiated volcanic landscape of Dobu and the Amphletts in the D'Entrecasteaux Islands near New Guinea, versus the monotonous coral islands of the Trobriands. These island groups are connected by regular trading expeditions, and the concentration of mythical meaning in the Dobu area, as well as the reactions of the Trobrianders to this imageable volcanic landscape, is described in his pages. Speaking of the trip from the Trobriands to Dobu, Malinowski says:

The low strip of land, which surrounds the Trobriand lagoon in a wide sweep, thin away and dissolves in the haze, and before them the southern mountains rise higher and higher. . . . The nearest of them, Koyatubu, a slim, somewhat tilted pyramid, forms a most alluring beacon, guiding the mariners due south. . . . Within a day or two these disembodied misty forms are to assume what for the Trobrianders seems marvellous shape and enormous bulk. They are to surround the Kula traders with their solid walls of precipitous rock and green jungle. . . . The Trobrianders will sail deep, shaded bays. . . . beneath the transparent waters a marvellous world of multi-colored coral, fish and seaweed will unfold itself . . . they will also find wonderful heavy, compact stones of various shapes and colors, whereas at

home the only stone is the insipid, white dead coral . . . besides many types of granite and basalt and volcanic tuff, specimens of black obsidian, with its sharp edge and metallic ring, and sites full of red and yellow ochre. . . . Thus the landscape now before them is a sort of promised land, a country spoken of in almost legendary tone.

In a similar way, although the "dream-time" roads of Australia pass in every direction over a land which is largely level mulga plain, yet the legendary camp sites, the nodes of sacred history and attention, seem to be heavily concentrated in the two regions of differentiated landscape: the MacDonnell and the Stuart's Bluff Ranges.

Parallel to these comparisons of primitive landscapes we may put Eric Gill's comparison of Brighton, England where he was born, to Chichester, to which he moved in his adolescence:

It had simply never occurred to me before that day that towns could have a shape and be, like my beloved locomotives, things with character and meaning . . . [Chichester] was a town, a city, a thing planned and ordered—no mere congeries of more or less sordid streets, growing, like a fungus, wherever the network of railways and sidewalks and railway sheds would allow. . . . I only knew that Chichester was what Brighton was not: an end, a thing, a place. . . . The plan of Chichester is clear and clean. . . . Over the Roman wall you could look straight out into the green fields. . . . Four straight wide main streets dividing the city into nearly equal quarters and the residential quarter similarly divided by four small streets and these almost completely filled with seventeenth- and eighteenth-century houses. . . . But Brighton, as we knew it . . . well, there is simply nothing to be said about it. When we thought of Brighton, it was of a place of which the center was our home . . . there was no other. But when we lived in Chichester . . . the center was not No. 2 North Walls, but the Market Cross. We gained not only a civic sense but a sense of ordered relations generally. . . . Brighton wasn't a place at all. It had never occurred to me that any other sort of town could exist.

The perceptual clarity of the island of Tikopia, due to the presence of Mt. Reani, has already been mentioned. How a differentiated shape can be used in detail, is illustrated by this quotation:

When a Tikopia sets out from his native land his first estimates of distance he has travelled are based on the portions of the island still showing above the horizon. There are five principal points on the scale. The first is the raurp, the lowland near the shore. When this disappears, the voyager knows he is some distance out. When the
cliffs (mato) arising 200 to 300 feet in various spots round the coast become lost, another point is reached; then the uro mauna, the crest of the chain of hills ringing the lake, perhaps 500 to 800 feet in height, sink below the waves. When the uro asia (the last break in the contour of Mt. Reani, about 1000 feet) goes down, then the voyager realizes he is far out to sea; and when at last he sees the uro rononono, the tip of the mountain itself, vanish from sight, he greets the moment with sorrow.19

With the aid of a favorably differentiated landscape profile, this familiar phenomenon of parting has been regularized into accepted intervals, each with both practical and emotional meaning.

When a character in a novel by Forster returns from India, he senses with sudden shock, on entering the Mediterranean, the sheer form-quality of his surroundings, their imageability:

The buildings of Venice, like the mountains of Crete and the fields of Egypt, stood in the right place whereas in poor India everything was placed wrong. He had forgotten the beauty of form among idol temples and lumpy hills; indeed, without form, how can there be beauty . . . . In the old undergraduate days he had wrapped himself up in the many-colored blanket of St. Mark’s, but something more precious than mosaics and marbles was offered to him now: the harmony between the works of man and the earth that upholds them, the civilization that has escaped muddle, the spirit in a reasonable form, with flesh and blood subsisting. Writing picture postcards to his Indian friends, he felt that all of them would miss the joys he experienced now, the joys of form, and that this constituted a serious barrier. They would see the sumptuousness of Venice, not its shape.22

Disadvantages of Imageability

A highly visible environment may have its disadvantages, as well. A landscape loaded with magical meanings may inhibit practical activities. The Arunta face death rather than move to a more favorable area. The ancestral grave-mounds in China occupy desperately needed arable land, and among the Maori some of the best landing-places are forbidden because of their mythical import. Exploitation is more easily accomplished where there is no sentiment about the land. Even conservative use of resources may be impaired where habitual orientation does not allow easy adaptation to new techniques and needs.

Geoghegan refers to the richness of place names in Aleut but follows this with the interesting comment that there are so many particular names for each tiny feature that very often the Aleuts of one island have scarcely heard of the place names on another.26 A highly differentiated system, lacking abstractness and generality, may actually reduce communication.

It may have consequences of another sort. Strachey says of the Arunta:

Since every feature of the landscape, prominent or otherwise, is already associated with one or the other of these myths, we can understand the utter apathy of literary efforts . . . . their forefathers have left them not a single unoccupied scene which they could fill with creatures of their own imagination . . . . tradition has effectually stifled creative impulse . . . . native myths ceased to be invented many centuries ago . . . . they are on the whole uninspired preservers . . . . not so much a primitive as a decadent race.27

If it is desirable that an environment evoke rich, vivid images, it is also desirable that these images be communicable and adaptable to changing practical needs, and that there can develop new groupings, new meanings, new poetry. The objective might be an imageable environment which is at the same time open-ended.

As a peculiar example of how this dilemma can be resolved, even in an irrational way, we may take the Chinese pseudo science of geomancy.28 This is a complicated lore of landscape influence, systematized and interpreted by professors. It deals with winds of evil that can be controlled by hills, rocks, or trees that visually seem to block dangerous gaps, and with good water spirits that are to be attracted by ponds, courses, and drains. The shapes of surrounding features are interpreted as symbolizing various spirits contained therein. This spirit may be accounted useful, or it may be inactive and useless. It can be concentrated or dispersed, deep or at the surface, pure or mixed, weak or strong, and must be used, controlled, or enhanced by planting, sitting, towers, stones, and so forth. Possible interpretations are many and complex; it is an endlessly expanding field which experts are exploring in every direction. Divorced from reality as this pseudo science may be, yet it has for our purposes two interesting features: first, that it is an open-ended analysis of the environment: new meanings, new poetry, further developments are always possible; second, it leads to the use and control of outside forms and their influences: it emphasizes that man’s foresight and energy rule the universe and can change it. Perhaps there are hints here as to ways of constructing an imageable environment that is not at the same time stifling and oppressive.