



THE USE OF SEQUENCE ANALYSIS AS A METHOD FOR
THE DESIGN AND LOCATION OF PARKING FACILITIES
IN THE CITY

By

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ABSTRACTTHE USE OF SEQUENCE ANALYSIS AS A METHOD FOR THE DESIGN AND LOCATION
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This thesis is an attempt to enlarge on the current research into the analysis and design of the experienced sequence of movement in the city. The premise is that most of this research, whilst valid, has tended to concentrate too much on the purely visual qualities of a sequence, with the result that its basis for design is too narrowly drawn. The intention in this thesis is, instead of studying a street, to examine the sequence of a purposeful trip, the journey to shop. The particular focus of the study is on the problem of parking which is visualized here as the point of transfer between car and pedestrian movement.

To examine this experience in detail, an analysis is made of four different trips into downtown Boston to shop. These sequences are described, compared and evaluated within a critical framework.

On the basis of this analysis theoretical solutions for the location and design of parking facilities in the city are put forward.

Finally, the validity of sequence analysis is assessed as a method for parking design and as a technique for research. It is concluded that the method is useful on both counts, as a way for determining critical problems, and for evaluating design proposals.

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INTRODUCTION

Of late there has been a considerable amount of research into many fields connected, however loosely, with city planning. Perhaps it is the symptoms of a profession that is still not sure what its role should be and where it is going. Perhaps it indicates a healthy body broadening its basis of knowledge. But whatever the cause, one line of the research has been directed toward trying to establish a fundamentally new basis for analysis and design. The interesting feature about this has been that the researchers have been drawing not from the "traditional" concepts of land-use planning, or formalistic architectural projects or even such fields as economics and sociology. Rather, they have been looking toward psychology and particularly the psychology of perception for their inspiration. The rationale behind this approach is a simple one. If we are to design and plan cities that people are to live and move around in, then perhaps we should start by finding out exactly how people perceive and understand the city, how they use it and what it means to them. If we as planners can clarify the essential problems and critical features from this method, then we might arrive at a basis for design.

Perhaps the first piece of constructive research directed toward the perceptual form of the city was Kevin Lynch's "The Image of the City". This particular work was directed toward finding out the mental picture of the city people built up over time and to defining the basic physical components of this "image". The material for this was

derived largely from a number of detailed interviews. What is significant has been the extension of this basic approach into further more detailed fields of research. "The Image of the City", in a sense, presented us with a fait accompli. People were asked what they thought the city to be, and the results were tabulated and categorized. What never came out was how this image was built up, and how they really used the city. It is in large part an attempt to answer the question "how?", that much of the current interest in psychology and perception is directed.

One particular aspect of this research is the analysis of "sequences" in the city. Not all those interested in the subject view it in exactly the same light, but in general the argument is that a person perceives and uses the city by movement through it. If we want to understand the process of perception in depth, then we must study the way a person moves through the city, how and what he perceives, and finally we must examine the streets and channels down which he travels. To lay the groundwork for this thesis let me first of all outline very briefly some of the current research into sequences analysis and design. My feeling is that most of this research although useful and vital has been either too abstract, or too narrowly restricted in scope to be entirely valid as a basis for design.

(a) Philip Thiel

Thiel's largely pioneering work on sequences has been devoted more to sequence analysis in the abstract rather than practical sense. His basic effort has been toward defining what the problems are and

then into description and recording, rather than toward producing actual designs. As a result much of his work has evolved around the production of a graphic language. The language he uses is complex and difficult to grasp, the result, I believe, of trying to be too precise in his definitions on the one hand, and of trying to oversimplify his graphic symbols on the other. Nonetheless his ideas have formed the basis for further research on the subject by others. ¹

(b) Edmund Bacon - "The city as a simultaneous movement system". ²

Thiel has considered sequences in an abstract way, dis-associated to a certain extent from the city itself. Bringing the subject closer both to reality and to the city is Bacon's concept of the city as a "simultaneous movement system." Not only is the emphasis different from Thiel's, Bacon's whole starting point is too. Thiel is thinking generally of sequences in a static sense, of spaces and forms which are defined in themselves and through which one moves. In short, his concept is architectural. Bacon does the reverse and starts with the idea of movement, then comes the formal aspect which is seen as a succession of perceived experiences, rather than formal types.

The features of his idea, which in essence is not a new one, are, first, that the systems of movement are the means by which we can design and control the city; secondly, the notion of all movement being interrelated, be it people or goods, rail or road, taxi or plane.

1. For a further example of a proposed graphic technique for sequence analysis see B. Abernathy's Thesis, A Method of Sequence Design in Urban Streets.

2. Bacon, Edmund N., "Urban Design as a force in Comprehensive Planning", A.I.P.J. Feb. 1963.

(Most concepts of transportation planning have tended to focus only on one or two means of transport, using this as a basis for structuring the city). And, finally, and most important, his idea of the movement system not merely as being a means for carting people from A to B, but as a way to structure our perceptual and sensory experience of the environment. The city, Bacon argues, is so big and open to so many changes that the mind is incapable of developing or grasping a three-dimensional plan at this scale. Therefore we must seek a different way to structure it, namely, "simultaneous movement systems!"

Movement through space creates a continuity of experiences derived from the nature and form of the spaces through which the movement occurs. Here is the key to the concept of a movement system as a dominant organizing force in architectural design. To establish a track through space which becomes the actual path of movement of large numbers of people, or participants, and to design the environment to produce a harmonic experience as a person moves over that track in space, is to be a physical designer of cities.³

(c) Appleyard, Lynch and Myer. "The View from the Road."

Bacon's concept of movement in the city is largely instinctive and hypothetical. A much more rational analysis of the subject can be found in the book "The View from the Road" by Lynch, Appleyard and Myer.⁴ If Bacon merely talks about the idea of somehow designing sequences of movement, Lynch and his co-authors have actually got

3. Ibid.

4. Appleyard, D.S., Lynch, K.A., Myer, J.R., The View from the Road, Technology Press, Cambridge, 1964.

down to the task of analyzing what it is we really perceive and comprehend whilst driving along a road. On the basis of this analysis, which draws largely from the current research into perception, design proposals can be made. In short, by ordering the perceptual form of the environment, Lynch argues that we can make our cities more meaningful and usable.

The importance of this approach is not so much the designs that come out of it, but the basic rationale behind it. It is the emphasis on both perception and the use of research and data drawn from direct analysis in the field that is the keynote. In "The View from the Road", the authors derive their concepts and plans from a systematic study of various highways. A study that involved simply driving down the highways and recording, by various means, one's actual experience. The argument being that if one is to design a road, say, the best place to start is to go out and look objectively at roads themselves. A deceptively simple proposition to be sure, but one that nearly all designers either ignore entirely or, if they do use direct experience, do so in an illogical and unscientific manner.

What we have then is a decided advance on both the work of Thiel and the ideas of Bacon. The excessively complex notation system devised by Thiel, is replaced by something at once simpler and easier to comprehend. And Bacon's broad concept of movement systems has been brought closer to reality by a study of the roads themselves. An extension of Lynch's research was carried out by the 1963 collaborative workshop at M.I.T. Here the attempt was to conceive of a network or

system of sequences, the research and design being centred on Boston's street pattern. If the attempts at design were not entirely successful, at least the attempt was valid to try to relate the idea of the sequence design of streets, first, to an overall pattern and, secondly, to a specific problem (Boston).

My feeling about all this work is that a beginning has been made, and a considerable amount of groundwork carried out. Most important, the problem of description and notation has gradually been refined and simplified. What I am still concerned about, however, is that much of this work is too narrow in its approach, is still too abstract, and does not provide a firm enough basis to use for design.

The problem with "The View from the Road" approach is that it emphasizes the visual aspects of the sequence without relating them directly to other criteria for street design. True the authors see their work as only one aspect of design, and argue that it must be considered in conjunction with economic and other factors. I am not arguing that this approach is wrong, but rather that the use of sequence analysis as basis for a design technique should be extended beyond the recording of visual features. The analysis of the street sequence as described in "The View from the Road" is carried out in such abstract concepts as rhythm, motion, the sense of space, continuity, progression and so on. In fact an effort is being made to produce a new language, a new technique for design based on these slightly arbitrary criteria. A consequence of this approach is that the street itself is seen as a series of visual events, purely in terms of this stylized language. Further, the street becomes a thing in itself, a

feature which possesses some formal quality along its whole length. What concerns me here are two things. First, at least in the city, few streets are ever appreciated as a continuous whole. The movement patterns tend to flow from one street to another rather than continue all the way down one street. Secondly, and more important, is my feeling that to conceive of the streets in purely formal terms is narrow and slightly misleading. What is left out here is the more purposive aspect of the way people use streets. The authors talk about rhythm and space along a street, but how much does this concur with the other factors we expect in a street? Generally we drive into the city for a purpose. That purpose may vary, of course, from trip to trip, but nevertheless on each occasion we will be seeking a destination; We will be looking for the correct road to take. We will be concerned with finding our way, with looking for a place to park, with walking to the destination. In short our actual use of the city is far more complex than a simple progression from a to b along a single street.

Now, as I said before, I am not trying to deprecate the invaluable work on sequence design that has been done already. What I want to do is to somehow enlarge and extend the analysis of sequences to include much more of the additional complex factors that make up our use of the city. Perhaps I could state my point better in another way by saying that Lynch and others have analyzed the street purely in terms of our experience of the visual form. I want to analyze our experience in using the city for a given purpose, in which the visual form of the streets plays a role not merely as an abstract shape, but as something

that guides, educates and helps us fulfill our purpose.

If we think of a trip to downtown for a moment, it is interesting how many different factors contribute to our total experience. Take a shopping trip to downtown by car. There is the whole problem of orientation, of finding the destination and a place to park. There is the question of how long we want to park for, and as a consequence where we should park. There is the cost of parking, and there is the question of weather conditions. And during the journey we play the role of the driver and the pedestrian. All these factors affect our perceptual experience of the city. And it seems to me that if the sequence analysis approach to design is to have any validity at all, we must try to consider these additional factors.

My aim in this thesis, therefore, is to examine a specific trip purpose, and a definite problem in which the various factors that make up our total experience of the trip can be analyzed. To be more precise I propose to study one particular trip, the journey to shop, using one mode of transportation, the car. But to drive to shop in a car means that at some stage you have to park, get out of the car and walk to the destination. This brings me to the specific problem that I want to focus on, parking, or, in effect, the transfer between car and pedestrian movement. For if we think about the process of parking in terms of a sequence of events that we experience, we can see it as the point at which we transfer from one form of transportation to another. And, if we think about it further, the process of transfer can be fairly complex. Anyone driving to a downtown destination for the first time

has to go through a certain routine. He has first to identify his destination; then having done this he will have to park his car. Occasionally there might be provision for parking right at his destination. More often than not he will have to seek out a parking lot and then re-identify his destination, this time as a pedestrian. With time the process might become easier. He would become familiar with the area, know where this particular destination is located, where the most suitable parking places are and the easiest access to and from them. However, if he has to proceed to other destinations elsewhere in the downtown area, he will have to go through the same process of identification and orientation over again.

In this journey to shop the parking place, or the point at which we transfer from the car to travel on foot, plays a vital role. It is the point at which car and pedestrian meet; where the larger scale requirements and high speed of the former must be reconciled to the slow walking pace and smaller spatial requirements of the latter. It is also a point of re-orientation and as a result can lead to confusion if the sequence of transfer is not clear. The question of where to go next must be a common one facing the driver after parking his car.

To examine the way we experience this sequence I made case studies of four different trips into Boston. The experience was recorded and the different trips compared to a number of criteria that I will shortly outline. In so doing the intention was not only to cast the problem in a new light, but to generate design ideas that can be more far-reaching than previous attempts at sequence design. Therefore, on

the strength of this analysis, I will put forward a number of theoretical design solutions and more specific criteria, which can form the basis for future sequence analysis and design.

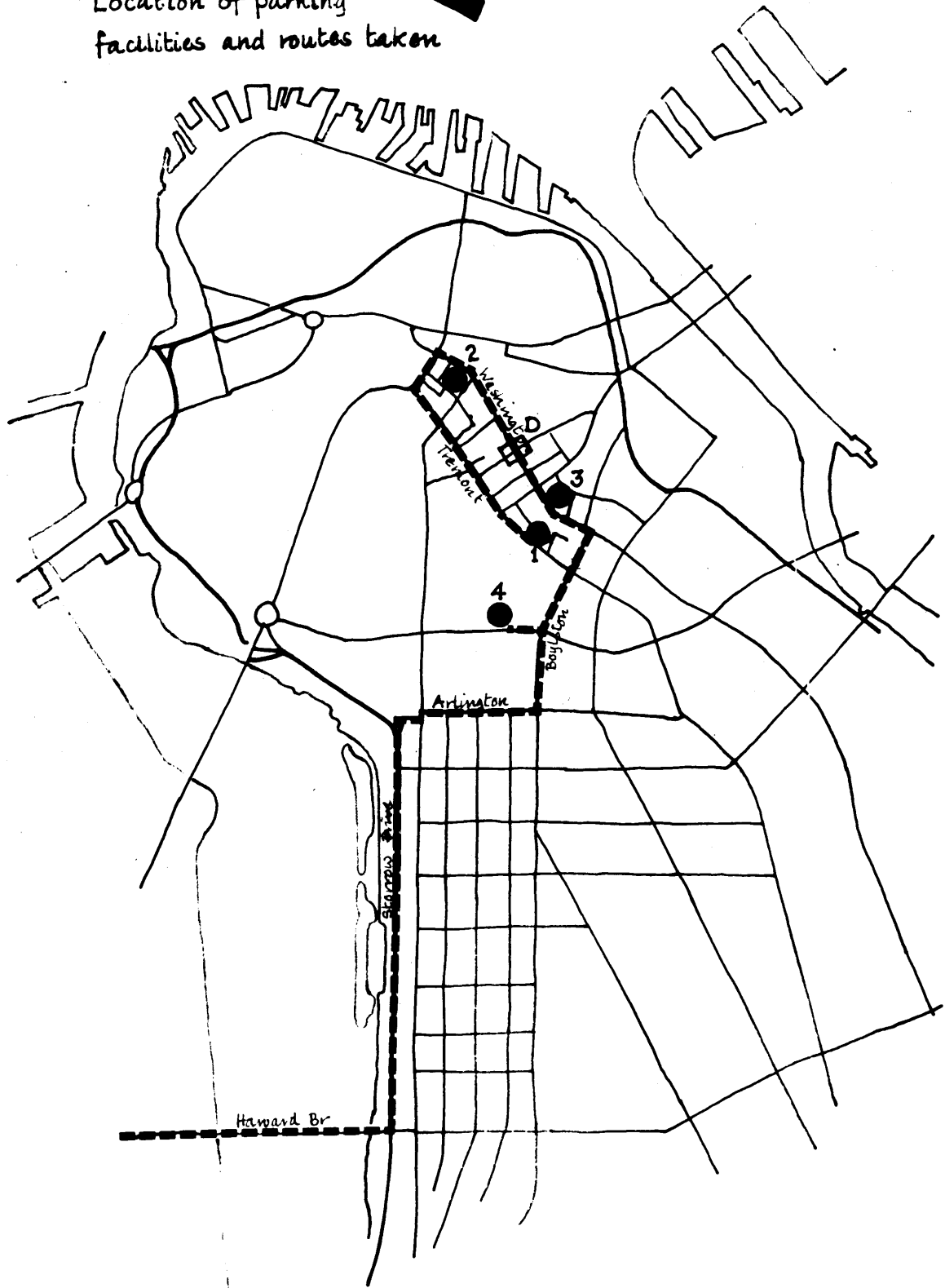
In a sense one can look on this thesis as merely a parking study with a few proposals. But it is a parking study with a difference, since I am relating it to an analysis of experienced sequences. In so doing I hope I am putting the subject of this method of analysis on to a more realistic level. For if analysis is to lead to synthesis and design, it must relate to functional design problems. I am not arguing that the only use for sequence analysis is to do parking studies, conversely neither am I claiming that all parking studies should be analyzed in this manner. But if our designs are to relate more to people's actual experience, and if abstract analytical techniques are to be useful in design then the only future is to bring these two together as I hope I have done in this thesis.

To sum up, then, my objectives in this thesis are as follows.

1. To enlarge on the existing research into sequence analysis and design by examining all the factors that affect one particular purposeful sequence, the journey to shop.
2. In studying this sequence the main focus will be on the process of transfer between car and pedestrian movement, which, it is assumed will occur at the parking place.
3. To put forward theoretical proposals for the location and design of parking facilities, based on the previous analysis.
4. In carrying out the first three objectives, to test the validity of sequence analysis and design per se.

THE SURVEY

Location of parking facilities and routes taken



Framework and criteria

In preparing the survey of four trips into Boston I found that the number of variables one could consider was extremely large. I decided, therefore, to limit myself to examining three variables that I felt to be the most important and most relevant to the problem of parking. The first, is the degree of familiarity the driver has of his surroundings. The second, is the type of parking facility used. The third, is the location of the parking facility relative to the destination. My hypothesis is that varying any one of these will affect the experience of our trip to downtown.

My method, briefly, was to make a number of "simulated" shopping trips into Boston by car myself, in order to compare the impact of the three main variables on the sequence itself. I endeavoured in the surveys to hold constant as many factors as possible. Each trip was made on a Saturday and at the same time, so in theory the traffic conditions for each were similar. The main approach into Boston was the same, though of course the final approach to destination and to parking varied according to the location of the parking place on each sequence. The destination chosen was the Winter Summer Street intersection at Washington Street where Jordans and Filenes are located. So this was also held constant.

Each trip was analyzed in the

DRIVE → PARK → WALK → ARRIVE Destination

sequence; and returning, in the

LEAVE Destination → WALK → UNPARK

sequence. The drive from downtown back to home was omitted because it raised a whole number of additional problems that I did not have time to consider, and that are separate from the problem of locating destination and parking place.

Four sequences were examined, and to assess the effect of the different variables the tests were set up as follows. To test the first variable, familiarity, I carried out the first two trips "blind". By this I mean that I drove into downtown, not in complete ignorance of where the destination was, but without knowing exactly which was the best and easiest place to park. I was not, therefore, simulating the first time visitor, but rather the infrequent driver, generally unfamiliar with the more detailed layout of downtown. The implication of this situation was that the unfamiliar driver would tend to drive into town until his destination was actually spotted, and then start looking for a place to park. The second two sequences I carried out with prior knowledge of where the parking facility was, and roughly how to get from there to the destination. My interpretation here was that it was not necessary for me as the driver to actually see the destination before parking, the knowledge from my own experience that it was nearby was sufficient.

To examine different types of parking facility, on each sequence, I parked in a different parking lot. The first trip, which was "blind", I determined to park in the street. The second trip, also "blind" I chose the first convenient parking place, which turned out to be a grade lot. For the other two sequences I chose on the map two different

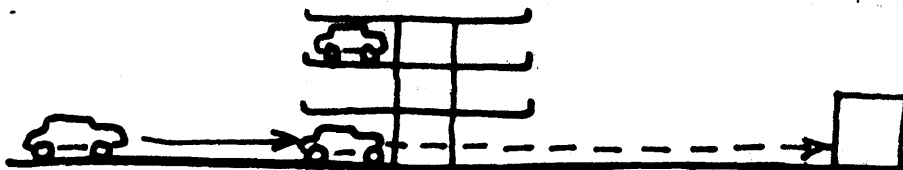
sequence one



sequence two



sequence three



sequence four



types of facility, both within relatively easy access to the destination, and approached off the route I was using. The first was an elevator garage, the second was the Boston Common parking lot, which is underground, has three levels, ramps and driver parking.

Finally there is the location of the parking facility itself relative to the destination. The choice of this grows automatically out of my selection of four different parking places, which are all located in different positions.

The sequences, therefore, had the following characteristics:

Sequence one.

1. driver unfamiliar with area in detail.
2. street parking.
3. parking located within destination area.

Sequence two.

1. driver unfamiliar with area in detail.
2. grade lot; driver parking.
3. lot located in Washington Street.

Sequence three.

1. driver familiar with area.
2. elevator garage; attendant parking.
3. garage located in Washington Street.

Sequence four.

1. driver familiar with area.
2. underground, multi-level garage; driver parking.
3. garage located outside destination area.

To compare and evaluate the four sequences I drew up a number of criteria. These were derived partly through empirical observation during a number of trial sequences, and partly from the visual criteria put forward by Kevin Lynch in the Visual Plan. They are as follows.

1. ORIENTATION

The driver/pedestrian should be fully orientated at all stages on the trip.

To be well orientated implies three requirements. A person should, first, know where he is; secondly, where he is going; and thirdly, how to get there. On a trip to downtown by car, however, not only does the driver need to know where his destination is and how to get there, but also where to park, and how to get from the parking place to his destination. For a good well orientated sequence this means that there must be some connection between destination, parking place and the driver himself.

2. ECONOMY

The trip should be economical in terms of:

- (a) Cost
- (b) Time/distance for trip.

Under cost I am only considering the actual cost of parking (meter or garage rates) and not the total cost of the trip. This, after all, is how we tend to regard the cost of short trips such as these. We seldom think about calculating the amount of gas being used up when searching for a parking space, just to save paying a fee.

Time/distance is obviously an important consideration but it is difficult to agree on any set standard. That we want to minimize time taken and distance travelled is obvious. But what length of time and what distance should be the maximum allowed is hard to establish.

An Eno Foundation report has published figures on how far people walk from parking place to destination.⁵ But these do not tell us what is desirable, only what people actually do. At best they can provide a certain yardstick within which to work.

3. PHYSIOLOGICAL/PSYCHOLOGICAL.

(a) Congestion. The sequence, to be enjoyed, should be relatively free from traffic congestion.

(b) Safety. The sequence should be safe both when experienced as a driver and as a pedestrian.

(c) Micro-climate. The effects of extreme climatic conditions should not create discomfort nor cause us to abandon the trip.

4. FORMAL AND VISUAL QUALITIES.

(a) The sequence. The sequence should have a sense of progression and fulfillment; the parts should be identifiable.

(b) The parking facility; the design of the parking facility should be such that it is identifiable from outside, and clear to use from within.

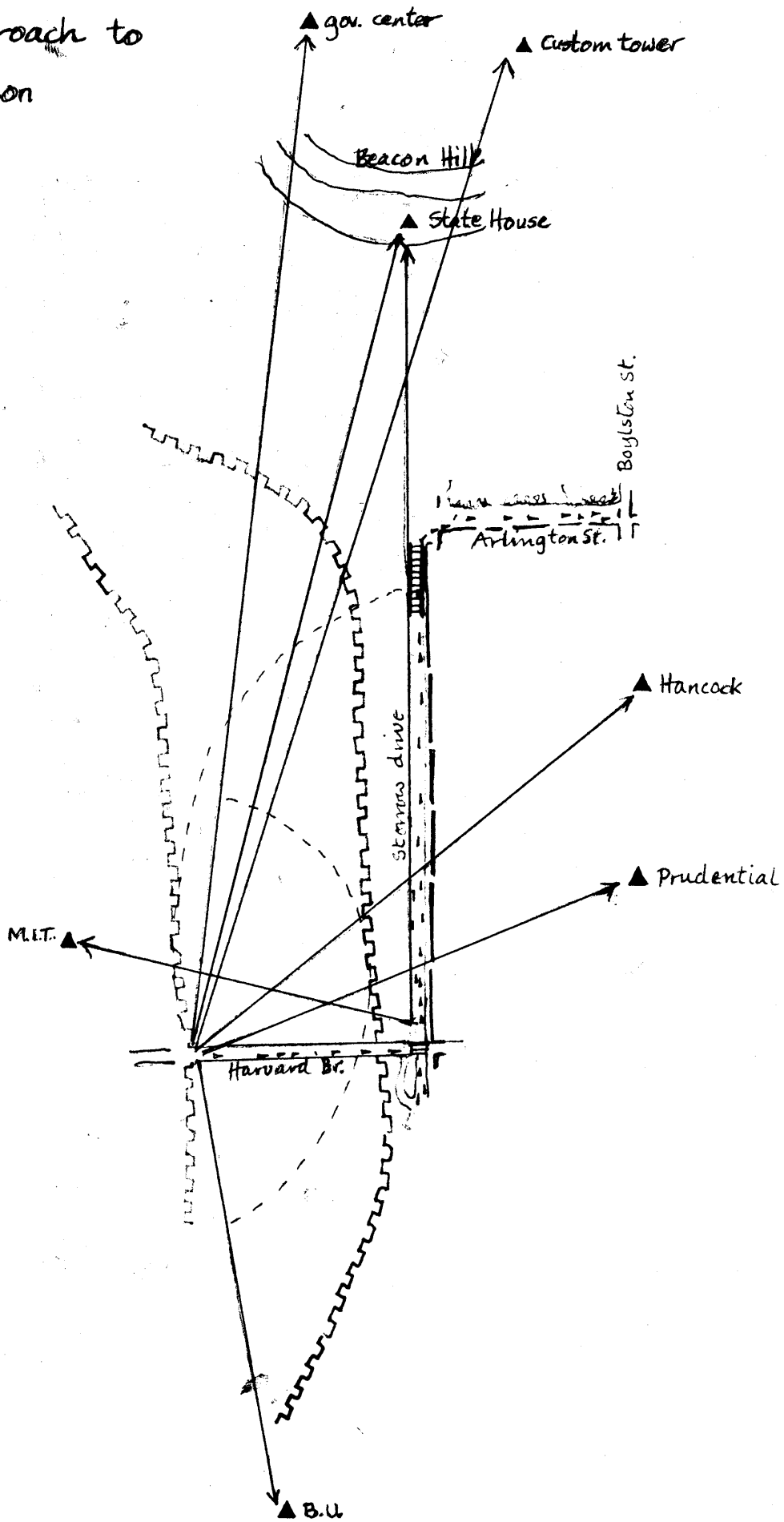
In analyzing the formal qualities of the sequences I am not interested in examining them from all aspects. I do not, for example, propose to analyze them according to Lynch and Appleyard's more aesthetic criteria, nor am I interested in evaluating them from the point of view

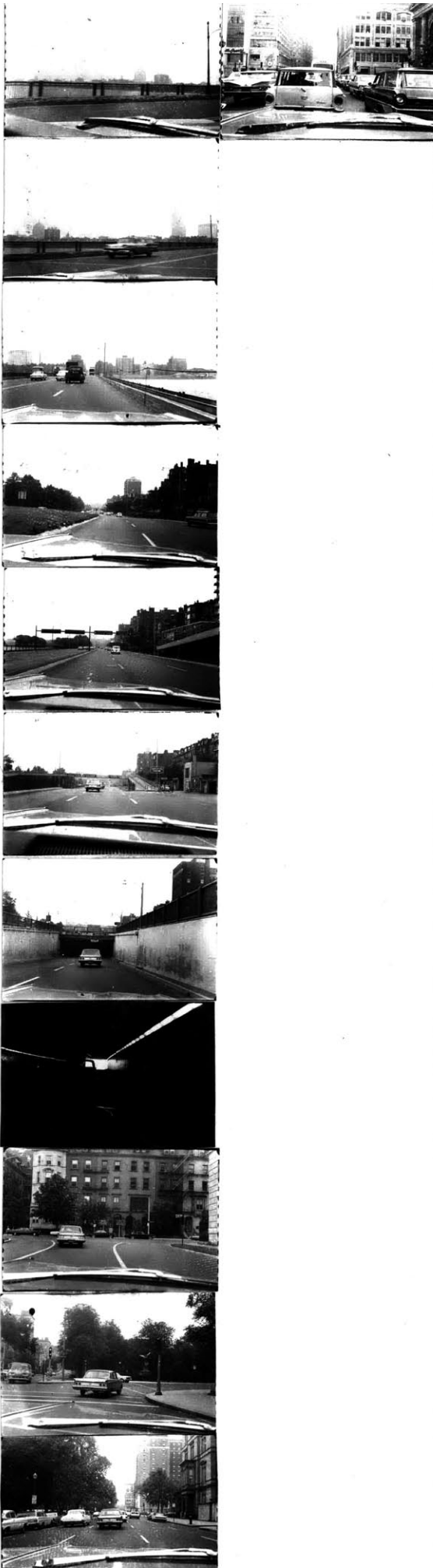
5. Burrage, Robert. H., and Mogren, Edward G., Parking Eno Foundation for Highway Control. Chapter Two, pp. 18-59, on "Parking habits and characteristics", gives a wealth of information. From table 11-19, we should expect the average distance walked by shoppers in Boston to be 656 feet, from parking to destination.

of how much they tell me of Boston itself. These aspects of sequence design have already been well covered. Instead I want to evaluate the form only in the way it relates to the process of way-finding and parking. I want to restrict it, in fact, to the more purposive rather than ethereal qualities of the sequence.

Now I have so far spelled out the criteria that I feel will be important in evaluating the sequence. They are not, for the most part, definitive criteria with specific standards against which we can measure each sequence. Rather they provide a framework within which we can compare one sequence with another, and on the basis of this comparison arrive at some more specific standards and criteria for design. What I propose to do now is to describe and compare the four sequence surveys. The sequences themselves are outlined in the series of drawings, photographs and verbal description that follow. I shall then comment and compare each sequence under the criteria I have just put forward.

Approach to Boston





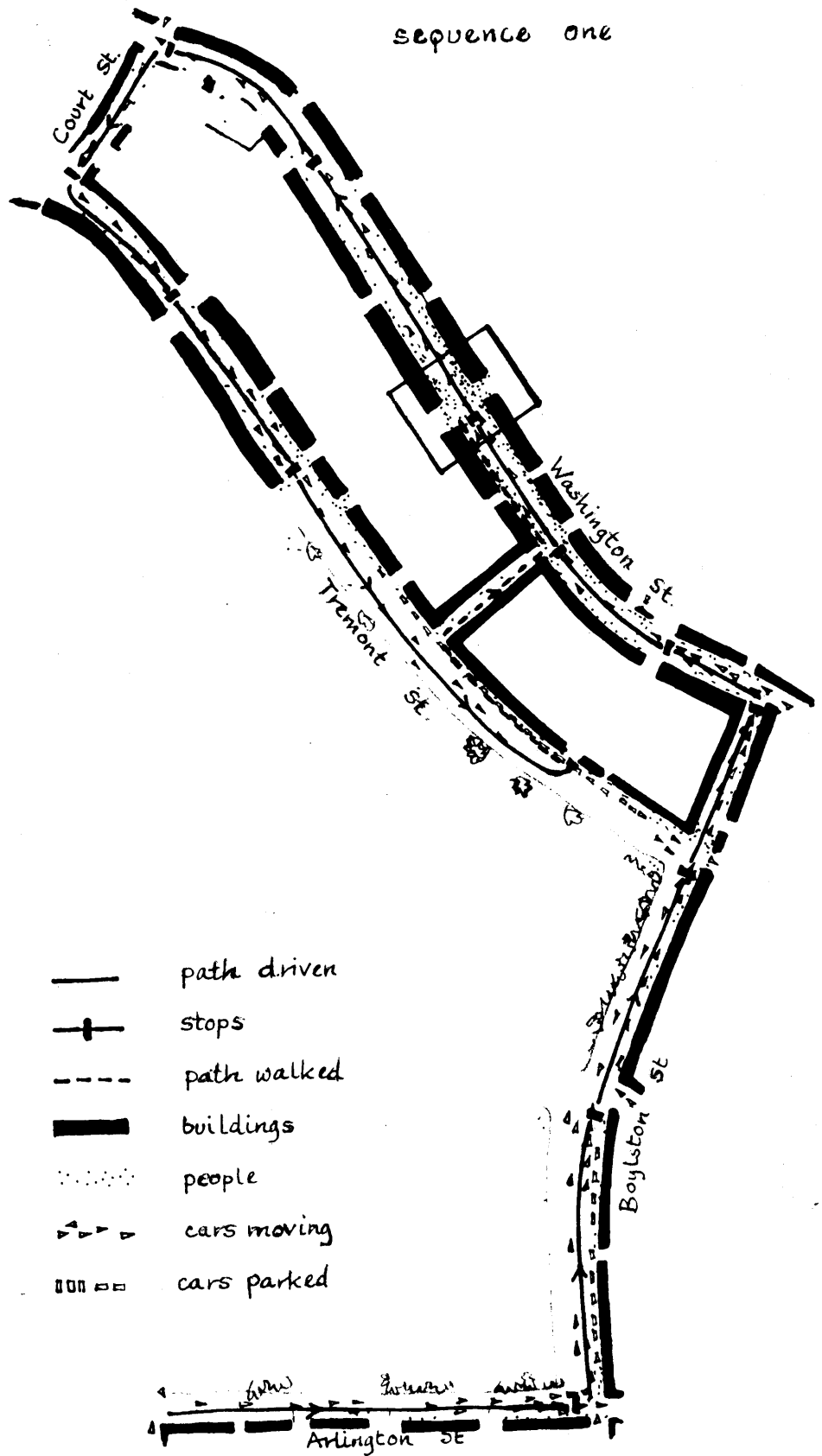
Description of Sequences

Approach

The trip starts at the Cambridge side of Harvard Bridge. Crossing the bridge the space opens up. There is a panoramic view of the Boston Skyline. There are a number of prominent landmarks, with the main concentration of prominent features over to the left, defining the centre. At the end of the bridge I turn off onto Storrow Drive. The traffic along Storrow moves fast, and I have a sense of a residential area on my right and the river on the left. Ahead I can see several tall buildings, Beacon Hill and the gold dome of the State House. Approaching an underpass I see a sign indicating downtown Boston at the next exit. I turn off Storrow Drive and emerge into the residential area on Beacon Street. I turn left on Beacon Street and right down Arlington, following the one way flow of traffic. I sense immediately that I am approaching downtown. The traffic increases, and ahead I can faintly see the signs of some shops. Driving on I arrive at a set of traffic signals, the Boylston Street intersection. Here there is definite sense of confusion. The centre of Boston seems at once to be to the left and straight ahead. Most of the traffic seems to be turning left, so I turn left.

From this point on the sequences differ and I shall now describe each one in turn.

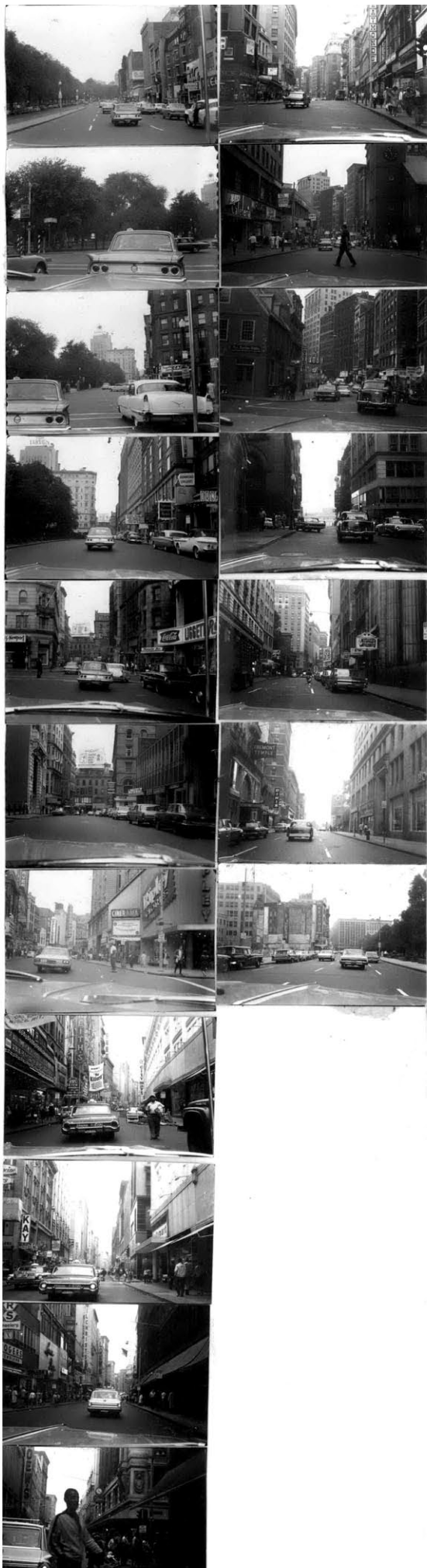
sequence one



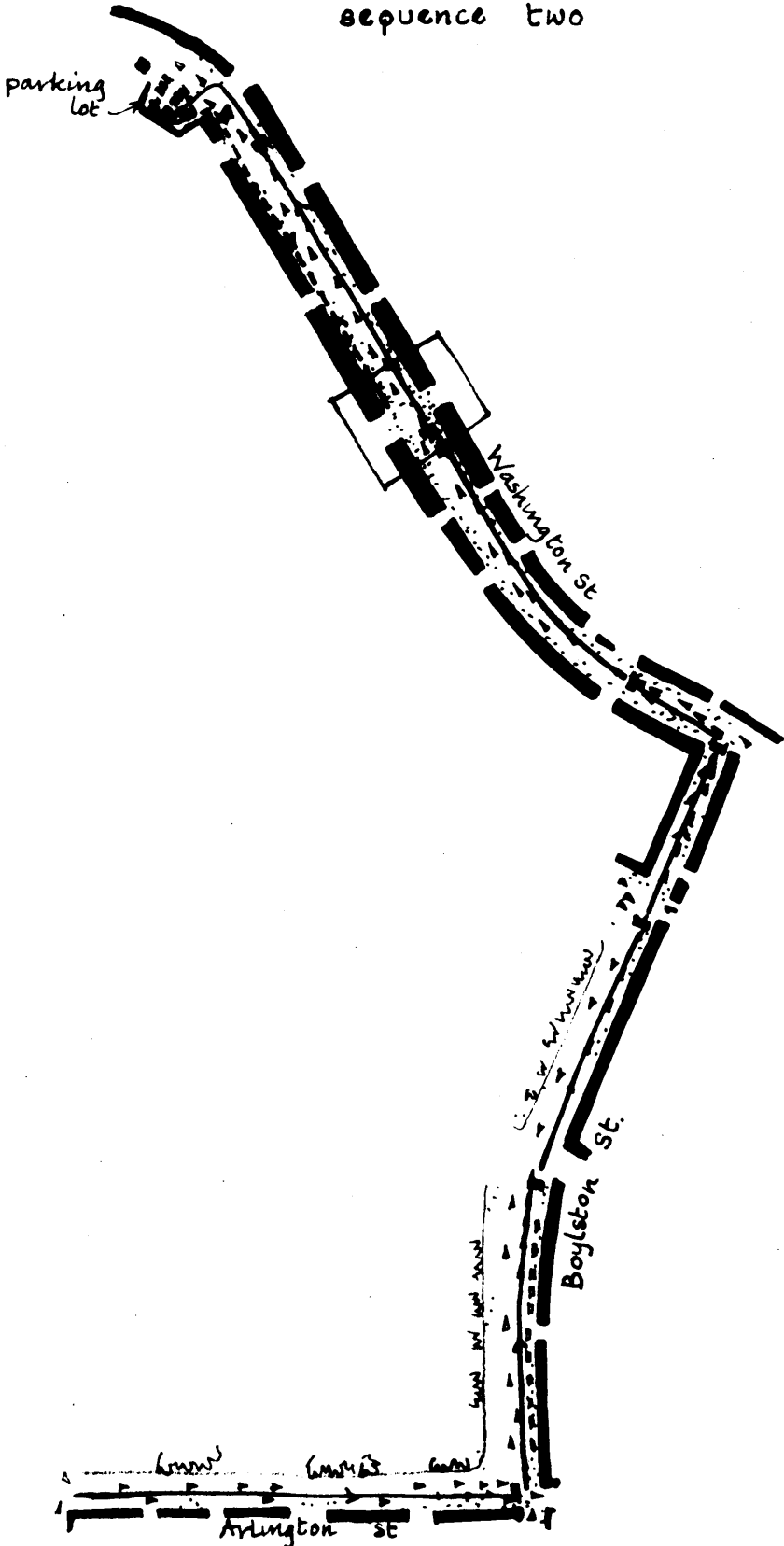
Sequence one. Meter Parking in Tremont Street.

Driving down Boylston Street there is a gradual build up in intensity of activity, shops and signs and traffic. Driving speed becomes slower and I stop at two sets of traffic signals. Arrive at an "T" intersection. Signs tell me that it is Washington Street. Turn left. Traffic, people, signs and height of buildings become almost overpowering. I proceed very slowly up the street. Look for the destination. Finally identify and arrive at Winter Street intersection. Problem now is to find a place to park. There is no sign of any space. "No parking" signs proliferate. Drive on up the street. Still no sign of a parking space. Decide that I am getting too far from the destination and must try to turn down a side street. I turn down Court Street; still no sign of a parking space. Turn left down Tremont. Traffic heavy and slow moving. No Parking place. Arrive at Common. I see a line of parked cars on left. I see a sign saying parking permitted. Then I see a space free. I drive past, stop, reverse in, stop car, get out, lock up car, insert coin in meter, Then try to regain my bearings. Decide that Washington Street must be parallel to me. Walk down a side street. I am right. I soon arrive at Washington Street. Jordan Marsh I can see some way up the street to the left. I walk on up through heavy crowds.

Return. I try to retrace my steps. Turn up a sidestreet. It isn't the same one as before but it must lead to Tremont. Arrive at Tremont. Turn left. See my car. Arrive at car, unlock, get in, drive off.



sequence two



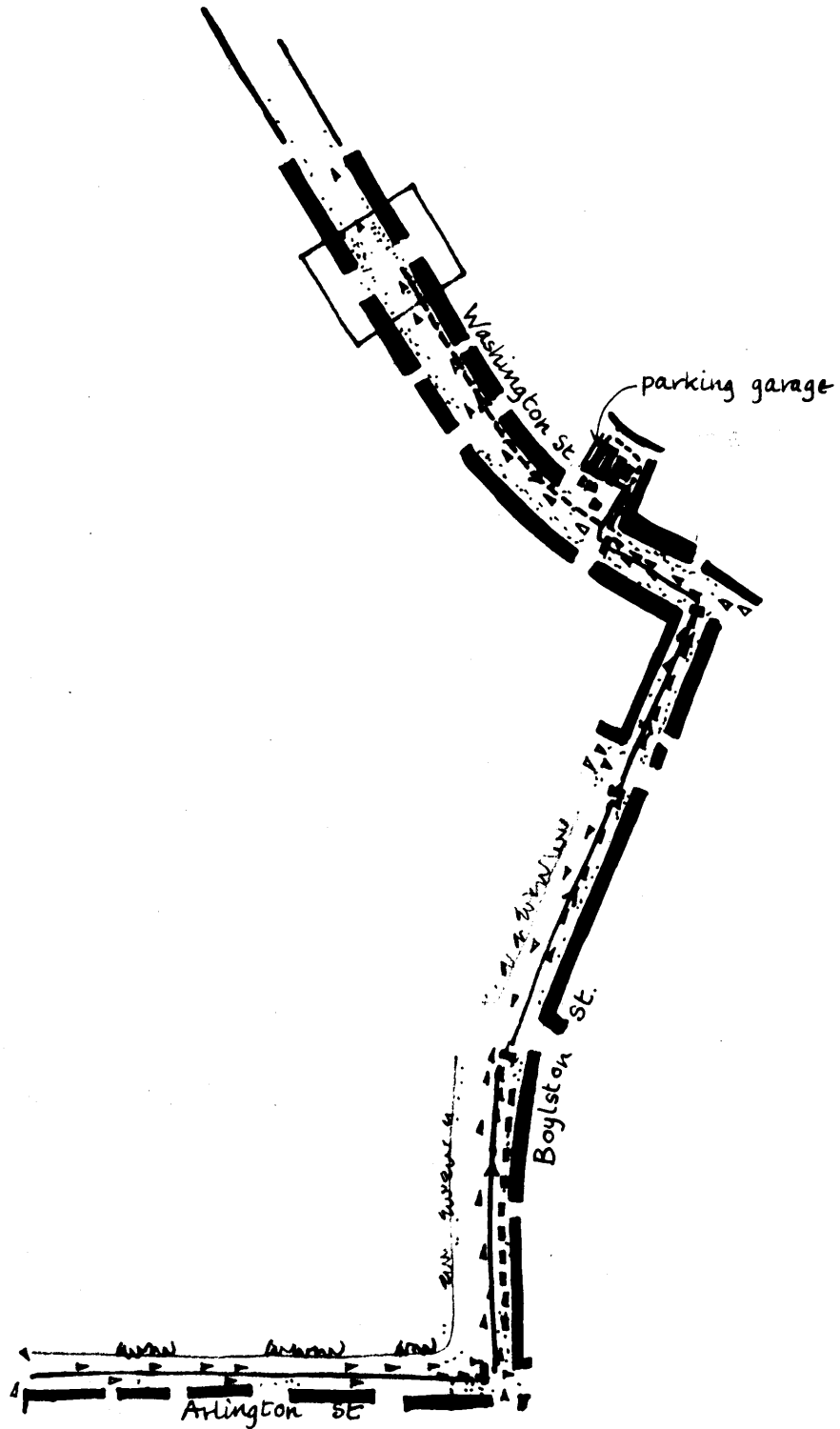
Sequence two. Grade Lot in Washington Street.

Driving down Boylston Street there is a gradual build up in intensity of activity, shops, signs and traffic. Driving speed becomes slower, and I stop at two sets of traffic signals. Arrive at Washington Street. Turn left. Traffic, people, signs and height of buildings become almost overpowering. Proceed slowly up the street. Look for destination. Finally identify and arrive at Winter Street intersection. Start looking for a parking place. "No Parking" in the street. Drive on up. Still no sign of a parking place. At the curve of the road ahead I see a sign saying "Parking". Drive up closer. It is a grade parking lot. I drive in, stop at booth, collect ticket, move on searching for space; see one vacant in the far corner; drive car in; get out; lock up, walk back to entrance of parking lot. I start walking back down Washington Street. Crowds are heavy. They get denser as I approach Filene's. Arrive at destination.

Return Walk up Washington Street to parking lot. Crowds again heavy. Arrive at parking lot, enter, walk to car, unlock, get in, back out, drive to entrance, stop, search for ticket, give it to attendant, pay, drive off.



sequence three



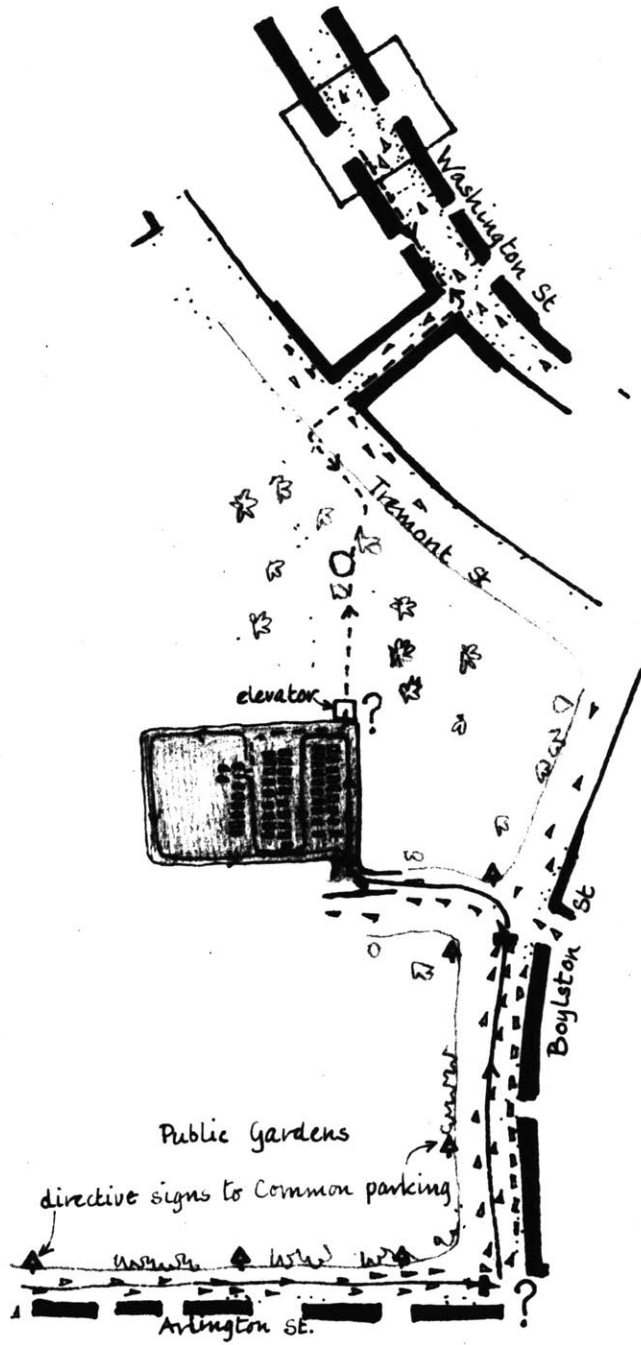


Sequence three. Elevator garage in Washington St.

Drive down Boylston Street. Stop at traffic lights at Charles St. and Tremont. Arrive at Washington Street. See sign for City Mart parking just up the street. Join in behind line of cars turning right to enter lot. Cars move very slowly. I turn right. I see the elevator garage ahead. Man waves me in to a space in front of the elevator. Stop. Take a ticket from the man. Get out of car. Walk back down street to Washington Street. Turn right and walk on up to the destination.

Return. Walk back down Washington Street, turn up street leading to garage. I am not sure quite where to go. Sign on corner of building tells me to collect car there. I walk up to corner and find the collection area is around the back of the building. I enter office. Hand in my ticket to cashier, pay, get given another ticket. Sign says white ticket holders stay at bay one. My ticket is white. Sit on a bench. Wait for car. Watch cars being unloaded and loaded into elevators. Place is noisy and dirty. Gates clang. No sign of my car. Wait for five minutes. Attendant drives it out of elevator, leaves it in front with door open. I get in and drive off.

sequence four



Sequence four. Boston Common Garage

Entering Arlington Street after turning off Storrow Drive I see a sign to Boston Common Parking Garage. Drive on up Arlington to Boylston. Traffic heavy. Turn left on Boylston. See three signs to Common parking. Arrive at Charles St. intersection. Stop at lights. Sign says turn left to parking lot. I turn left and immediately see sign and ramp leading down to parking garage. I drive down the ramp turn right at the bottom. It is dark compared with outside. Stop at booth, collect ticket from machine. Drive on in to parking area. It seems quite full. I drive around up and down the aisles looking for a space. Find one. Park car. Get out. Lock up. Look for the exit. Very confused. No signs to indicate direction. Then I see a light in the corner with people standing I decide that must be an exit. I walk to it. I see it is an elevator. Wait for elevator to arrive. Elevator brings me up to surface. I am in the middle of the Common. There is a moment of dis-orientation. I have to think which way to walk to Tremont. I see vague hints of activity through the trees. I walk in that direction across Common. Soon arrive at Tremont. Cross street walk up Tremont to Winter St. Down to destination, through heavy crowds.

Return. Walk from destination to Tremont Street. Confusion at this point as to where exactly on the Common the entrance is to the parking garage. On walking on to the Common I see a bandstand that I recollect passing before. I walk up to it and see the glass boxes ahead. Enter the box and pause on getting into the elevator to decide on which floor the car is parked. Leave the elevator and search for my car. I find it enter and drive around the garage following the exit signs. It seems a long and meandering route. Eventually I arrive at the entrance; stop the car; pay the attendant and drive off.



Evaluation of sequences

1. ORIENTATION

(a) The approach to downtown.

If we look at the main approach into Boston common to all four sequences we can determine a certain progression of events as we get toward the centre. Since the process of orientation is a two-way interaction between the environment we perceive and ourselves and our experience, we can describe this progression in two ways: first as a succession of perceived forms, and secondly as a succession of goals that we look for, perceive, and arrive at. Put more simply, all I am saying is that when we drive into a city's downtown we go through the following process..We have to identify the city as a whole, we then have to find and identify the downtown, next we must find the specific district in the downtown, then the particular street and finally our destination. This continual searching for smaller and smaller goals as we get nearer our destination is part of our orientation process. And it is interesting to compare this theoretical construction of what we are looking for, with what we actually perceive and experience. Applying this to my sequences into Boston we can ask ourselves how well the forms perceived when driving in "fitted" with the goals I was searching for.

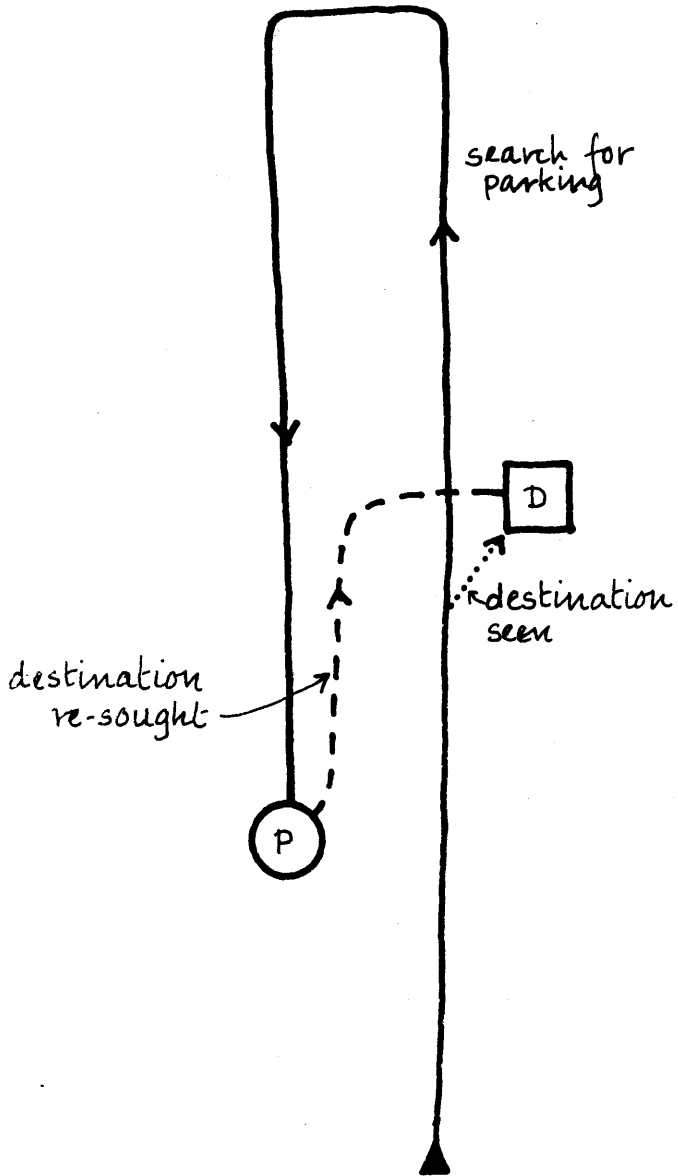
For the most part they "fit" quite well. The approach I used to get to Boston (over Harvard Bridge) is made across water. The effect of this as I have described is to open to view the whole skyline of Boston, with the result that Boston itself can be identified, downtown can be perceived, the major landmarks noted, and a rough sense of

direction established. Driving down Storrow Drive, having identified Boston, the next goal is to get to the downtown. I turned off at the first sign to downtown which took me down Arlington Street. The wide panoramic views, of course, are gone, and the driver must now fall back on other clues to identify his whereabouts. Here I found that the impression of approaching downtown is brought home to us by the steadily increasing number of cars, people and general shopping activity. In fact in Boston this "congruence" of activity with the form of the city is fairly good. The real difficulty, however, comes in trying to understand the path system and the different intersections. As it turned out, the route I chose for analysis had only one really confusing intersection which was that between Boylston and Arlington Streets. But once on Boylston, the build up in activity, the types of shops and size of buildings as one moves along the street tell you unmistakably that you have arrived at downtown. True you are never aware exactly when downtown is entered. But this is a relatively minor point. Up to this stage all the four sequences shared the same approach into Boston. From then on they differed. Let me now evaluate the sense of orientation along each one in turn.

(b) Sequence one.

The first two sequences were carried out to simulate some unfamiliarity with the environment. Aside from the Arlington-Boylston intersection there were no points of real confusion and the flow of traffic following the one-way street system led me straight on and up Washington Street where the destination was sighted. For the first time visitor, therefore,

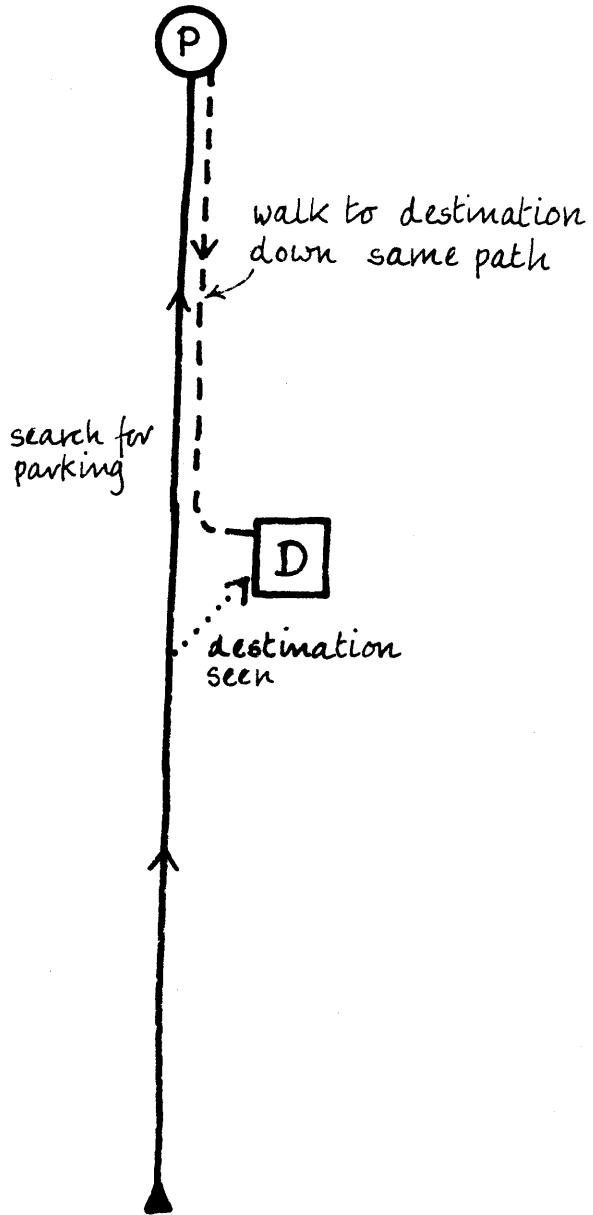
SEQUENCE ONE



the finding of the destination after getting on to Boylston Street comes relatively easily. The problem then is to find a suitable parking space.

On the first sequence I was trying to locate a street parking space, and the search process became quite involved. There is no street parking in Washington Street, nor up a good many of the side streets. Therefore I had to turn up a side street, then back down Tremont until a space was found. But what had happened was that in searching for a place, I had lost the connection between myself and the destination. Therefore, although I had seen the destination by car, I now had to re-find it as a pedestrian. The route I had taken by car involved only two left turns, but it was complicated and lengthy enough to reject any idea of trying to retrace my path. By a process of deduction a first time visitor could possibly have worked out that he had parked in a street parallel to Washington Street, and that it should just be a matter of walking down a side street, and then along Washington to the destination. More likely than not he would have felt confused if not totally lost. The significance of this sequence is, first, that trying to park in the street in a downtown can lead to extended and rather complicated search patterns which can throw one's sense of direction off. This is something I have come across through previous experience in many places, and not simply in Boston. Many drivers, in fact, adopt regular search patterns which they consistently apply when trying to park in a downtown. This has been borne out in

sequence two



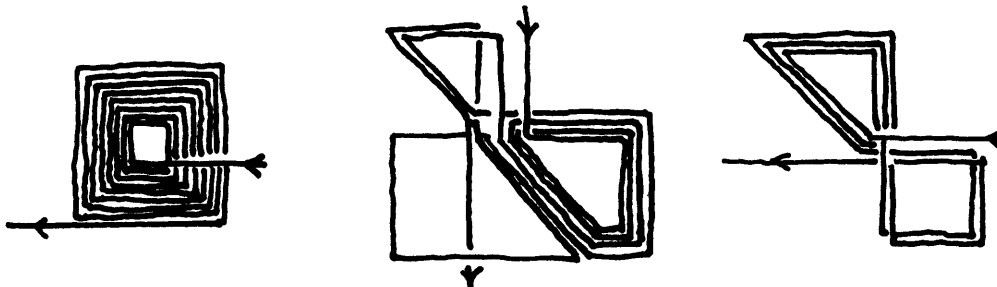
some earlier parking studies.⁶

The second significant feature of this sequence is the possible breakdown in orientation that can occur unless the connection between destination and parking is clear. In this case the destination was actually seen, yet the connection was lost in the search for a parking space.

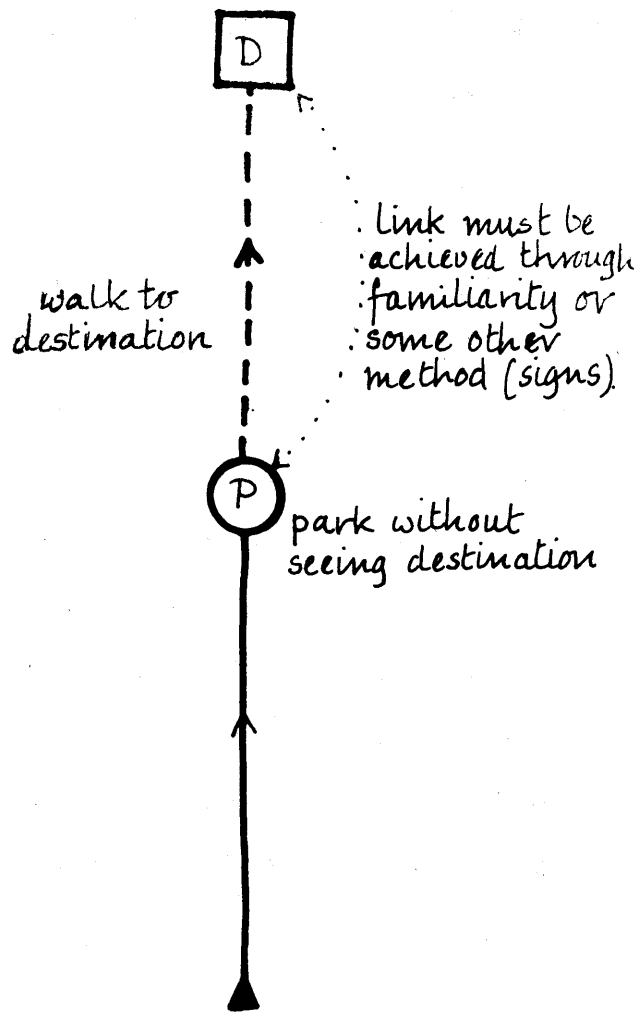
(c) Sequence two.

Bearing in mind this second point it is interesting to compare sequence one with sequence two. For simplicity of circulation and orientation this must be regarded as feasible prototype. The destination was sighted. I proceeded up Washington Street. I sighted a parking lot, parked and walked back to the destination down the same route as I had just driven. Here the connection between parking and destination is simple, easy to use and easy to grasp. This sequence did have problems, but they were not those of orientation. Only one thing concerns me here, is there an optimum distance people will drive after passing the destination before trying to double back and find a parking place nearer the destination? This I do not think can be deduced from

6. Smith, Wilbur S. and LeCraw, Charles S., Parking, Eno Foundation for Highway Traffic Control. 1946. On p. 20, the authors illustrate some remarkable examples of search patterns a few of which are shown below.



sequences three and four



my surveys, and would need a more thorough analysis. But, I would state, that I was beginning to feel the necessity of turning off shortly before I sighted the parking lot.

The parking facility itself did not cause any severe orientation problems. Being a small grade lot there was no possibility of getting momentarily "lost" in trying to get out of the parking lot. Similarly the smallness of the lot enabled me to relocate my car fairly easily on returning.

(d) Sequence three.

Now the first two sequences involved seeing the destination itself. The latter two did not. In fact it would be virtually impossible to use either of the two latter parking facilities and actually see the destination without making an elaborate journey. What I am saying therefore is that to use the Boston Common lot or even the elevator garage on Washington Street when aiming for the particular destination I have chosen, would not be simple unless one had prior knowledge of the whereabouts of one's destination. My point here is that a driver's familiarity with an area can help one's sense of orientation to a considerable extent. This may be belaboring the obvious, but it has some bearing on the design of ideal sequences as I will come to later.

The characteristic of both the two latter sequences is that I stopped short of my destination, parked and then proceeded up the final stretch on foot. This means that the actual finding of the destination will be done on foot. In sequence three, where I parked in Washington Street just a few hundred feet short of the destination (but not within sight of it) this was not a great problem. I was already on the

destination street, and all I had to do was walk on up. The unfamiliar driver might have had to ask his way, but there were a few clues to tell him where to go; the general movement of people and the increase in activity towards Filenes and Jordans for example. In sequence four the orientation problem was far more difficult as I shall describe shortly.

The multi-storey elevator garage that I used in sequence three had a minor orientation problem. On the return journey you have to negotiate your way around to the rear of the building to find the ticket office, and to collect one's car. It is not a major complaint of course. But the signs were generally inadequate. And I suspect that it is often slight inconveniences that might put people off from using that facility, or even from driving into town.

(e) Sequence four.

In contrast to the other parking lots examined, the Boston Common Garage is a good example of mislocated facility that can cause extreme disorientation and confusion for the user. In this case I knew its location on the map and its general relation to the Washington Street area, so the sequence did not involve seeing the destination prior to arriving at the interchange - or so I thought. The approach to the interchange was fairly straight forward. It is, after all, the only parking facility in Boston that is fully signposted, even though the signs themselves are unobtrusive and do not indicate the purpose of the parking garage. (The degree of explicitness of signs is important and I will deal with this aspect on page 71).

The parking garage itself is particularly confusing, and the

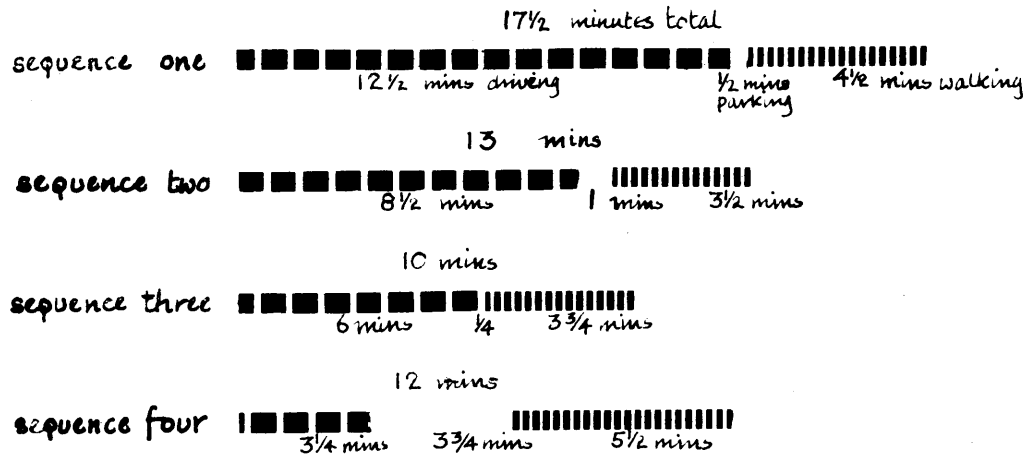
general atmosphere of the place does not alleviate this in any way. It is dark and ill-lit, the directional signposting is minimal and one has little idea of where is the best place to park. On leaving one's car there is no indication of where to go, and it took a few moments for me to decide that a small area of light in one corner of the space might indicate an exit; which fortunately it did. The elevator exit brings you to the surface right in the centre of the common, and it was here that I found myself completely lost for a few moments. It was difficult to determine in which direction to walk, even though I had some familiarity with the area. Some shops and general activity were vaguely visible through the trees, though it was hard to determine whether they indicated Boylston or Tremont Streets. A further factor was the complete lack of connection between the car entrance to the parking garage on Charles Street, and the pedestrian exits a few hundred yards away in the centre of the common. This lack of connection between the two can be extremely confusing, as in this case, because it dissociates the last place of orientation to the outside, the car entrance, from one's position on leaving the interchange as a pedestrian. I am not arguing that car and pedestrian entrances or exits should be the same, but some sort of visual link would be helpful. Finally, as if this lack of orientation were not enough, one is faced by the tremendous contrasts between the dark Stygian depths of the lot, the cramped confines of the elevator, and the sudden emergence on to the brightly lit, wide open expanse of the common. In a way, of course, this contrast is an exciting one to experience, and would be acceptable

if one could still keep one's bearings whilst experiencing it. At the moment it only serves to aggravate an already confusing situation.

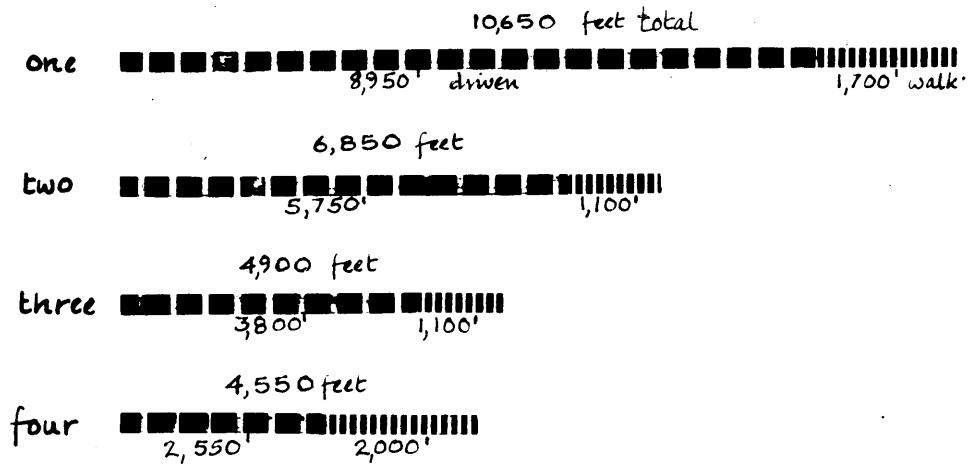
But if the Boston Common Garage is difficult to use in the drive → park → walk sequence, it is equally confusing in the reverse direction. Emerging on to the Common after walking across Tremont Street it is impossible to see the small glass boxes indicating the pedestrian entrance, and it was only through my recollection of passing a bandstand previously, that I knew in which direction to walk. Then on seeing the pedestrian entrances, there was a moment of decision as to which was the right one to select. On entering the garage I was faced with the problem of locating my car, a perennial difficulty in all large self-park lots, but made worse in this case by the garage having three levels and there being no indication on the ticket as to which level the car had been parked on. I was fortunate, and managed to recall the level. Others I suspect have not.

In sum the Common garage raises considerable orientation problems. One is because of the type and design of the facility itself. It is large, has many levels, with ramps and customer parking, it is poorly signed inside; all these contribute to the situation of confusion. Other problems arise from its location which is really some distance from the Washington Street, not to mention the main office district. Furthermore the siting of it underground in the middle of the huge expanse of the Common does not exactly help to diminish the distance between parking place and potential destinations.

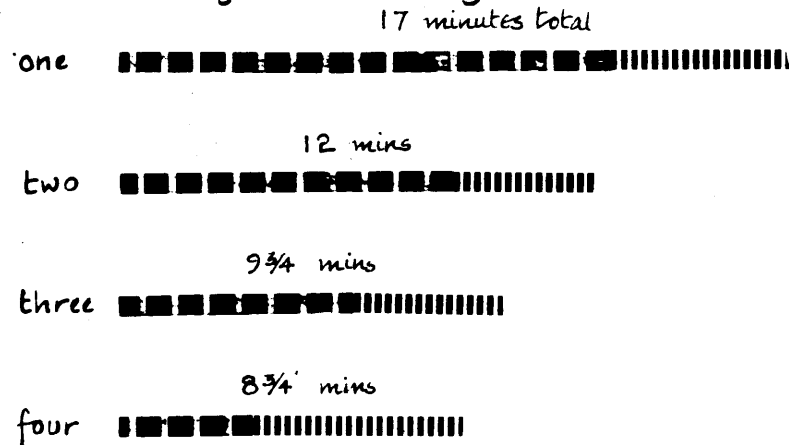
Time Taken*



Distance travelled*



Driving and walking times combined.



* all times and distances measured from Arlington-Beacon intersection.

2. ECONOMIC

(a) Time/Distance.

The time taken to travel over the different sequences varies considerably and there was a difference of $7\frac{1}{2}$ minutes between sequence one (the longest) and sequence three (the shortest). Aside from the general interest in comparing the times different sequences take in Boston, these overall times do not give us a real basis for comparing relevant factors that might be useful for design. To compare the sequences more rationally I have broken down the times into three sections. Time driving, time parking and time walking to destination.

Let us first look at driving time alone. All the times are measured from the same starting point, the junction of Arlington and Beacon Streets, so basically what we are comparing is the difference in time between driving in until the destination is sighted, and stopping short of the destination and walking. As we would expect sequences one and two proved considerably the longest. Sequence one, of course, indicates the considerable difficulty in trying to park in the streets in downtown Boston. Parking in the street, one may argue, is an unpredictable business because you just take a chance on whether a space is free, so it could be that the time I took might be considerably reduced in other circumstances. This could be true in some cities, where it might be possible to park relatively easily in the street. With Boston I am not so sure. Legal parking places are few and far between, they are not on all the main streets and Boston's one way street system inevitably forces one to make tortuous detours. For

these reasons I would say that the long period taken by me to find a place to park is a true picture of the existing situation. I would add that other attempts by me to park in the street have also been time consuming.

But the question of street parking aside, we can see from sequence two that driving up Washington Street and past the destination made the driving time $2\frac{1}{2}$ minutes longer than the driving time of sequence three, and $5\frac{1}{4}$ longer than sequence four. There is therefore a considerable saving in stopping short.

Now driving time is but one side of the coin. Once having parked, we still have to walk to the destination, and, to get a real comparison, we must compare the total driving and walking times for each sequence. Examining the totals we can see that the shortest time was sequence four, the Boston Common lot, followed by sequence two. In other words, all things being equal, it is quicker to stop off at the Boston Common and walk, than drive on into Washington Street. Further, it was quicker for me to park and walk from Boston Common, than to try parking in the street nearer the destination. The reason for this is mainly that the general congestion on the streets slows down the pace of the car so much that it virtually becomes quicker to walk even though the distance covered is the same as by car. Another factor in Boston's case is that there are no parking places much less than a thousand feet from the destination, so there is not the saving of being able to park right at the destination that one might find elsewhere.

In short, therefore, if we take time as the main criterion it is generally quicker to stop short of the destination and walk, rather than

drive on in. What I could not establish from these surveys is how far away from the destination one can expect to stop before the extra walking length becomes excessive. In Boston's case there are other criteria that make the extra distance walked more objectionable than the mere time question, and these will be the real constraints as I shall discuss later.

The third time consuming aspect of the sequence is the process of parking. Comparing the time taken to park in the different facilities, we can see that there is a very wide range, from the quickest, $\frac{1}{4}$ minute in sequence three, to $3 \frac{3}{4}$ minutes, which is the time it took me to park at the Boston Common garage, from the moment of entry, to the moment of exit. Now this is a considerable difference by any standards, and must explain to some degree the extent to which people will try to park in the street rather than go through the bother of parking in a garage.

To illustrate the reasons for the different times taken to use each parking I have listed below a summary of the main actions taken by the driver in each sequence.

Sequence one. Meter parking in the street.

- Parking place sighted.
- Stop car.
- Reverse in and park.
- Get out of car.
- Lock up car.
- Place coin in meter.
- Walk away.

Return

- Parking place sighted.
- Unlock car.
- Get in.
- Maneuver out.
- Drive away.

Sequence two. Grade parking lot.

Parking lot sighted.
Drive in.
Stop and collect ticket.
Drive around looking for a space.
Space sighted.
Drive in and park.
Get out of car.
Lock-up.
Walk out of parking lot.

Return

Parking lot sighted.
Enter lot.
Walk to car.
Unlock car.
Get in.
Drive through lot to entrance.
Pay attendant.
Drive off.

Sequence three. Elevator garage, attendant park.

Parking garage sighted.
Drive up to entrance.
Stop car.
Take ticket from attendant.
Get out of car.
Walk away.

Return

Parking garage sighted.
Walk around to rear.
Enter office.
Pay and collect another ticket.
Enter garage.
Wait for car to be delivered. (five minutes)
Car delivered by attendant.
Get into car.
Drive off.

Sequence four. Multi-level ramp, driver park.

Parking garage sighted.
Enter garage.
Stop and collect ticket.
Drive around looking for a place.
Space sighted.
Drive in and park.

Get out of car.
Lock-up.
Walk to elevator.
Wait for elevator.
Enter elevator and travel up to surface.
Walk across common.

Return

Entry box sighted.
Enter.
Wait for elevator.
Take elevator to parking level.
Look for car.
Car sighted.
Unlock car.
Get in.
Drive to entrance.
Pay attendant.
Drive off.

From these descriptions it can be seen that the shortest time parking will be at any facility with attendants doing the parking. In Sequence three, for example, which was an elevator lot, all I had to do was drive up to the entrance, stop the car, collect a ticket from the man and walk off. There was no reversing, maneuvering or locking of the car to be done. Sequence one, which was parking at a meter, took a few seconds longer because I had to insert a coin in the meter and also lock the car. Sequence two which was a driver parking grade lot, took longer still because I had to drive around looking for a space before I could park. The worst of all was the Boston Common lot. This is a large garage with multi-level ramp circulation, and the best part of the time was spent driving up and down the aisles searching for a space. Then having parked, the car must be locked up. Finally I had to find my way out, picking a path through the parked cars and waiting for an elevator to take me to

ground level.

But these times refer only to the process of parking. If we look at the times taken to unpark the cars, on the return journey, the situation is quite changed. The attendant park facility has some drawbacks here, and this is noticeable in sequence three where I had to wait five minutes before my car was delivered to me. The advantage of street parking is also illustrated here, because it is the one facility that does not require payment before leaving. It was just a matter of getting into the car and driving off. With the Boston Common lot, it took time to locate the car, drive around to the entrance and pay. In large lots like this, in fact, the time searching for your car is something to be considered.

(b) Cost

A fundamental consideration in any trip to downtown by car is that of the cost of parking. There is nowhere in downtown Boston where you can "legally" park free, but the next best thing is a meter. In terms of cost therefore sequence one is the cheapest monetarily, though this must of course be balanced against the extra length of time taken. Added to this is the time limitation on meter parking, which can often make it useless for longer term trips. Comparing the three garages, the most expensive were the two in Washington Street, the argument being, one supposes, that if one is to park in that area the privilege must be paid for. This is slightly delusory, because, in the case of sequence two, the expected saving in time and convenience in parking on Washington Street does not occur. In fact it is both cheaper and quicker to park in the Boston Common lot than use the grade lots in Washington

Street.

It is difficult in this particular survey to give a true picture of the effect of cost on parking habits. Obviously an interview survey would be necessary to determine attitudes. I can but observe that the price of \$1 the the first hour's parking on Washington Street might not be worth the very limited time saved. But on the other hand the energy expended and frustration experienced looking for a street parking space might again not be worth the time. All in all time and cost factors tend, I feel, to make one consider not driving into Boston at all, rather than to choose between the lesser of two evils.

3. PHYSIOLOGICAL ASPECTS OF THE SEQUENCE.

(a) Congestion.

Boston like all large cities suffers from congestion. Indeed because of the narrowness and complexity of its street system, she probably suffers more from it than most American cities. Now I am not going to try to define specifically what congestion really is, or how many cars on a street of a given width causes congestion or even at what stage it becomes tolerable or intolerable. What I will say is that there were sufficient cars and pedestrians on Boston's downtown streets to affect my experience as outlined in these sequence studies.

The effect of traffic density on driving time I have already mentioned, and noted that it takes about as long to drive as walk along some of Boston's streets. But even when walking we are not entirely free from the effects of congestion. There is such a thing as pedestrian as well as car congestion, and anybody shopping in

Washington Street appreciates that. This also has bearing on walking time. The distance walked in sequence four is twice as long as sequence two or three, but, because much of this is across the Common rather than along Washington Street, the actual time taken is not twice as long.

Perhaps more significant than actual time is the psychological effect of congestion. To me the difference between not driving and driving up Washington Street is much more than simply the saving of a few minutes in time. It is rather the avoidance of over-strain and over-concentration in trying to deal with the intolerable barrage of signs, cars, and pedestrians. Washington Street subjects one to an overload of communication and activity, which makes the journey seem much longer than it actually is. Indeed I was constantly surprised when checking the times on the surveys, at how short the trips were.

From the point of view of congestion, therefore, sequences three and four are infinitely to be preferred. The reason for this is simply that by not driving right into Washington Street the worst area for congestion is avoided.

(b) Safety

Part of our physiological experience of the sequence is our sense of safety whilst travelling along it. In general our concern for safety is going to be aroused by two factors, the physical condition of the environment (the road surface, the slopes, the bends, the blind curves and so on) and the type and intensity of the traffic. On the four sequences any concern about safety occurred mainly through the latter,

and the worst example was in Washington Street itself. The sense of a lack of safety whilst moving along it either as a pedestrian or a motorist is always with you. The pedestrian is continually being jostled off the sidewalks and on to the road, and is forced to keep his eye open for cars. Likewise the motorist is constantly aware of the possibility of a pedestrian stepping off the sidewalk in front of him. The narrow streets, the narrow sidewalk and heavy traffic all contribute to this general feeling of uneasiness.

Safety is also a matter for concern within the parking facility itself. Personal safety does not become a major consideration when parking in the street or using the attendant park elevator garage. It does become a problem in any driver park facility. The grade lot in sequence two made no provision for pedestrian movement in the lot. This is standard practice, so much so that we tend to take the situation for granted. But picking one's way through a sea of parked cars, whilst not nerve shattering, forces one to be fairly careful. Certainly some form of demarcation on many of these lots would be beneficial, and particularly so in the Boston Common garage where the pedestrian seems in permanent danger.

(c) Micro-climate.

The effect of climate on these sequences can be important. This, in reality, is nothing more than saying that our use of the city is effected by the weather. If it rains, we try to avoid walking as far as possible. If the roads are icy we might choose to take the subway

rather than drive. These are decisions we make all the time. Yet, if we think about it, few cities have ever made any effort to deal with the problem.

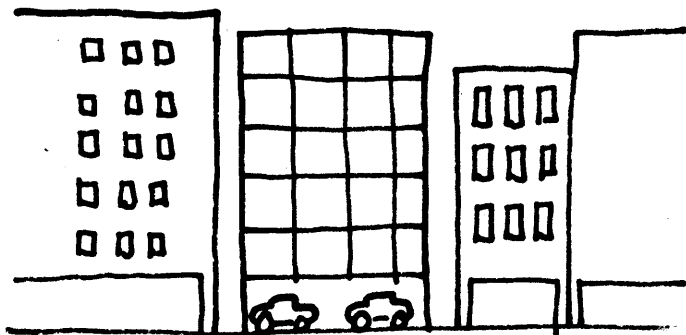
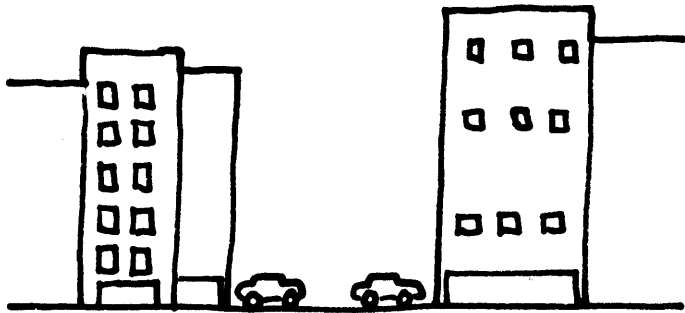
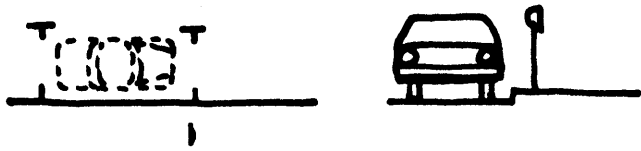
If we look at the four sequence studies it is clear that it is when walking rather than driving that we are most likely to be affected. True, of course, snow and ice will impair driving conditions but this is more of a problem in outlying areas than the central city. In all four sequences the walking distance would make the trip unpleasant if it were raining. The choice would become weighing up the lesser of two evils. Namely whether to drive in and walk a thousand feet in the rain to the destination, or take public transport and, perhaps, endure waiting for a bus in the rain.

The worst sequence of all as regards climate is the Boston Common Lot. In the summer it is quite pleasant to walk across the Common to the shops. In winter it is not only unpleasant, but frequently impassable. To my mind this places a severe deterrent on using such facilities, located some distance from the shops or requiring the crossing of a widely exposed area. The Boston Common Garage overcomes this problem to a certain extent by running a free bus service to Tremont Street. But the saving in exposure to the weather must be weighed against the extra length of time this takes.

4. FORMAL AND VISUAL QUALITIES

(a) Sense of progression and identity of parts along the sequences.

Since the sequences analysed involved travelling down a number of different streets and intersections, we must expect a certain number of abrupt changes of character and form. But accepting this, it does



not mean that there should not be some overall structure, some overall sense of purpose and direction in our movements. We are, in fact, driving into the city's centre and we should expect an increase in building size and intensity as we move in. This does in fact occur on all the sequences. On the main approach we see the whole skyline of Boston when crossing the bridge; we experience driving alongside the city on Storrow Drive, and on turning off, we find a sudden change as we enter the densely built up residential section of Beacon Street. Along Arlington and Boylston Streets we find the actual building bulk remains constant, but the activity increases. Finally, Washington Street itself possesses unmistakable formal qualities of its own. The extremely confined nature of the space, the activity, the signs all add up to something unique and identifiable. In the formal sense, therefore, the sequences are generally satisfactory.

(b) Formal clarity and identity of parking facilities.

The four parking places examined provide a contrasting range for comparison. The street parking place, in its simplicity, is identified by the parking meter, the white markings on the road, and by the parked cars themselves. The two lots on Washington Street illustrate the comparative visual clarity of two different facilities in a highly built up area. The elevator garage is a tall structure and merges to a considerable extent with the surrounding buildings. In short although bulky, it does not dominate. The only factor that contributes to its prominence is the fact that it is set back from Washington Street. The other parking lot is a grade lot fronting directly on to Washington Street, and surrounded by buildings. In a sense it becomes quite

prominent, the only drawback in this particular instance is that it is on a curve in the road and cannot be seen from Washington Street until one is right up to it. Generally, however, the grade lot set amongst a group of tall building and fronting on to the street will be fairly prominent merely by contrast.

The Boston Common Garage, being underground, has no visual clarity from the outside. The only features visible are the entry ramps and exit boxes on the Common. It is however the only parking facility I studied that is really appreciated as a space. To use it is to experience some harsh contrasts. The ramp takes you from the outside and down into a dark, not particularly well lit space, but which is very large in area. The next contrast, perhaps even more powerful is upon emerging from the garage and on to the brightly lit wide open space of the Common itself.

Conclusion

From these surveys it is not possible to state categorically that one sequence is better than the others in all respects, though it may compare favourably on one or two points. And it is clear that no sequence is ideal or so free from criticism that it can become a model for the design and analysis of other sequences. What we have learned, however, is roughly where the main problems are and which are the issues we should deal with first.

Basically what these studies show is that to park in Boston is a confusing, time-consuming and frustrating experience. If we decide to drive in by car we might possibly get lost, we will experience varying degrees of traffic congestion and we will have to walk some distance to our destination. To drive into the city, locate one's destination and park one's car is perhaps of secondary importance in the context of the trip as a whole. Yet the large amount of effort required to carry out the trip makes the minor event a major consideration. In fact we concern ourselves so much about the difficulties of parking, that the trip to downtown may never be made at all. Instead we choose to shop where the parking and effort will be easier. If we look at the sequences on each, points of disorientation were experienced. The cost of parking was high in the two Washington Street lots and less so at the Common. The cheapness of street parking is of little avail if it is difficult

to find a space free. The time taken varied from sequence to sequence, but in all of them the distance walked was more than the 656 feet put forward by the Eno foundation as a mean for a city of Boston's size. Congestion was experienced on all routes, though to a lesser degree on sequences three and four. The problem of safety was latent rather than overt, although along Washington Street one has to take extra precautions both as a driver and as a pedestrian. Finally the climate could adversely affect our experience on the walk between parking place and destination.

Turning to the three variables I put forward for analysis, I have shown, in a perhaps grossly oversimplified way, that familiarity with the environment can lead to savings in time and distance travelled, and also avoidance of congested routes (sequences three and four are better in these respects than one and two). In this context familiarity means knowing the best place to park and the best routes to take. But even a fairly regular visitor to Boston's downtown must find it confusing to use, and he would take some time to become completely familiar with it. What this situation implies is that the sequences should be structured so that virtually any person is able to find his destination and select a parking place with a tolerable amount of ease. We cannot make a person become familiar with a city overnight, but we can make the process of adaptation easier and quicker to achieve through sensible planning and design. And if we can do this, we are contributing toward that person's sense of orientation in the city.

If we are to think of improving the physical environment to make

the trip sequence to downtown easier and more pleasurable, the main variable is the location of the parking facility itself. What the four sequence surveys show is that by varying the location of the parking place relative to the destination we can cut down the time taken and distance walked, and we can avoid leading the driver into the more congested areas. In putting forward some possible solutions to the problem I will therefore concentrate mainly on the location of parking facilities in the downtown.

Also important is the type of parking facility itself, and the four examples I studied all display some advantages and disadvantages. From my study I could not determine any correlation between the type of facility and the ideal location for it. This, I feel, is going to be dictaged^x by factors outside my particular criteria. The price of land and its availability, the balance between capital investment and running costs; in general it is these more economic factors that will determine the actual type of facility chosen. What I can do, however, is to discuss some design considerations that bear on the criteria put forward in this thesis.

I have established a framework for analyzing the sequences, and I propose to stick to this same framework in outlining some proposals for the location and design of parking facilities. In fact all I am really doing is turning what I originally hypothesized to be possible criteria for investigation into definitive criteria or objectives for design. In each case I will put forward some "ideal" design solutions. My answers are going to be uneven. Some through lack of data which can

only be acquired by further research, others because the range of "solutions" possible is indeterminate and hence I can quote but a few.

Now my basic trouble is that I am dealing with an extremely large problem in a brief and rudimentary way. I have analyzed four trips into Boston and described the strengths and weaknesses of each. The difficulty is that in recording and analyzing what I perceive along one sequence I am doing much more than just set the framework for another parking study. The difficulty with trying to analyze the "sequence" of a shopping trip to downtown is that in detail it is extremely complex. We cannot in reality talk about one sequence because there are so many alternatives and variables to consider. The route to downtown is not a single one, but a whole network of streets in which the driver can pick and choose his way around at will. We cannot talk of one destination because there are hundreds of them, scattered all over downtown, and similarly numerous parking places to serve them. Likewise the experience of the trip is going to vary, not only from person to person, but also with the particular attitude or mood of each individual at any given time. We might drive the same road every day, but each day our experience will be different. Something, it may be the traffic, the weather, a bad temper, is going to affect our appreciation of it.

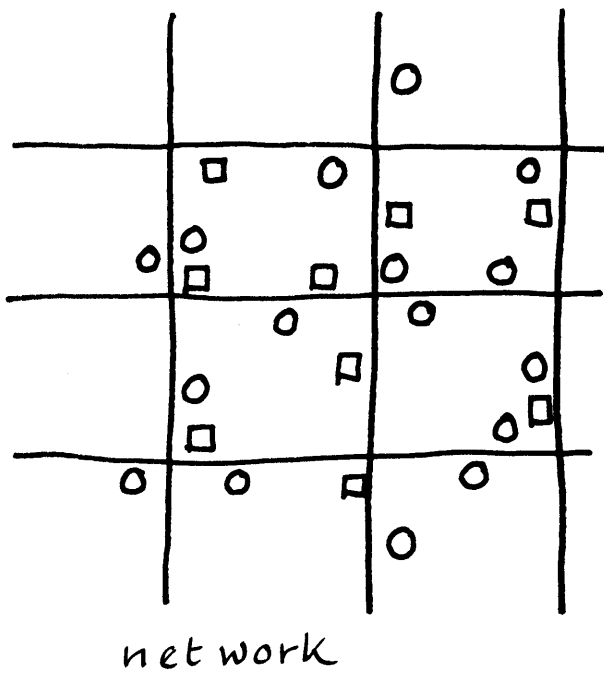
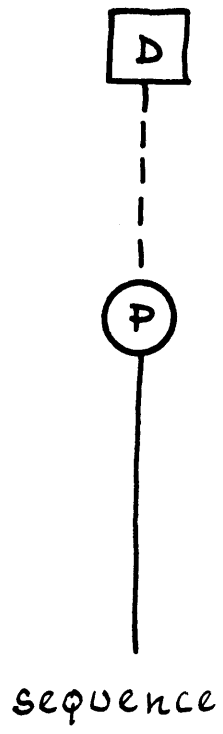
Then the features of the environment I see are controlled (or not controlled) with many other objectives in mind as well as ease of movement and parking. If I looked deeper into building forms I perceived, I would soon run into the whole question of zoning. If I looked further

into the visible activity I saw, I would have to deal with land use planning. If I wondered why there was so much traffic in one place or why the one-way road system was difficult to comprehend, I would have to consider the transportation network. In short to deal with one's perceptual experience in the city as I have done here is to deal with the city itself. This is at once both a fundamental weakness and strength in this approach. One is able to coordinate many elements into one experience, which is fine for analysis. But when it comes to designing or controlling these various aspects it becomes far more difficult.

A further limitation, in my study, is that I have not studied all aspects of the parking problem. I have widened the problem by embracing more aspects of a person's overall experience when parking, but, in so doing, I have left out a good many other considerations that would be essential in a parking study (see appendix). Similarly I have not made a comprehensive and detailed analysis of all Boston's parking and transportation needs. This was a question of time, for without these necessary limitations a book could have been written on the subject.

Even considering these limitations it is still possible to put forward several worthwhile design proposals based on this survey. In fact the majority of my suggestions deal with the location of parking facilities in the city, a design problem which the current literature on parking handles in a different way. But as a consequence of these limitations my proposals are more general and theoretical rather than specifically related to Boston's own problems, although the experience in Boston is always used as a basis.

THEORETICAL SOLUTIONS



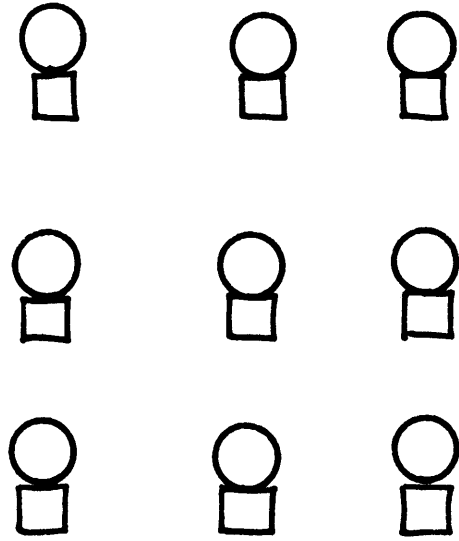
Some principles for the location of parking facilities in the city.

In putting forward ideas for the location of parking facilities in the city I shall relate my designs to the criteria I have used to analyze the four sequences, and base the design proposals as far as possible on conclusions drawn from my survey.

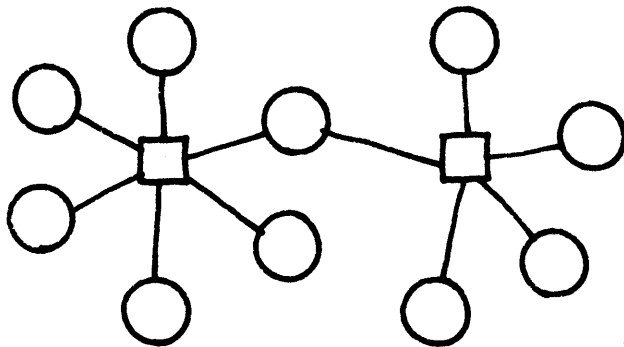
1. ORIENTATION

The objective is to locate the parking facilities and structure the sequences so that a driver moving along one of the main approaches to the town is aware of his own location, the location of his destination and the location of a place to park. Also, having parked, he must be able to proceed from parking place to destination without confusion.

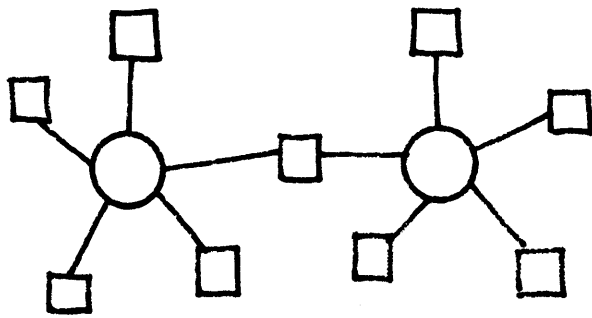
The essential problem, as I see it, in designing well-oriented sequences is to establish "links" between the destination, the parking place and the driver. These links may be a street, or visual contact between destination and parking place, or simply good signposting. Now we can structure the links in two ways. We can conceive of them as sequences which we experience. This indeed has been the basis of this analysis. But we can also see them as a network of streets, parking facilities and destinations arranged as a pattern in space. The former is essentially the structuring of our actual experience along a route, the latter is the arranging of routes to form a functional pattern. I will discuss each of these design approaches separately,



parking and destination attached



destinations served by a number of parking facilities

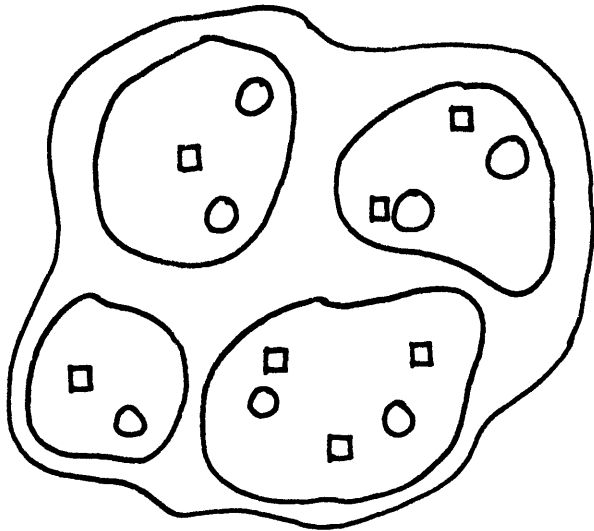


parking serving a number of destinations

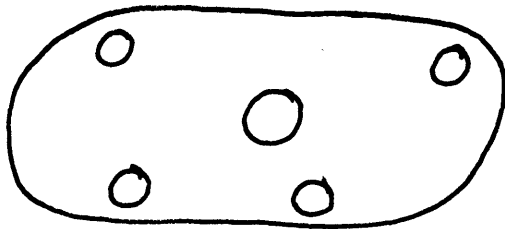
but I don't regard them as independent at all. Indeed any number of sequences will form a network of sorts, and a network in turn will be experienced in terms of one sequence at a time. Posed as design concepts, however, the two can lead to different approaches to solutions and for this reason I choose to separate them.

(a) Patterns of Location in a network.

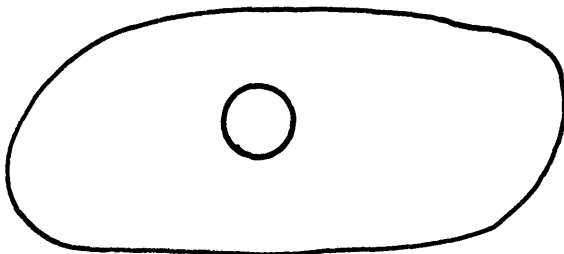
Let us start first of all with the idea of relating parking place to destination in some rational pattern. Ideally we could conceive of a city in which each destination (or building) had its own parking lot. This of course would solve the question of the journey from parking lot to destination. But in the central city would be impossible without drastic rebuilding of streets and structures, and a lowering of densities. In general therefore we must accept that a parking facility will be serving a number of destinations, and that a destination will, in turn, be served by a number of parking lots. What we have to do is to structure this arrangement so that the connections between the two elements are clear and readily understood. How can we do this? Thinking back over the sequence surveys, I pointed out that the progression of steps through which we orientate ourselves whilst driving into the city leads from identification of the whole (downtown) through the identification of the smaller parts (destination and parking). In Boston we can think of a hierarchy of parts from the whole downtown area (the skyline we see from the river); then the different areas, (Government Centre, Finance District, Prudential, Washington Street shopping district and so on); and below these the different streets or blocks which form parts of an area.



parking facilities serving destination areas and specific destinations



parking facilities scattered in one area.



one parking facility serving an area.

It is clear that our destination is not likely to be downtown as a whole, but some part or parts of it. The parking facilities could serve these different parts: the main areas, the streets and certain key destinations. This suggestion is fairly straight forward, and is really the situation in most cities today. The only trouble is that the relationship between parking place and the destinations served is generally not made clear, and nowhere is this more apparent than in Boston. If such a system is to work, the organization of it should be clear and identifiable, the parking facilities should also be identifiable and be connected in some way with the destination.

What this means is that, taking Washington Street for example, there should be a number of parking facilities that clearly serve this area. Basically I can think of two patterns for doing this, by dispersing the parking places in the area or by concentrating them. The dispersed pattern is harder to structure in one's mind, but it might lead to a closer identification of the individual destination with one of the parking places. Concentration of the parking into one large lot would greatly simplify our image, but it could lead to extended walking distances to the perimeter of the destination area.

A further important design requirement at this scale is to relate the parking facilities and the destinations to the main street pattern. One of the troubles with Boston at the moment is that not only does she not have a clearly articulated system of streets, but the parking lots are frequently situated in obscure, unobtrusive backstreets. It should be possible to determine the main approaches to the key downtown areas and have a policy for locating the parking places to tie in with these.

(b) Design of sequences.

If the proposed breakdown of destination areas and related parking facilities could be carried out as a policy, then the structuring of the sequences themselves should reflect this. We should be able to drive into a re-structured Boston for example, recognizing first the downtown area itself and the key landmarks which would help us identify the different areas. On turning off the expressway we should by a variety of means (signs, landmarks, activity patterns and so on) be able to identify where we are and the direction in which to go. We would be led easily to destination area which we are aiming for. Now it is at this point that some design problems arise. I mentioned earlier that the parking facilities could relate to the destination area. And this could be fairly easy to achieve. We could continue our journey into Washington Street and locate a parking place which, we are informed, serves the Washington Street area. But the problem is that even though we are in the destination area we still have to locate the destination itself. A further problem is that the parking place serving the area might not actually be in the area itself. Somehow the connection between parking and destination must be made. Let me outline a number of ways this could be done.

(i) Parking attached to destination.

I have spoken all along of the parking place as the point at which one transfers from one mode of transportation to another. This makes it essentially an intermediary point along the sequence, a point at which one spends little time. It symbolizes change and passing through.



transfer



arrival

They parking place is always a transfer point by definition because one has to transfer from one form of travel to another. But, in spite of this, a parking place can symbolize the feeling of ARRIVAL rather than TRANSFER. For example, if the parking facility is attached to a building it becomes a part of it, and when you enter the parking lot you know to all intents and purposes you have arrived at the building. The psychological advantage of this over a transfer point is immense. Often parking takes place under the most trying of circumstances, yet to the user the situation is quite satisfactory. One writer has described just this experience.

....many people will walk great distances unhesitatingly if they think they are closer than they actually are. A man will park on the outer periphery of a huge parking lot at a stadium, thread his way among acres of automobiles to get inside the structure, walk up and down ramps, corridors and stairs, and wriggle his way between tight rows of seats, then reverse the process at the end of the contest and tell the folks back home he was lucky enough to park "right there at the stadium." The same man would probably refuse to shop downtown because the nearest garage is a block from the department store. Probably the visual link is a key here. ⁷

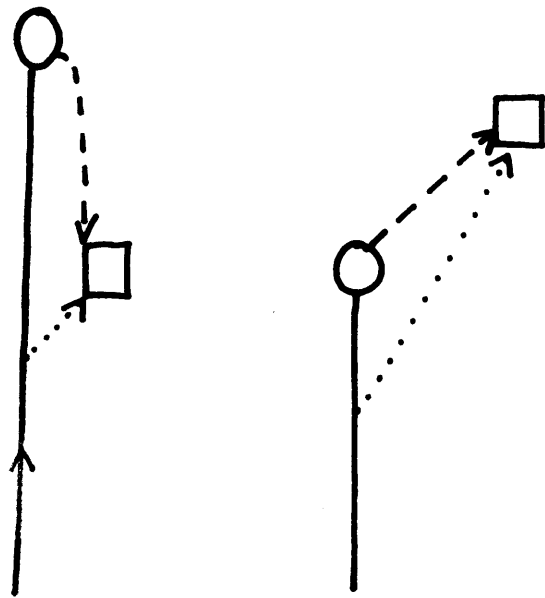
The question of the visual link I will deal with in a moment, but it seems to be that the real issue is the attachment of the parking lot to the destination and the sense of arrival one experiences as a result. True the parking place may be on the periphery, but it is the stadium parking lot, and that is enough to signify one has arrived at one's destination. It is just the same with large shopping centres. On a Saturday the North Shore Centre may be extremely crowded

7. Gerald Bresse, "Urban Transportation and the Individual", in Transportation Design Considerations, N.A.S. - N.R.C.

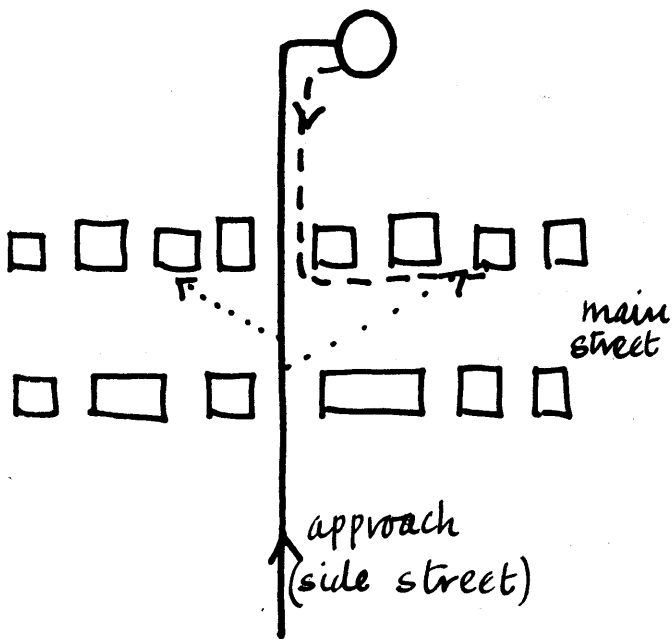
and the distance from where you can park your car to the shops themselves maybe quite great. But no matter, you have arrived and that is the main thing.

Ideally, we could argue that the orientation problem could be solved if all parking places could possess this quality of arrival, if parking and destinations could be related in such a way that the arrival at one implies arrival at the other. An example of this would be a street in which you could park your car in front of the shop you wanted to visit, rather in the same manner that the cow puncher would hitch his horse to the rails in front of a shop in a town of the old west. The trouble with a solution like this is that there would be too many cars, not enough space in the streets to park them and, inevitably, congestion. No, thinking about parking in the downtown means thinking inevitably of off-street parking, and frequently multi-storey parking at that. It also means thinking in terms of a parking place serving a destination area and not just one particular building.

The sequence surveys give us a certain clue as to how effective this can be. The two parking lots in Washington Street both have this quality of arrival to a limited extent, and there is little doubt in one's mind that they serve that area. If we can create this sense of contact between destination area and parking, then an advance will have been made. One can mention, in passing, the Boston Common Lot which possesses no sense of arrival at anything in particular, except, of course, the Common itself.



visual connection



(ii) Visual connection.

In most cases we will find that the juxta-positioning of destination and parking facility is not going to be possible. But there still must be a connection between the two. One way to achieve this would be to provide a visual link between parking lot, destination and driver. This is not quite the same as the sense of arrival I was aiming for earlier. True to achieve a sense of arrival a visual link is necessary, but to establish a visual link does not always mean there will be a sense of arrival. To park at the nearest parking lot to a store which is visible a block or so away does not by any reckoning stimulate a sense of arrival at the store, even though we know it is the nearest parking place.

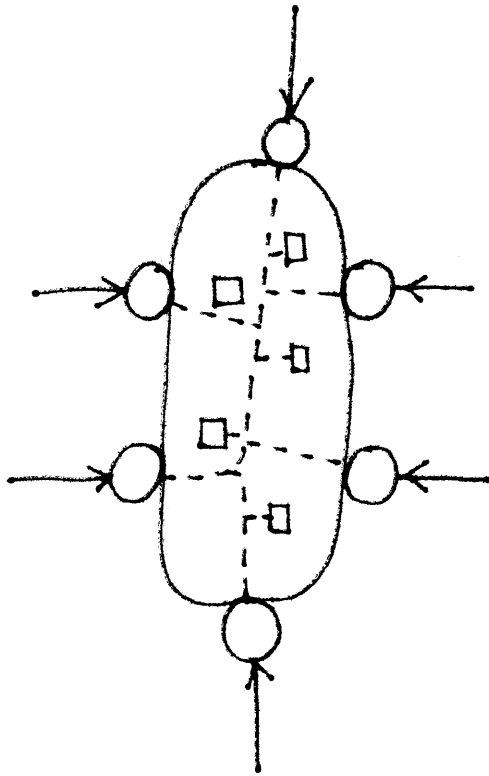
To achieve a visual link, one sequence might be to take the driver past his destination, on to a parking place, and for him to retrace his steps as a pedestrian. This is just what happened in the first of my sequences. The problem of everyone having to travel down the main street to do this, could be avoided by approach sequences which crossed the main shopping street, allowing views for a short instant of the shops, and then leading the driver on to a parking facility up a side street. This technique could be extremely effective in many ways because it places the parking off the main shopping street and on to the side street, where land is cheaper and the visual impact of the parking would be less drastic. The driver who did happen to be proceeding along the main shopping street would probably have to be informed of the parking places down the side streets by some other method.

Another technique would not necessarily require the channelling

of the motorist past the destination, but simply the provision of visual access to both destination and parking from the approach road more or less simultaneously. I cannot help thinking, for example, that if we could see the Washington Street shopping area from the approach road at the same time as the Boston Common parking garage, that facility would be much easier to use.

In short, to establish a visual link between the main elements would surely make a sequence clear and understandable. Though whether we can always achieve this in existing cities without rebuilding is debatable. At the best it must remain a guide to influence design whenever rebuilding does take place.

There is one problem that occurs to me here. Assuming the driver knows his destination is a distance ahead, and at the same time he sees a parking facility near at hand, what is to tell him that that parking lot is the one for him to use? How do we know the driver won't take a chance and try to get closer to the destination? One thought is that parking should relate to their destinations in some way, short of joining the two together. Perhaps some architectural feature or sign could be common to both. We could also think in terms of parking lots for the exclusive use of shoppers and others for office workers. But this would require some radical re-structuring of the existing situation, and the requirement, perhaps, that each shop or office should provide adequate parking for all its customers. Somehow I do not think this is possible in most C.B.Ds. and I would argue that we must accept the current situation of parking facilities serving a number of different destinations.



parking on the perimeter of destination area; pedestrian links only to destinations within.




To resolve the problem of the driver's choice I would fall back on a sign that would inform him that the parking facility was the only one serving the shopping area.

(iii) Path linkage.

Quite often a visual link will not be possible or desirable, and the problem then will be to make a connection between destination and interchange in other ways. Perhaps the most obvious would be to use the actual paths themselves to structure our orientation. Supposing, for instance, all the destinations and parking facilities downtown were grouped around pedestrian flow channels, we would then know that all we had to do was to park our car at any parking place and that we could walk from there easily to our destination. The connection in fact is not visual, but through the path system. This is the principle that pedestrian malls, shopping centres and other proposals for traffic segregation work on. But the paths need not necessarily be segregated. If we parked on a street, and the street had some indication that it would lead to the destination, then a connection would be made.

(iv) Signs and Symbols.

A further way in which we can make the connection between parking, destination and driver is by signs. Road signs are of course a familiar sight to any motorist. He is virtually conditioned to using them wherever he travels by car; we shouldn't balk at using them as part of our design. But I also want to discuss signs in a much wider sense than just a notice on a post or wall. Before I do this however let me first discuss briefly the pros and cons of verbal signs or notices.

The first thing we must ask ourselves is what we want the sign to do. I gave the answer to this at the beginning of the thesis when I stated that to be fully orientated we should know roughly where we are going to and how to get there. A sign should inform us of both these facts. To certain extent the signs we have in the city or along the highway do this already. The road number sign  tells us on which road we are travelling; the destination forewarning sign  tells us we are heading in the right direction; the indicator sign  tells us which road to take at a junction, and so on.

On the highway the signs are usually fairly clear and standardized. In the city this is not always the case and Boston is a particularly notorious example of incomprehensible signing. The indication of parking facilities, being generally up to the private owner, is even more haphazard. All too often we find badly signed parking places which either give us the information too late to be useful, or misinform us. I found, for example, a few instances of parking facilities tucked around the back of buildings with only an inconspicuous sign to direct us, with the consequence that I passed it before realizing what it signified. I also discovered misleading signs that boldly stated the Washington Street was only two minutes walk away, when it turned out to be a good ten minutes.

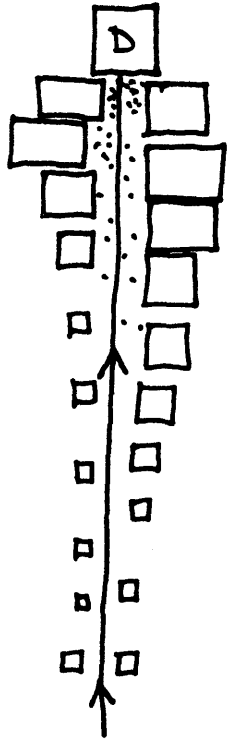
In our case we want the signs to indicate two things, the destination and the parking facility. In addition the signs themselves should be of two categories: the "directive" sign that forewarns us or guides us to our destination, and the "rooted" sign that identifies the destination

signs to be designed (p. 100)

when we arrive there.

Now the number of individual destinations in the downtown are immense and we obviously cannot expect everyone of them to possess a directive sign. But we can adopt my earlier proposal to break the area into specific destination districts, to which we are guided. In Boston we could expect signs to the Washington Street Shopping district, Government Centre, financial district, markets and so on. And most important, these districts should also possess rooted signs that will tell us when we get there. This latter point seems to me vital, because one of the major weaknesses in nearly all cities, and Boston particularly so, is that we often find ourselves following signs to a given destination, with no sign at the destination itself. This is not only confusing to the first time visitor, but to any long time resident who finds himself taking an unfamiliar route in. A further piece of information that would be valuable to have on directive signs is some indication of the distance the driver has to go to get to the destination. This would be particularly useful in assisting the driver to choose a parking place. For instance, to see a sign stating that Washington Street was 300 feet away simultaneously with a sign indicating a parking lot just ahead, would give the driver how far he would have to walk on to reach his destination.

The signs to parking facilities should again be both rooted and directive. They should also tie in with any signing scheme for destinations. For example, if one sees the signs to the Washington Street area it should be possible for garages to indicate that they serve this area.

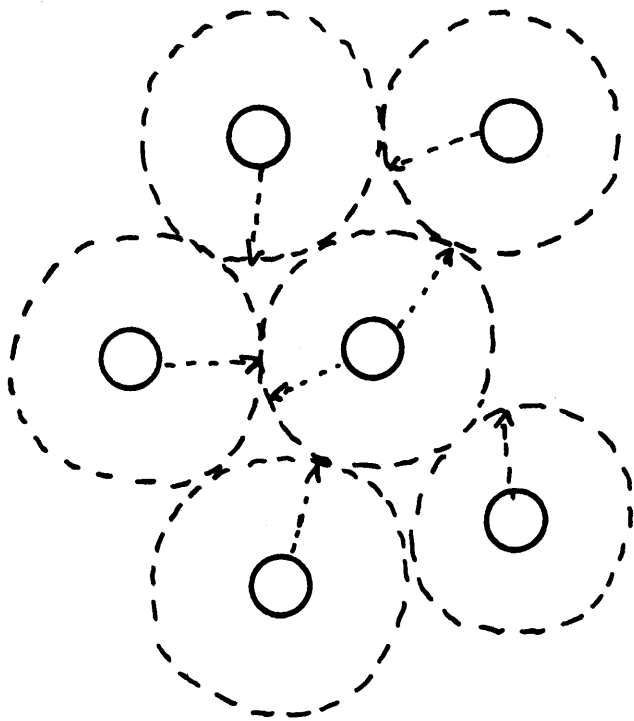


intensity of activity and
buildings increases as
destination downtown is
approached.

And I have already mentioned the necessity for good signing to direct a person to parking that is located out of view, off the main street.

Now I have spoken so far only of the word sign as meaning a verbal or visual notice, but it is possible to think of signs in another sense, as a trace or clue indicating something. A light on in the window of a house is a "sign" that someone is at home. We don't see the person himself but deduce it on the basis of previous experience or logic. It seems to me that much of direction-finding in the city is based on our interpretation of unexpected and subtle signs in the environment. This might be a case of excessive deviousness on my part, but it is conceivably possible to use devices like this to reinforce the sequence structure. In my sequence using the Boston Common Parking Lot I found that the bandstand in the Common was vital for my orientation. So what, you may argue, it was only a coincidence. But coincidence or not, it worked, and it might be possible to use similar signs to act as landmarks to guide and orient us.

One of the requirements of a sign in the context of this discussion is that it forwarns us, forwarns us that is of a destination or parking place. We might therefore structure the main sequences into downtown so that certain cues tell us we are approaching our destination, or that it lies to the left or right of us. We are dealing with shopping. Proceeding along a road leading into the centre we might experience a gradual build up in the intensity of activity, shops, shop signs until the climax of the main shopping street is perceived. I think this process occurs already along the Boylston Street sequence into Washington Street.



distribution of parking facilities
based on optimum walking
distance

The signs or views of shops up a side street can tell us that the main shopping area is off to our left or right.

It is easy enough to talk about such "signs" in describing the existing environment, but it becomes more difficult to realize them in actuality. My feeling on this is that the major step forward is the realization that such courses are open to us anyway.

2. DESIGNING FOR ECONOMIC CRITERIA

In considering designs I am not going to discuss the question of the cost it pays to park. Although I feel this does dictate to a considerable extent our choice of parking place, I cannot consider it here because it is affected by many factors over and above those I have examined.

What does influence the ideal location and design of parking facilities is the question of time/distance. I have not, as I admitted earlier, been able to arrive at an optimum time/distance between destination and parking on the strength of my survey. No sequence was ideal, but the two easiest were certainly those in Washington Street. The only standards to work with here are the walking distances outlined in the Eno Report on Parking. In general, however, the objective must be to locate parking as closely as possible to all destinations.

Thinking about parking location patterns it is clear that the abstract ideal would be a distributed pattern based on optimal walking distances, each parking facility serving a given area. Because of the varying parking space requirements of different areas in the city, the

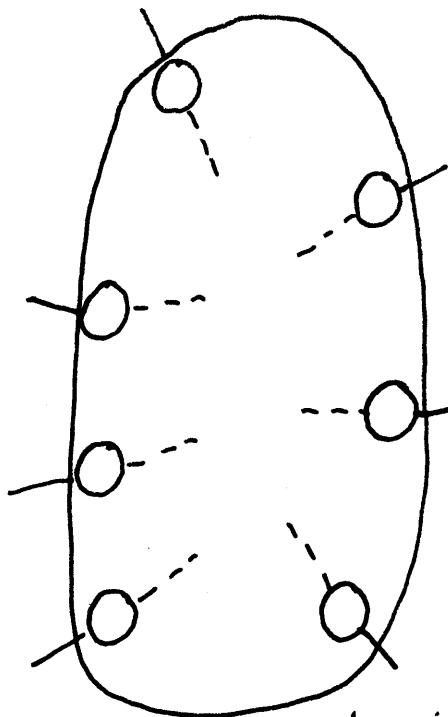
size of the facility could vary with demand. Needless to say in practice this ideal could never effectively be attained. Land availability, cost, special topographical and site problems will always have the last word. Nonetheless it can be an ideal towards which the designer can work.

Turning to sequence design, my survey has shown that the weakness of sequence one, is the extra time/distance involved. For optimum time/distance therefore we should park short of the destination, or better still park at the destination itself. Parking short of the destination, however, runs into some conflict with the ideal of good orientation, in which cases it would be necessary to implement some of the proposals for signing and visual contact that I have put forward.

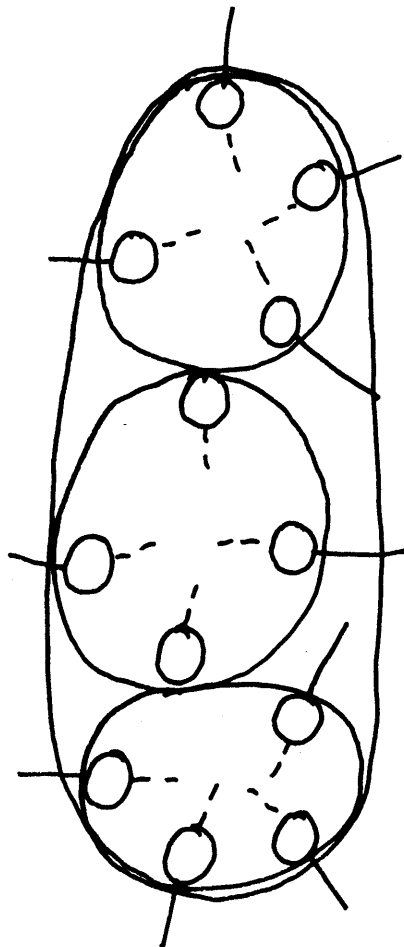
3. DESIGNING FOR PHYSIOLOGICAL CRITERIA

(a) Design to minimize congestion.

It is difficult to put forward any definite principle for the ideal location of parking facilities to minimize the traffic congestion experienced. Congestion after all has different causes and effects in different cities. My basic, perhaps slightly naive and obvious, conclusion arising from the sequence surveys is that the farther into the downtown one proceeds the greater the congestion. In consequence, a possible pattern could be one in which the parking places are located on the perimeter of the main downtown. This would concur, in theory, with the proposals for minimizing time distance. The one problem here is that the downtown covers a fairly wide area, at least in large cities. This means that it would be impossible to locate all parking around



parking around perimeter
of downtown.



parking around perimeter
of sub-areas in downtown.

the perimeter, simply because the distance from there to possible destinations downtown will be too great. Some efforts to avoid this make use of additional transportation to take drivers on into the centre after parking (see Gruen's plan for Fort Worth). This makes the journey to downtown unnecessarily complex and time consuming. A compromise solution would be to take the concept of destination areas and locate the parking on the perimeter of these. This would cut down, though never eliminate, congestion. A comparable situation in Boston would be to locate parking facilities around the perimeter of Washington Street, thereby syphoning off most of the traffic and avoiding it entering Washington Street itself.

(b) Climate Control.

I have a feeling that our attitudes to the weather in the city are going to change. The conditions in which one shops downtown are sometimes appalling. As I pointed out in my survey, all four sequences would be unpleasant in the rain considering the distances to be walked, and to walk from the Boston Common Lot in winter across the Common would be intolerable. It is small wonder that the downtown has lost so much trade to the outlying shopping centres. A start toward meeting the problem would be made if the walking distance between destination and parking place could be cut down, as I have already proposed. But other more bold solutions might have to be sought. The most straightforward could be the use of covered sidewalks.

4. FORMAL DESIGN OF SEQUENCES AND PARKING FACILITIES

In discussing the visual design of sequences I am deliberately avoiding any reference to the more abstract formal qualities that the authors of "The View from the Road" go into. I am doing this not because I think this approach has no merit, but simply because to do so would mean repeating the same ideas that they have been more than competently put forward. What I want to do is discuss the formal design as it relates solely to the more purposive or functional aspects of a trip. In other words I will put forward some design ideas with the general aim of making the process of locating destination and parking place more easy, rather than emphasize the aesthetic or pleasurable aspects of the sequence.

At the level of city form what we want is an imageful layout in which the various parts are identifiable and relate to each. I mentioned earlier the concept of a city comprising a number of destinations areas within which are located the more specific destinations (buildings and streets). What we want is a formal pattern that can reflect and be congruent with these areas. Boston, to a considerable extent, possesses this quality already. She has a number of highly articulated, easily recognizable areas often heightened by prominent landmarks. Beacon hill with the state house, the finance district with the custom house tower, the Prudential Centre and tower, and, shortly, the government centre with its clustering of tall prominent buildings. The trouble with Boston is that there are many areas with an imageless character, but worst still is the incomprehensible and complex road network, that

rapidly undoes any clarity that we find in the main areas. A modified or restructured street network together with some strengthening of the visually weak areas would help considerably. Aside from the street replanning, such proposals are essentially longterm. We cannot clarify Boston's image overnight. So generally I see plans such as this implemented by zoning, bulk and density controls, which over a period of time could ensure a certain consistency in each area.

This clarification of form could and should be reflected in our experience along any of the main streets. A drive into the centre would take us through a series of identifiable areas. And as we proceed in the intensity of activity and form would increase as we near the centre. Again these improvements would be effectuated over time. More immediate action to improve the main sequences could focus on details such as the improvement of confusing intersections. More often than not this might mean better signposting. Occasionally more drastic rebuilding might be necessary, particularly if an intersection were dangerous or congested as well.

The Design of Parking Facilities

Although one of the variables I proposed for analysis was a comparison of different types of parking facility, I am not going to discuss in any detail their actual design. In the first place my survey did not bring up all the necessary data, which was not expected of it anyway. And, secondly, the subject is well covered by a number of books and periodicals. (see bibliography). I can add little to what they say. The choice of type of facility and its design is going to be the subject of many more considerations than I have been able to go into, as I have already mentioned.

There are, however, a few observations I would like to make about the design of parking facilities relative to the sequence as a whole, and particularly to the question of orientation.

A parking facility, I have stated, should have identity from the outside and clarity from within. Put more precisely, we should be able to recognize it as a parking facility from the outside, and understand how to use it and where to go once we get in. These are fairly obvious requirements, but from my experience at the Boston Common lot, they are principles that designers find it hard to adhere to.

Visual identity means first that in designing a parking lot we should make it look like a parking lot. Following the functionalist tradition in architecture we should be led to such a solution inexorably.

Unfortunately this does not always work out. A passionate dislike of a sea of parked cars sometimes leads to attempts to disguise the parking lot completely. In fairness to the design there are immense visual problems in designing a parking facility, whatever type it is. But it is possible to design a structure which looks like a parking garage and still presents a tolerable exterior. Some of the multi-storey garages in Boston, Paul Rudolph's in New Haven and M.I.T.'s new garage are some examples.

The identity of a parking lot is further going to be affected by the surrounding buildings. A small grade lot off a large wide expressway will hardly be noticed; but a gap in the street frontage of tall buildings will stand out in contrast. Conversely a tall multi-storey garage might be readily visible from the expressway, but place it amongst similar tall office buildings downtown and it will hardly be noticed. Now I do not mean to argue that downtown should be littered with grade parking lots because they are more easily seen, but simply that we should be aware of the general visual characteristics of the different parking facilities. Where parking lots are virtually invisible (Boston Common) then attempts should be made to ensure that something informs us of their presence, if only a sign.

Designing for internal clarity is a harder subject to discuss, since the responsibility lies with the architect and not the planner. But there are some points that should be raised. One is the question of pedestrian and car circulation within the parking facility. This never seems to be thought out very well, and, in the case of the Boston

Common lot, is fairly chaotic. Even leaving the question of safety out, it would seem necessary to have flow channels for pedestrian and cars clearly delineated simply for orientation. What is also vital is to relate the pedestrian and vehicular entrances and exits. The two need not be the same but one wants to avoid the complete lack of connection between the two that we find at the Boston Common.

CONCLUSIONS

In this thesis I have been doing two things. In the first place I have been putting forward a method for analyzing one aspect of our perceptual use of the city. Secondly, to test this method I have related it to one particular realistic "problem" the location and design of parking places. In trying to assess these ideas there are two questions I propose to answer. First, what are the more realistic implementation implications of the actual proposals and criteria for parking that I put forward? Secondly, is this concept of sequence analysis a valid idea for research and/or design at all?

1. Implementation.

In analyzing parking as part of a sequence we experience, I am embracing many more issues than just that of parking. The effect of doing this is double-edged. From the analytical standpoint to do this is a good thing. Parking is not treated in isolation, but as part of something much wider. And in relating the actual process of parking to a perceived system of movement, I am placing it in a more comprehensive context involving not just the location of a given number of parking spaces at a certain point, but the questions of cost, time, relationship to traffic and so on.

As I mentioned in my survey conclusions, the trouble with this approach is that when it comes to design or implementation, the breadth of scope becomes a possible disadvantage rather than advantage. To

improve the sequences in the same terms that I have analyzed them would require coordinated planning on a large comprehensive scale. This means that any public policy based on some of the solutions I have discussed would include such aspects of planning as land-use, transportation and highway design. The usual plea that is frequently heard, is for parking to be related to an overall transportation plan. I am suggesting we go a stage beyond this and relate it to policies for the city as a whole. An argument that is easy to say and much harder to effectuate.

My feeling is that any policy for handling the subject would be done at two levels. The first would be general strategies with the emphasis on controls and long term planning. These would cover such concepts as the visual clarification of areas; a policy for the co-ordination and design of major landmarks; the long term restructuring of the transportation system; and a policy for the location and control of parking facilities. In sum the strategy would be to deal with those features that cannot be changed easily and quickly. The second level would be a policy for more immediate, short-ranged and specific actions. In Boston's case, for example, I would suggest a plan for signposting based on the ideas I put forward earlier, which could be drawn up and implemented in a very short time. Further specific actions could be minor design improvements to existing parking facilities, where they obviously fail to meet some of the criteria; and proposals for minor street improvements.

Basically, if the wide ranging analysis can be used as a framework

for more specific proposals, then I do not feel the all-encompassing approach is a necessary disadvantage.

2. The method of analysis.

The basic concept behind this method is that if we are to design and plan we must go out into the field, examine and experience the type of thing we are trying to do. If we are to design streets, we must go out and look at streets. If we are to design parking lots, we must look at parking lots. Most sensitive designers do this anyway. But the significance of an analysis such as Lynch, Appleyard and Myer carried out in the "View from the Road" is that it was rationally conceived and carried out. And if this thesis is to have anymore validity than just a handful of sketches it must be through the theoretical framework behind it.

Yet analysis is but one rudimentary step toward creative design, and if it is to be worthwhile, we must be able to make this step forward. The authors of "View from the Road" did so, and I have tried to do likewise in this thesis. I have not, it is true, come up with a plan for Boston's parking, but I have arrived at a number of design ideas on which more positive proposals can be based. How far these are worthwhile is for others to judge, but the step toward design proposals has been made.

The significance of an approach to design that draws inspiration from direct perceptual experience is that it relates design, by its very nature, to the direct needs of the individual. I think this is an important point to grasp, particularly because so much design these

days is derived from the technical means of solving a problem, rather than any consideration for the more human aspects involved. Today, the majority of buildings, for example, I suspect are the result of an effort to co-ordinate structural, volumetric, service, and circulation requirements in the most efficient way; rather than an effort to create a pleasant habitable environment in which to live and work. It is because their efforts are directed towards a person's actual experience in the city that the work of Lynch and other has so much validity and potential for better design. All I have tried to do is to extend this approach toward solving a more mundane aspect of our life in the city, trying to find a place to park.

My biggest concern about this approach to analysis is that the output might not match the volume and intensity of the input; or put another way, that the amount of energy expended in doing direct research into the minute details of how we find a place to park might not lead to any better design solutions, than working intuitively from existing data. For if one was to logically apply the method of analysis I have outlined, to determine all the various aspects of Boston's parking problem the scope of the work would be enormous. I have only considered shopping; a complete study would have to examine other trip purposes. I have only taken one approach route into Boston; a complete study would require an investigation of all major approaches. I have only looked at car and pedestrian movement; a complete study would have to take into account other forms of transportation. One could add to this list indefinitely. In short, then, if this approach to analysis and design is to be useful

we must simplify its application. How can this be done?

The main point is that obviously we cannot survey in this manner the entire city. But there is such a thing as random sampling, and adopting this principle we can analyze a person's experience to determine problems and possibilities. In my survey, for example, I have omitted many considerations, but nonetheless you can still get an idea of some of the problems of parking in Boston.

Aside from determining problems, I think this analytical framework could be used for testing and evaluating design proposals. For example, in weighing up the advantages and dis-advantages of locating a parking garage in a number of alternative locations, we could "simulate" the experience of people using it, by asking such questions as; when will the driver be aware of the parking place? how long will it take him to park and walk to various key destinations? what climatic conditions is he likely to experience? In short if we could design some of the criteria put forward in this thesis, then this approach to design might have some merit.

APPENDIX

APPENDIX

Some aspects for future research.

In writing this thesis I constantly found that the range of factors that should be analysed increased the more I looked into the problem. This is an inevitable result of trying to record and evaluate people's experience or use of the city. For the possibilities are enormous, even when limited to the problem of parking. There are, however, a few aspects that could and should be investigated to place some of the ideas in this thesis on a more sound footing. The major element lacking in this thesis is any direct study of people themselves. I have devoted the thesis toward analysing a person's experience of a certain sequences of events. But the experience as recorded was only my own. The first step forward, therefore, must be to examine other people's experience of similar sequences, for, without this, most of my conclusions must be regarded as hypotheses, rather than definitive findings.

There are three basic ways in which this research could be done. First, there are interviews with a random sample of drivers, based on a set questionnaire. Secondly, a few drivers could be observed directly whilst driving over a sequence. This would mean an observer travelling with the driver, recording his reactions and comments in detail, film, on tape recorder and by notes. Finally, vehicles could be observed at certain points in the field. I visualize all these techniques being used, the actual choice depending on the type of data to be gathered.

The general lines of investigation would be in two directions, relating to parking and relating to sequence analysis.

(a) Parking.

Arising from this thesis there are a number of problems that I would like to look further into. In the first place there is the whole question of way-finding in the city, and the various strategies a person adopts. I have hypothesized a relationship between parking place and destination. I believe the connection exists, but it would be interesting to know how people actually memorize this. Do people tend to think in terms of always trying to park exactly at their destination, or do they tend to fall back on a familiar parking place from which they can get to a number of destinations? Is proximity of parking to destination the vital factor? Or is convenience and ease of parking more important? Do people have a certain set search strategy which they adopt whenever they drive to shop in a certain area?, or do they trust to luck each time? These are all questions that could only be investigated through a more intensive analysis of the driver himself. It might well be that no clear cut answer will emerge, but even this negative answer would be useful. More positive findings, however, could lead to a clearer understanding of how a person really does use the city for a given purpose. The emphasis in this analysis would be on direct observation of a driver - with the use of tape recorders, movies and sketches as a means to recording the various actions, thoughts and feelings.

Secondly, there is the driver's reaction to the different types of parking facility. Various parking studies have involved time and motion studies of parking places, but these have tended merely to record the number of actions taken and the time taken. What does not come out are

the more subjective impressions of the experience. Is there any real aversion to parking in a garage rather than in the street? Is there a different reaction to the various kinds of parking lots? I have shown that to use some types of facility requires considerably more effort and time than others. It would be essential to know how much this is actually taken into account by people. This is something that might be answered in interviews.

A third factor that I would investigate in greater detail is that of walking distance. The Eno Foundation, as I have pointed out before, only records the average distance walked from parking place to destination, for given trip purposes. What is missing is any assessment of how people really react to this, and consequently any standard for an ideal distance to plan for. I concede that it might be difficult to find out what this standard could be, because, obviously the goal of everyone is to minimize the distance as much as possible.

(b) Sequence analysis.

I have tried to enlarge on the existing research into sequence analysis by attempting to record a larger number of critical factors affecting our overall experience of a trip than merely those dealing with visual form. This should be tested further by applying it to other problems; the journey to work, for example; or the transfer between other forms of movement (car to plane, ship to train etc.).

Aside from broadening the application of this method, the main effort should be toward improving the system of notation and description. I adopted a combination of diagrams, photos and a written text. It might be interesting to experiment with broadening this to include other techniques such as movies.

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