

CHAPTER 14

Just as a wit defined poverty as the result of pauvrete, one may explain the phenomenon of the lasting fame of Paris, London and Rome in the same way: These cities are famous because they are fameux.

. . .E. A. GUTKIND
Urban Development in Western
Europe: France and Belgium

I

The first analysis of the maps to be attempted is that pioneered by Kevin Lynch (Lynch, 1960), and subsequently used by a major portion of the herd of researchers that followed. The technique employed was a sort of content analysis.

Content analysis is a rather sacrosanct hammer in the academic tool box. As early as 1952 Berelson had described a field of research that had grown up using this technique (Berelson, 1952). The field was resurveyed by Cartwright a year later (Cartwright, 1953) and exhaustively covered by Pool in Trends in Content Analysis (1959). A content analysis handbook exists (Worth, Holsti, Zaninovich and Zinnes, 1963) and the field has acquired a genuine critic all its own (Stephenson, 1963). Scarcely a week passes without another piece of research appearing in which content analysis has been employed. All the commentators agree that content analysis is performed in order to quantify information that is qualitative. Cartwright has stated that the "fundamental objective of all content analysis is to convert phenomena, i.e. symbolic behavior of people, into scientific data" (Cartwright, 1953, 466). He goes on to say that scientific data must display four characteristics: 1) objectivity and reproducibility, 2) susceptibility to measurement and quantification, 3) significance for systematic theory, either pure or applied, and 4) generalizability. It is on this basis that the popularity of content analysis has flourished. Specific research fields in which content analysis has been employed are numerous and wide-ranging, including literature, movies, language, dreams, folklore, geography, sociology, anthropology and political science.

That content analysis has been, and continues to be, widely used says, of course, absolutely nothing about its validity or interest or significance as a research tool. Quite frankly, its limitations are enormous, but before discussing them it is vital that we understand just exactly what content analysis is and particularly the role it has, and continues to play, in the analysis of map imagery. Specifically, this means discussing the way in which Kevin Lynch used the technique, since his followers have deviated imperceptibly, if at all, from the form in which he originally employed it.

Kevin Lynch in The Image of the City was interested in two things. He was interested in imageability, i.e. the impact of a given urban component upon a person; and legibility, i.e. the degree of order in the relationships between entities of variable imageability. By themselves, these two interests do not require the aid of content analysis. Lynch could have simply assigned values in some systematic way to buildings, streets, squares and so on. But he was further intrigued by the collective public image of these matters. Now, the common man in the street does not

ordinarily assign numerical values to the impact upon himself of a given aspect of the urban environment. When called upon to evaluate such and such a feature, he uses highly qualitative language including liberal sprinklings of "likes" and "dislikes." This descriptive language, as valuable and as beautiful as it may be, manages to violate all of Cartwright's (and most other scientists') characteristics of scientific data. Somehow, in order to make it science, it has been felt necessary to convert this highly qualitative language of the common man in the streets to hard numbers.

The way Lynch did it was this. He asked a question such as "Tell us about the places in town that you like best," and pooled all the answers he received. From this pool of information Lynch extracted the relevant content — which meant only the places mentioned by the respondents. In other words, "relevant content" turns out to mean nothing more than "quantifiable content." To each of the places mentioned would be assigned a figure representing the frequency with which each place had been mentioned, that is, the percentage of people mentioning each place. Thus, if 10 of 100 people, mentioned a certain place, that place would have a frequency of mention of 10%. All the places mentioned would then be ranked in order by frequency, and classes would be formulated. These classes might be tailored to fit each individual list, to show the information to best advantage, or might be general, to insure comparability between many lists. Lynch set up four classes to handle his lists: 1) 75% and over; 2) 50-74%; 3) 25-49%; 4) 12.5-24%. In this report we have used the same class intervals to insure comparability to the bulk of mental map research. Earlier efforts of my own and others have used a fifth class (5-12.5%) to handle larger samples than those collected by Lynch. Some researchers have used tailored class intervals. Their results are difficult to compare with the results of others and hence verge on uselessness.

Lynch then classified the places mentioned into five intuitively derived types of urban elements: landmarks, nodes, districts, paths and edges. Due to the nature of our mapping system we have ignored Lynch's intuitive types and classified our material into point, line and area phenomena. (Furthermore, there exist a wide variety of intuitively generated typologies of urban phenomena, many of them far richer and more useful than Lynch's. See for example, Cullen, 1961; Wolfe, 1966). Thus Lynch's data was broken down into twenty compartments, five types of urban elements by four class intervals. Ours is broken into twelve compartments, three types of urban elements by four class intervals. Each of Lynch's twenty compartments was then assigned a particular symbol, and these symbols were placed on a standard map of the city in question. We have followed this procedure.

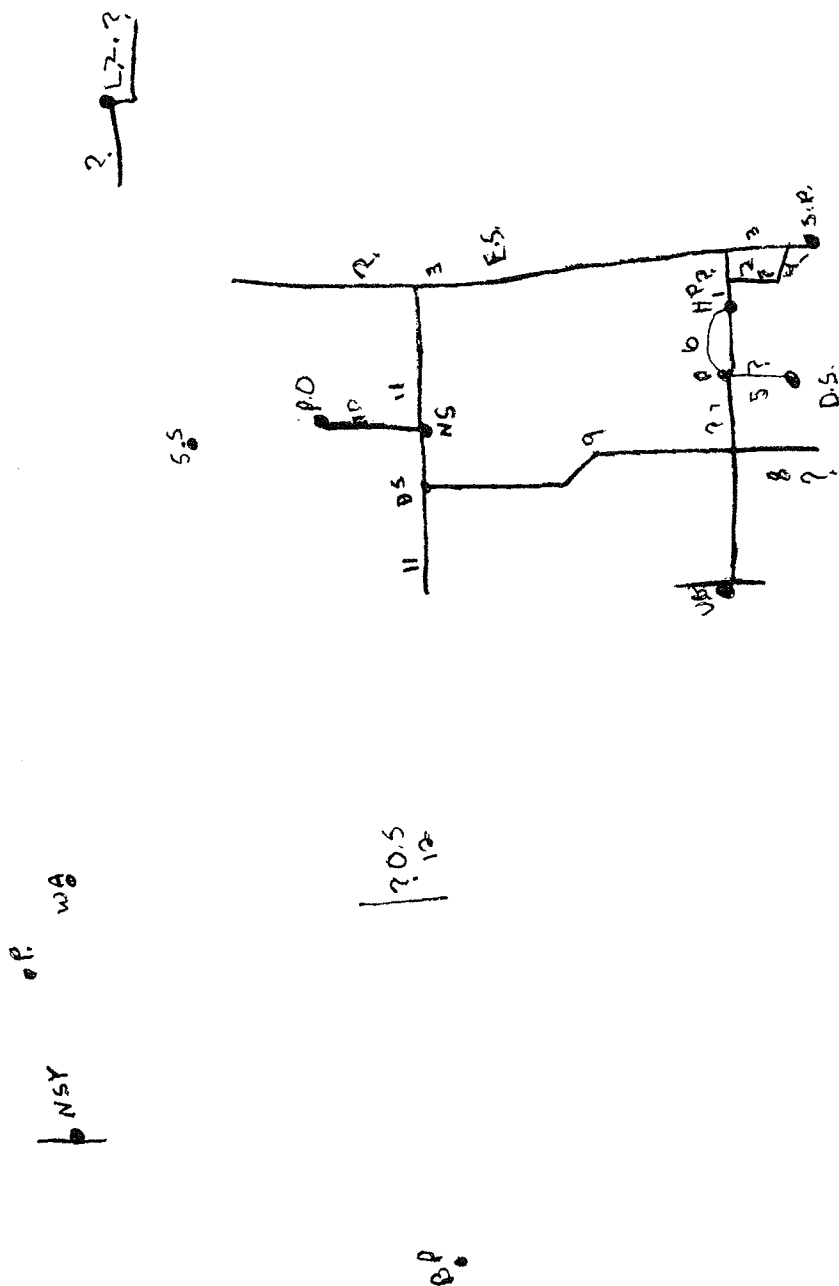


Figure 14.0 First London map: Lana Monroe

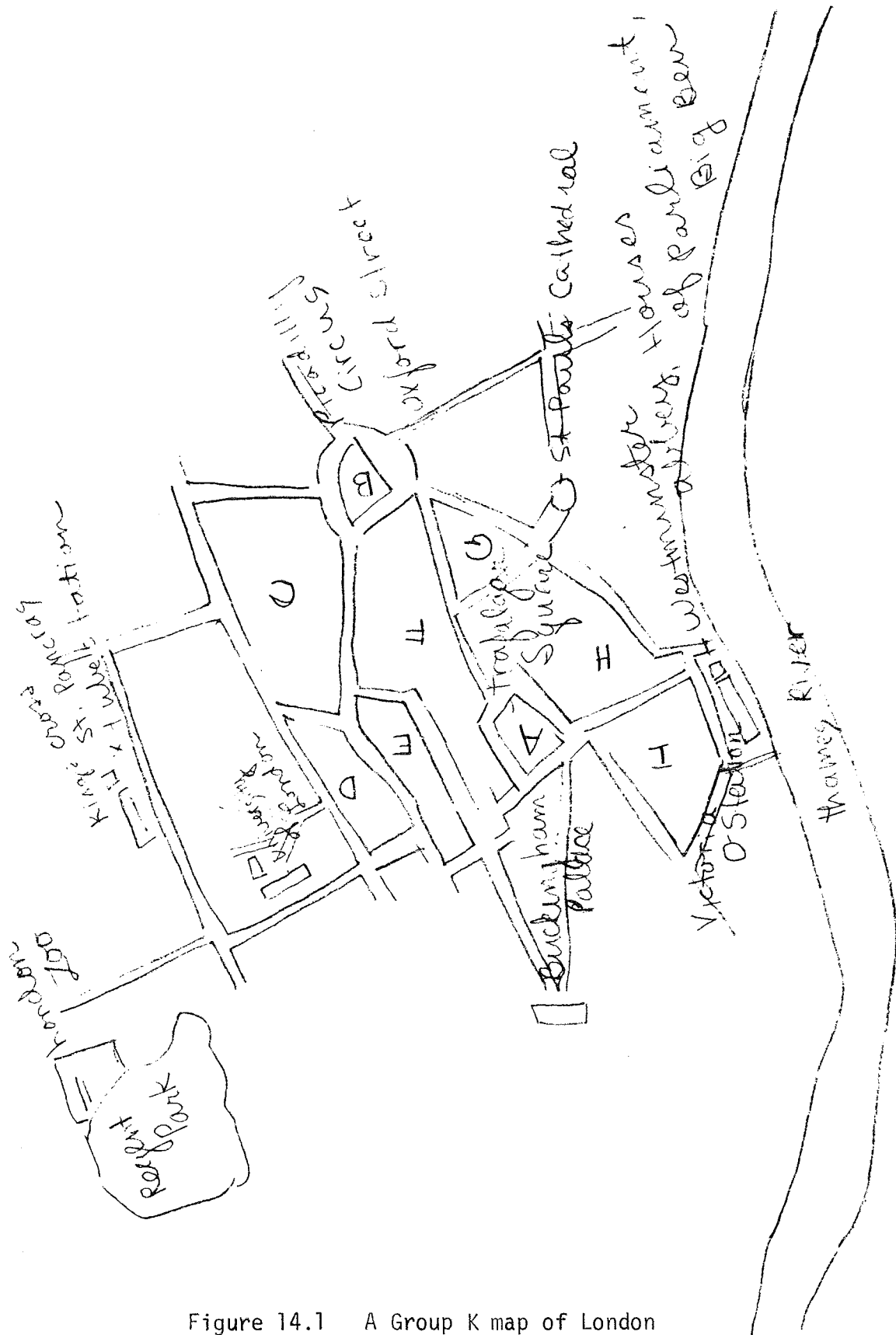


Figure 14.1 A Group K map of London

Lynch's data was at the outset verbal. The content analysis and Lynchian mapping technique are very efficient when dealing with verbal material for two reasons. First, the list of words contains no data concerning the relative spatial location of the places listed. Thus there is no reason to suppose that their intended location is anything but veridical, and hence no reason not to map these places where they occur on a standard base map. Second, the information about the city comes to the investigator as information cast in a highly reductionistic symbolic system. All the investigator does is treat each listed place as a place, assign it a frequency of mention and his work is done.

It is, however, impossible to justify the use of this simplistic technique for graphic (i.e. sketch maps) responses. In regard to the first point made in the preceding paragraph, graphic responses do contain information about the relative spatial location of the places portrayed, and thus there is no justification for mapping the responses on a standard base map. Further, the information portrayed in a graphic response is not necessarily presented in a simple reductionistic symbol system. Nonetheless, this is exactly what Lynch did, and what continues to be done. As this point may not be luminously clear, I shall pursue it.

Turn your attention to Figure 14.0. This is the first map of London drawn by Lana Monroe using the point-line-area method (without the tracing paper overlay information). On it you see a variety of points and lines, some names and some not. "HP," for instance, stands for Hughes Parry Hall, "S.P." for St. Pancras Station, "E.S." for Euston Street and so on. Try to apply Lynch's technique to this map and you face a horrendous question scarcely raised, if at all, by the verbal information. Just what is the content of this map?

Some is obvious. All of the points and lines with associated tags may be treated as if verbal information and easily extracted, listed, and frequencized. If the investigator is sufficiently familiar with the environment portrayed, he can make guesses about untagged items and be right. For instance, line #6 must certainly be Cartwright Gardens. I can say this because I know the location of Hughes Parry Hall and can intuit the name of the street on which it is located. I also happen to know this because Lana told me so on the trip to Rome, and because I noted this on the back of the map. I could have guessed and been wrong, (as I was wrong regarding the identification of "L.Z." which for some reason so effectively evoked the image of Liz Taylor for me that I never thought of London Zoo). What does the investigator do with places obscurely identified, or not identified at all? Ignore them? I see no other serious option, and yet that is hardly a responsible attitude to take. Furthermore, from the examinations of thousands of sketch maps, in my own research

and the research of others, I can say without fear of contradiction that the majority of them contain less identifying information than is found in Figure 14.0.

Sad to say, this barely scratches the surface of the problem. What about the rest of the content of Figure 14.0? For example, the relative location of the various points and lines. Is this not part of the content as well? Of course it is, and yet our simple verbalistic technique cannot deal with it. Not only is the location of places ignored, but so is the density of their occurrence. Note that Lana has connected most of the points in the vicinity of Euston Street and that most of the points and lines are found in this vicinity. On the other hand, note that the rest of the space is occupied by no more than seven points and lines, and that these are scattered, unconnected. This is valuable map content which must remain unnoted. Again, the fact that there are three enclosed areas on the map will also go unrecorded. And so on. The amount of content that content analysis cannot deal with is immense.

Now consider Figure 14.1. Here's another problem. This map was produced by a student in Group K who had no exposure to the point-line-area system of mapping, although she claims this is not the first time she has drawn a map. The question I wish to raise is whether she has drawn streets or blocks or both or neither? On the face of it, this may appear an absurd question, but a brief analysis will show that it is not. I have added capital letters to her map running from A to I to help us out. Take the enclosed areas lettered A and B. Both of these are named, A being Trafalgar Square, and B being Piccadilly Circus. Heading away from Piccadilly to the Thames is a pair of double lines labeled Oxford Street. This is positive evidence that she has drawn both blocks and streets. In point of fact in London, the street-enclosed area of Piccadilly Circus (B) is just large enough to park your fanny on and the enclosed area of Trafalgar Square (A) is only slightly larger. Armed with this information we turn next to the area labeled H. Is it legitimate to regard this area in the same way that we regard areas A and B? No. Note the location of St. Paul's. Between St. Paul's and Trafalgar Square there is more than a mile of London chaos. If A is indeed intended to represent Trafalgar Square, H can represent no known block or set of blocks. Then what is it? Who knows? I maintain that nobody knows, not even she who drew the map, on the following grounds. The mapper in this case is concerned with the representation of places she knows in London. She is aware that these places are connected by a network of streets because she traveled on them. She has opted to represent streets in a pictorial fashion and has consequently chosen to use parallel lines. It is impossible to draw a network of any connectivity using such a symbol for streets without producing—in the attempt to draw streets—sets of enclosed space. That is, I maintain that



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the block-like enclosures (such as H) are a consequence of the choice of the line symbol and are intended in all but cases A and B to represent nothing at all. They are, in effect, space fillers, not blocks.

It would be equally easy to reverse the argument from blocks to streets to show that she had drawn blocks and that her choice of area symbols resulted inadvertently in the production of streets. In this particular instance it would be slightly more difficult since I believe that probability is in favor of my first explanation, but it would not be impossible. Faced with area E for example, either explanation could easily hold. In other words, due to the ambiguity of the symbol systems employed by the average sketch mapper, the analyst is faced with additional, almost insurmountable, problems. The utilization of a standard symbol system such as the point-line-area approach obviates many of these issues. The manner in which it does this is easily explained, first by reference to Figure 14.1 and then by reference to Figures 14.2-14.5. The question of what is an area and what is a line that bothered us in Figure 14.1 would never appear on a map drawn according to our specifications, since areas appear on a separate sheet of paper. Thus, had our mapper wished to indicate an awareness of areas C through I on Figure 14.1, she would have drawn them on the tracing paper overlay. But let's take a look at a couple of other Group K maps.

Figures 14.2 and 14.3 are not atypical of Group K maps. They are most typical in the variety of symbols employed. I have not attempted a count of the total number of symbols generated by Group K for identical items such as streets, but the number is simply enormous. A hint of this may be felt by noting the fact that, symbolically speaking, Figure 14.2 is in an altogether different world from Figure 14.3. On the one hand we have a highly schematic though thoroughly ambiguous set of symbols, most of which are tagged. Red meat for the content analyst, locational problems aside. On the other, we are faced with an almost completely pictorial representation involving four trees, a tennis court, two houses, a blacktop that is really a blacktop and then...a rather wild attempt at portraying apartment buildings. Does the analyst note: trees, 4 mentions? And what does he do with those "apartments?" I was once in the position of using such disparate data (Wood, 1971) and I will simply say that it was rough sledding. Frankly, I feel that the maps speak for themselves and consequently I turn to a pair of Group L maps.

Figures 14.4 and 14.5 were pulled from the pile of Group L maps with my eyes closed. Janine Eber drew Figure 14.4 while Leslie Casyk drew Figure 14.5. (In neither case have we reproduced the tracing paper overlay.) Janine Eber has followed the rules for producing maps using the point-line-area method, except that she has failed to number all

her lines. Otherwise linear phenomena such as the Thames, streets and bridges are represented by simple lines, and places are represented by points. The symbols are entirely unambiguous. Almost all of them are labeled. Leslie Casyk has followed the rules less particularly and yet comparability is high. There are three basic violations of the rules on Leslie's map: 1) She has included areas on the skeleton. Fortunately, she has also drawn these on the tracing paper overlay. 2) She has been unable to resist the temptation to draw a fat Thames. I participated in these mapping sessions and can speak to the difficulty of tracing that huge river with a single thin line. An alternative on our part might have been to characterize the river as an area, and yet I feel that this might have occasioned even greater conceptual difficulties. 3) Since her river is so fat, she has felt a corresponding urge to give substance to the bridges crossing it. Nonetheless, her violation of the mapping vocabulary has led to no ambiguity at all. Comparison of the Group L and Group K maps is exciting. The difference between the two L maps is slight; the difference between the two K maps is enormous. From the investigator's point of view, the L maps are more meaningful because they are more easily compared.

Criticism of the L maps might note that in the process of standardization, valuable differential information has been sacrificed. Thus, it is possible to readily distinguish types of mappers in the K sample. In Group L, this task will be more difficult. My response to this criticism is three-fold: 1) There are sufficient differences between the maps of Leslie Casyk and Janine Eber to separate the two girls into distinct classes of mappers. These differences will be subsequently examined, but at this point I will simply point to the varying degree of connectivity on the two maps, the varying number of places and lines represented on the two maps, and the significant variations in relative locations of the features the maps have in common; that is, despite the process of standardization, individual mapping differences are clear. 2) My second point deals with the nature of our research objective. We were concerned with the nature of the urban-individual interaction. It would be impossible for me to say anything about the relation between London and the girl producing Figure 14.3, because her map is difficult to interpret, and because it is most emphatically not a map of London. We have willingly and intentionally sacrificed some individuality to achieve our goals of understanding urban-individual interaction and of teaching certain basics about mapping and observing. 3) In the larger context of Project Group L it must be clear that we have an abundance of information about individuals that is unusual in studies of sketch maps. Thus, were it not possible to distinguish meaningfully among the Group L kids on the basis of the maps, it would be possible to do so utilizing other information. These three points must answer any criticism leveled at the lack of

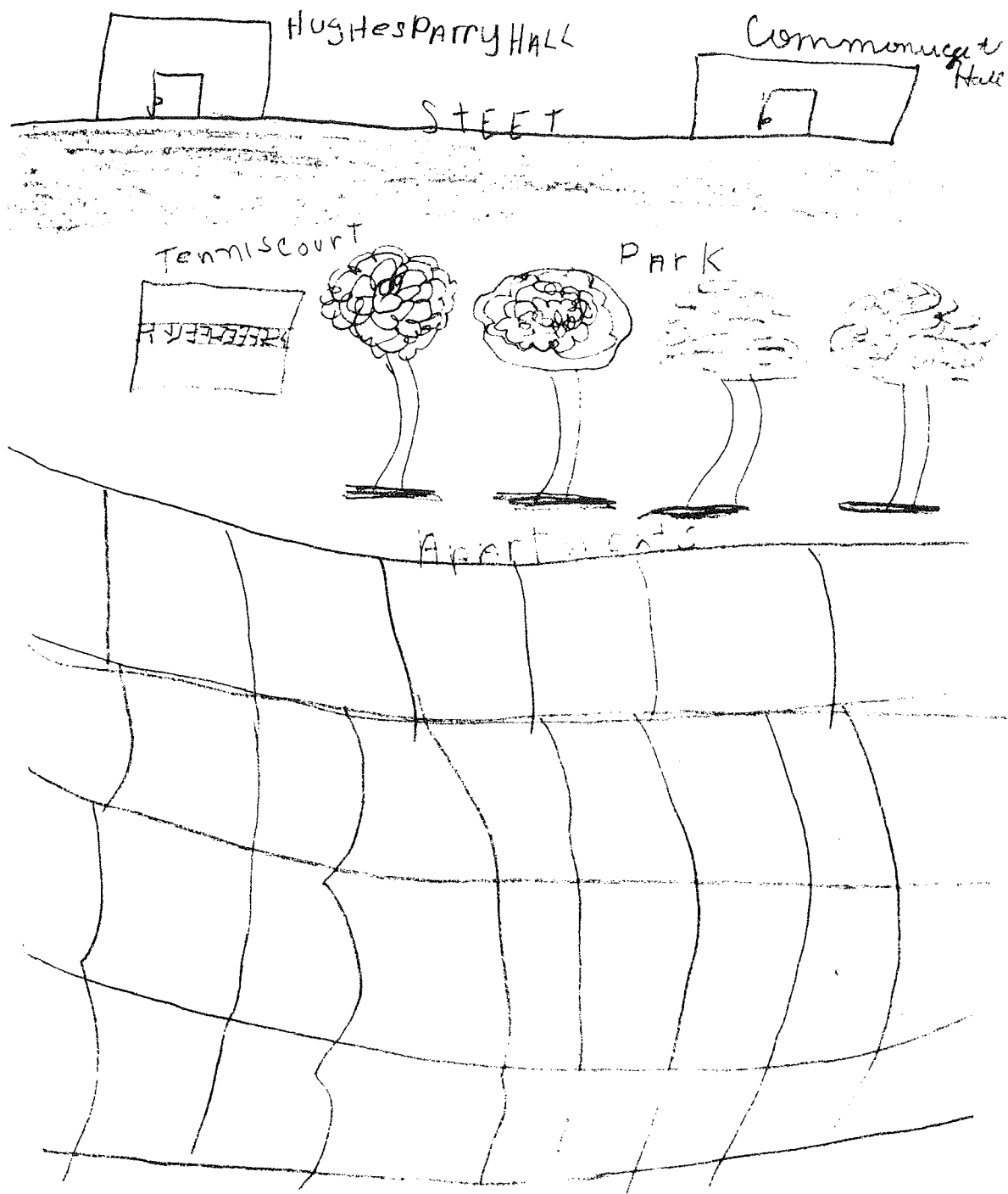


Figure 14.3 A Group K map of London

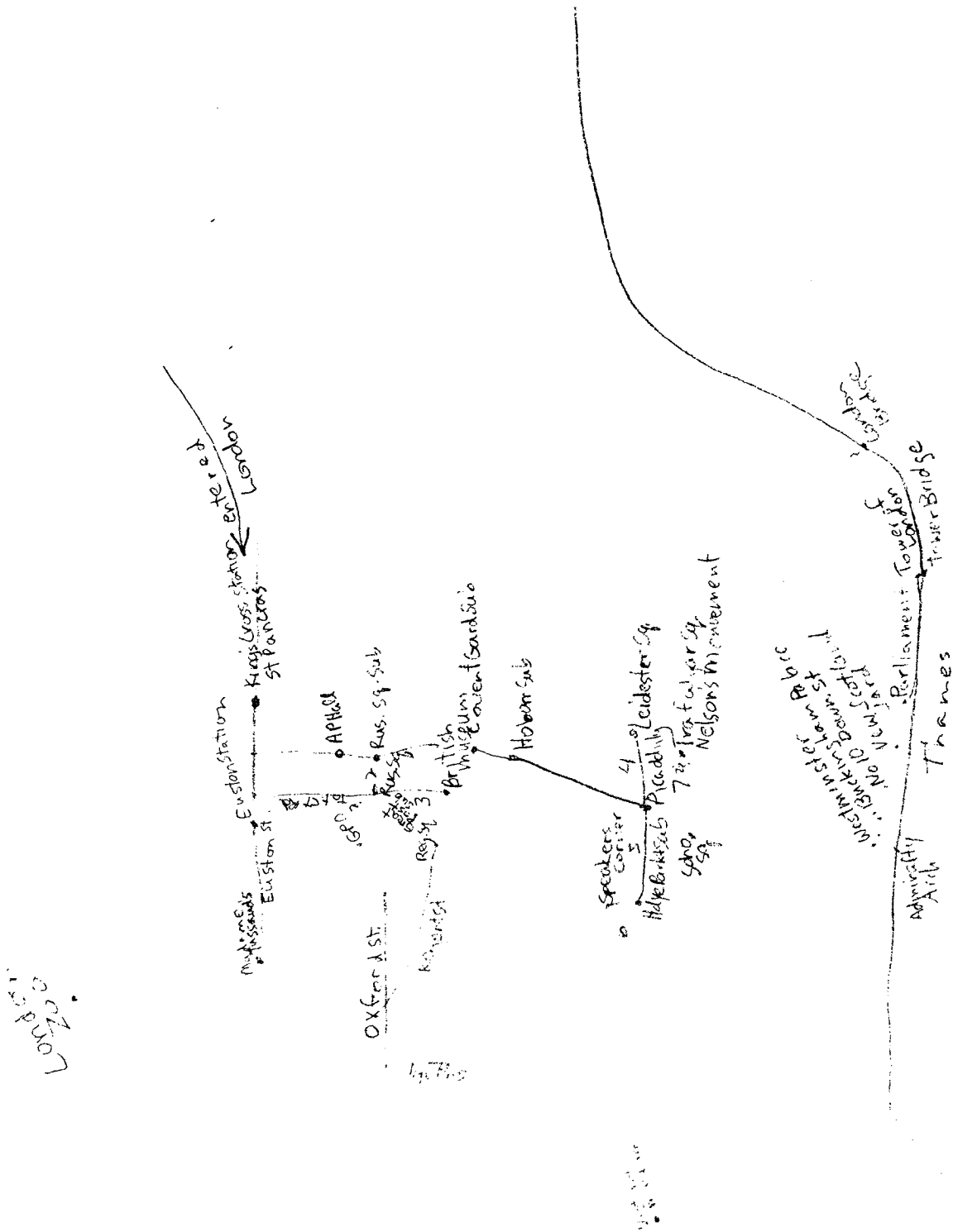


Figure 14.4 First London map: Janine Eber

differentiation between the more or less standardized products of Group L. It might, in fact, be suggested that due to the lack of standardization in the Group K sample, and in all populations drawing instructionless sketch maps, inter-map differences have been exaggerated beyond the differences between the mappers themselves.

In Table 14.0 I have summarized the reasons that make the job of content analysis easier using maps drawn according to the point-line-area method.

TABLE 14.0

Instructionless Maps	Point-Line-Area Maps
1. Symbolically ambiguous	1. Symbolically unambiguous
2. Often lacking verbal tags	2. Seldom lacking verbal tags
3. Are scarcely comparable	3. Are comparable

Can there be any question as to the way in which the content analysis was performed on the Group L maps? Since almost all points and lines and areas had associated verbal tags, since the symbol system was unambiguous, since the maps were comparable, it was a matter of little effort to extract the ostensible content from the maps. In keeping with the Lynchian approach, locational and other purely graphic information was ignored and subsequently dealt with. Using maps such as the Group L maps makes content analysis a reliable tool within its own peculiar limitations.

This was, however, not the case with the Group K maps. In this instance I was thrown back upon the rules of procedure utilized in my earlier work. An exhaustive discussion of these rules is provided in Fleeting Glimpses (Wood, 1971, 66-69). Here they will be briefly summarized. First of all, each piece of identifiable information has been extracted. In the case of Figure 14.3, for example, seven classes of information have been extracted: 1) Hughes Parry Hall, 2) Commonwealth Hall, 3) Street (counted as Cartwright Gardens), 4) Tennis Court, 5) Trees, 6) Park, 7) Apartments. Each class received credit for a single mention with the exception of the trees which received credit for four mentions. Due to the ambiguity of the "apartments" symbol, I was only able to give this class a single credit. In the case of Figure 14.2 I was able to create 24 classes of information, counting the "five stops in between" as a single mention of a subway route since they were described generically, rather

than specifically. Some changes were made in nomenclature. Thus the Ring Road became Euston Street. A problem was posed by the identification of the circle labeled "Westminster Cathedral Abbey." There is a Westminster Cathedral and a Westminster Abbey, though the Abbey is near the Houses of Parliament and the Cathedral near Victoria Station. Both were widely visited by both Group L and Group K. Due to the lucid ambiguity of the relative location on this figure of Parliament and Victoria Station, I decided to flip a coin. The Abbey won. The second major decision was not to count areas and streets unless named. Thus in the case of Figure 14.1, only named places and streets were extracted as usable content. It might be argued that I could have clearly counted Euston Street (on which King's Cross and St. Pancras are to be found) or The Mall (connecting Trafalgar Square with Buckingham Palace) but these would have been guesses no matter how apparently reliable, and the rule not to count unnamed streets and areas was followed without exception. As we shall see when we examine the results of the content analysis for the Group K maps, much of this is academic since problems of this sort arose on few maps.

But no matter how amenable the data is to content analysis, content analysis can only do so much. At this point, I wish to examine just what it is that content analysis cannot accomplish. There are four basic criticisms that can be leveled against content analysis: 1) it is reductionistic; 2) it ignores the unique; 3) it ignores associations between categories; 4) it cannot extract information where it is not looking. Each criticism will be examined briefly below.

1) Content Analysis is Reductionistic. This means that a large body of material is compressed into relatively few categories. In our case, the environment of London is compressed into twelve categories, a preposterously small number. While this is a great advantage for clear analysis, inherent in the process is a severe loss of information. The investigator must decide whether the loss of information is offset by the gain in clarity. If content analysis is the only tool being used, the answer is a simple NO. The loss of information is so severe as to turn your clear analysis into an analysis of nothing. And a clear analysis of nothing is nothing at all. In this report the role of content analysis is circumscribed.

2) Content Analysis Ignores the Unique. There are two aspects to this criticism. The first is that any single response is buried in a mass of others. This criticism may be obviated by spotlighting unique individual responses and also by noting that the goal of the analysis is to derive a "public" image, which by nature subsumes individual images. The second aspect of this criticism is slightly more devastating and was originated by Alexander George (George, 1959, 7-32) who pointed out that an event which

occurs only once may be of greater importance than an event which occurs many times. In other words, frequency of mention may not be a function of image impact. There is no simple refutation of this criticism and since its roots are tediously buried in the method and ethics of science in general, I will not discuss it further. Simply note, that if the criticism has validity, content analysis has none.

3) Content Analysis Ignores Associations Between Categories. That this is true is up to the individual investigator. Contingency analysis, now ordinarily a part of any content analysis, establishes that two items are found together more or less frequently than would be expected by chance. However, contingency analysis is wide open to the Georgian criticism, and in any event postulates no necessary or causal relationship between "contiguous" items.

4) Content Analysis Cannot Extract Information Where It's Not Looking. This may sound absolutely ludicrous, but in point of fact may constitute one of the two most serious criticisms to be leveled against content analysis. An example of this may be provided by an unpublished study I made in 1968 in which I attempted to derive the Easterner's image of the Far West at the turn of the century by performing a content analysis on forty Dime Novels. Since I was searching for the physical image of the Far West my categories of extraction, which were empirically derived, related solely to the physical elements (physical in the geographic sense, as opposed to cultural) of the environment. In all, I collected 6,180 landscape cues which were divided into 156 categories, such as rocks, trees, mountains, woods, storms, rains and so on. These were ranked by frequency et cetera as described above and an image of the Far West as found in the Dime Novels was articulated.

Irrked by the three criticisms of content analysis that I have mentioned above, i.d. its reductionism, its inability to encompass the unique, and its limited ability to evaluate associations between categories, I performed another study. A short section of a Dime Novel was read orally to a group of 28 students at Clark University. This passage was entirely devoid of physical landscape cues. On the basis of this passage, which described the rescue of a white maiden from the clutches of a group of Indians, the students were asked to describe the environment. A full 96% of the students described a plains environment. On the other hand, only 9% of the 6,180 landscape cues in the 40 Dime Novels themselves involved plains imagery. Obviously, something was wrong somewhere. An example of the students' reasoning is relevant:

"This is a cowboy and indian story and so by convention it takes place in the wild West.

The area is flat low lying plain with little or no obstruction. Encamped on a section of this plain are hundreds of tee pees (indian houses)."

Another example shows the relevance of landscape elements not mentioned:

"Obviously mid-western Indians. Tee-pees indicate an environment with fairly favorable temperature precluding the necessity of better shelters. No mention of trees or Nick hiding in the forest so we assume that it is a grass-lands or semi-desert (sage brush). The chase tends to intimate a flat or slightly rolling land form. Horses mean enough grazing land. Water available for animals."

The point is not that the students reasoned well or poorly, but that they conjured up fairly complete images of the landscape of a region that was not explicitly described. Key elements in their constructions were horses, tee-pees, Indians, none of them elements of the physical landscape. In a general sense the question becomes, how much of an image can be seen as being sui generis within the actions or even the title of the book alone? For urban image analysts the question becomes, how much of the image of the city can be seen as being sui generis within the word alone? Having discovered the impact of the word tee-pee, I could count the number of times tee-pee was mentioned, knowing that that word was capable of evoking landscape images. How does one discover which words that are apparently not descriptions of the city, are in fact descriptions of the city? How, in other words, can content analysis be utilized to extract information relevant to the research objective in areas where it is not looking? I don't imagine that the question sounds so funny any more. It doesn't sound funny to me, but then I don't have the answer.

II

Despite the obvious multitude of criticisms that can be leveled against content analysis, it has a role. It can, in a systematic fashion, reduce a great deal to a very little. As long as we do not exalt that word "systematic" into a god, we're on firm ground, neither mystically scientific nor scientifically mystic. With the exception of eight reproductions of actual sketch maps, the balance of the figures in this chapter display the results of a content analysis performed on fifteen sets of data. Of these fifteen sets, two consist of verbal lists generated in response to a question, and thirteen consist of collections of maps. Let me briefly

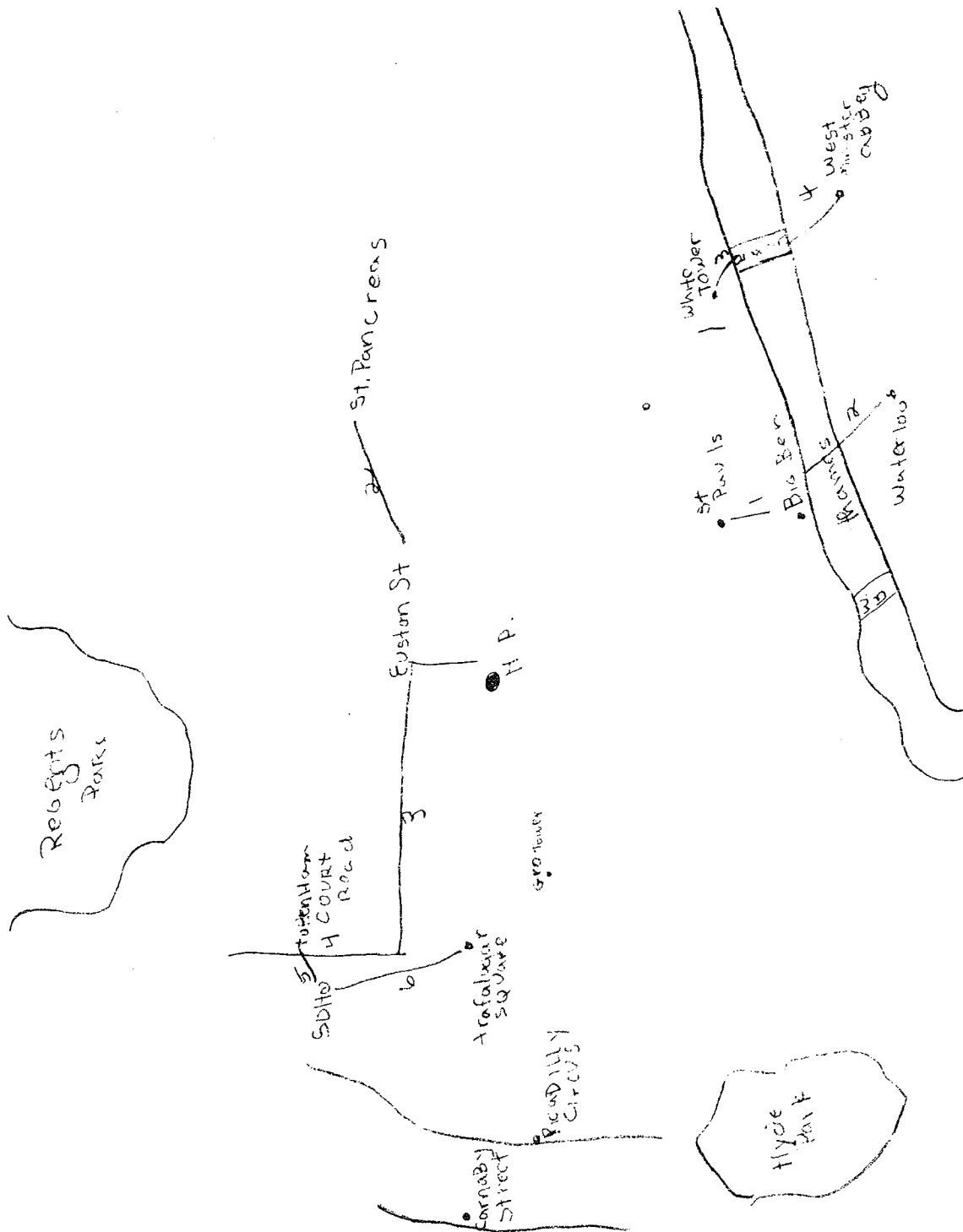


Figure 14.5 First London map: Leslie Casyk

recapitulate what we've done to achieve these results. 1) For each data set a list is made containing every place listed or mapped. 2) Against each place on this list is noted the number of times this particular place was mentioned. 3) Dividing the number of mentions by the number of respondents results in a figure called the frequency of mention, expressed as a percentage of the number of respondents. 4) All the listed places are ranked according to the frequency of mention. 5) This list is divided into four classes: 12.5-24%, 24-50%, 50-74%, and over 74% frequency of mention. On occasion, when a particular item was mentioned more than once per map, a figure greater than 100% results. The places mentioned less than 12.5% of the time are ignored in the mapped results, though they are considered elsewhere. On occasions, items mentioned less frequently than 25% or even 50% of the time are dropped from consideration when the sample is too small. 6) This list is further divided into point, line and area phenomena, resulting in twelve distinct compartments. 7) Each compartment is assigned a symbol. 8) The results are located on a standard base map of the city in question. These results will be discussed below in five separate sections. First we deal with a comparison of the London maps produced by Groups K and L, then exhaustively with the Group L London maps. Next we compare the K and L maps of Rome, and then treat the L maps of Rome. Finally, we attack the L maps of Paris.

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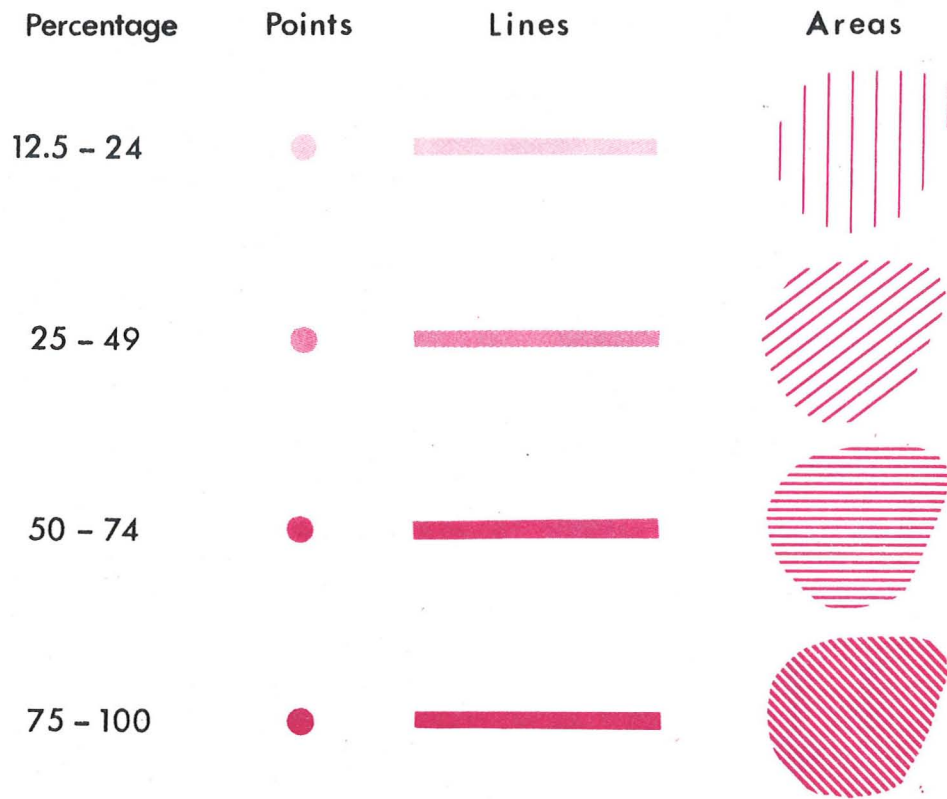
To begin, compare Figures 14.6 and 14.7. These two figures show the analysis of lists generated in response to the question "Where have you been, what have you seen while in London?" The question was put to both Group L and Group K during the same hour on 6 July, or after five and a half days in London. Figure 14.6 displays the result of the Group K analysis (n-43) while Figure 14.7 displays the results of the Group L analysis (n-34). The figures are practically identical. Mentioned by more than 12.5% of Group K were 17 points, 4 lines, and 2 areas; by more than 12.5% of Group L were 16 points, 4 lines and a single area. Quantitatively these results are similar, but the similarity is more than quantitative. The places mentioned by both groups are practically the same, and in many cases similar places have been mentioned with similar frequencies. We may point to the Tower of London, Tower Bridge, the Thames, Parliament, Big Ben, Buckingham Palace, Hyde Park, the Senate House of the University of London, and the British Museum—all mentioned by both groups within the same frequency interval. Mentioned in common with no more than a single frequency class difference were Westminster Abbey, Trafalgar Square, Piccadilly Circus, Oxford Circus, Carnaby Street, and Madame Tussaud's. The remaining places were not mentioned in common: Westminster Cathedral, a theater on Shaftesbury Avenue, Oxford Street, Russell Square, London Bridge, and the GPO Tower (all mentioned by

Group L but not by Group K); and Victoria Station, the Planetarium, Hughes Parry Hall, St. Pancras Station, King's Cross Station and Regent's Park (all mentioned by Group K but not by Group L). That is, the two groups mentioned 15 things in common and 12 things not in common. Let us reduce the significance of the uncommonly mentioned things. Note that the Planetarium and Madame Tussaud's are adjacent; note the proximity of London and Tower Bridges; note the proximity of Westminster Cathedral and Victoria Station. Each item in these proximate pairs is sufficient evidence of the fact of a visit to the other. Removing the four uncommonly mentioned items in the foregoing three pairs allows us to reduce the list of uncommonly mentioned items to eight. Now note that three of the places mentioned exclusively by Group K include the girl's dorm itself and two structures (the two stations) encountered daily by virtue of the nearby tube entrance. Obviously, Group L experienced these places as well. With these places discounted only five uncommon items remain. One of these, St. Paul's, was an item on the itinerary of the first full day's tour that Group L was forced to forego by virtue of its late start. Visits to St. Paul's had to be made by Group L on their free-time. For the remaining four uncommonly mentioned items I have no real explanation, except for the fact that the groups were not identical.

With these caveats entered, I submit Figures 14.6 and 14.7 as evidence of two things: 1) that the experiences of London were substantially the same for Groups L and K, and 2) that they were perceived by the kids in Groups L and K as being substantially similar. Perhaps my discussion of the points of similarity and difference tended to exaggerate the differences. If you feel this to be the case, look over the two figures once again before proceeding.

Now, I turn your attention to Figures 14.8 and 14.9. These display the results of a content analysis of the sketch maps produced by Group L and Group K. Figure 14.8 shows the analysis of the Group K maps (n-43) produced immediately following the generation of the list analyzed above. Figure 14.9 shows the results of the analysis of the first Group L map, produced two days earlier than either the generation of the Group L list (discussed above) or either of the Group K products. That is, the Group L maps were produced with less experience of London. Under these disparate conditions, perhaps it is not surprising that the figures should show some differences. If so, it is all the more surprising that the differences should be such as they are and in such magnitude.

The figures are entirely distinct. The Group K map shows 31 points, 23 of them within a third of a mile of the dorms. The Group L map shows 32 points, only 10 of them within one-third mile of the dorm. Turning to the lines, the Group K map shows only four lines, two of which are



Legend for Content Analysis Maps

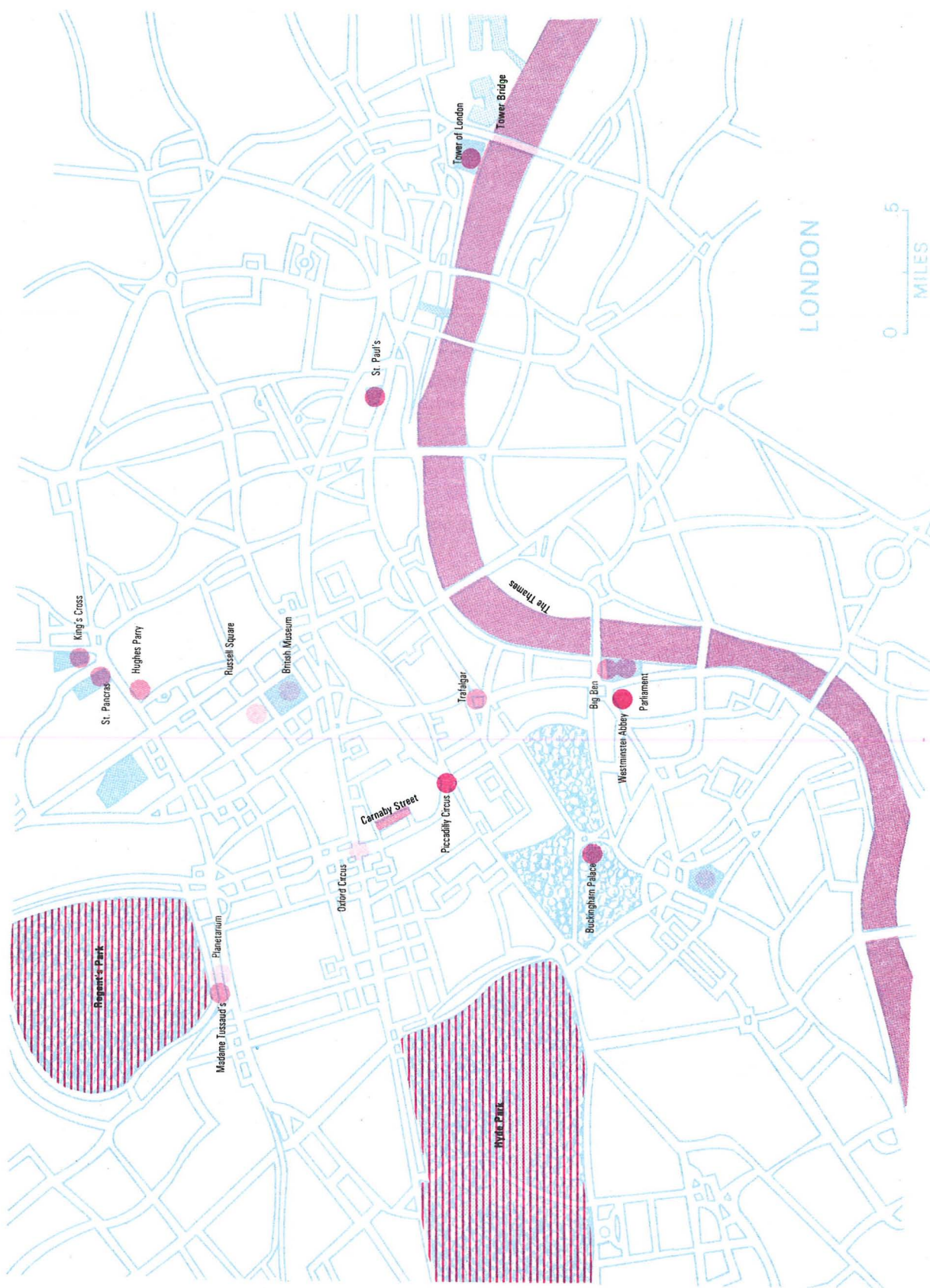


Figure 14.6 Where Group K went (n=43)

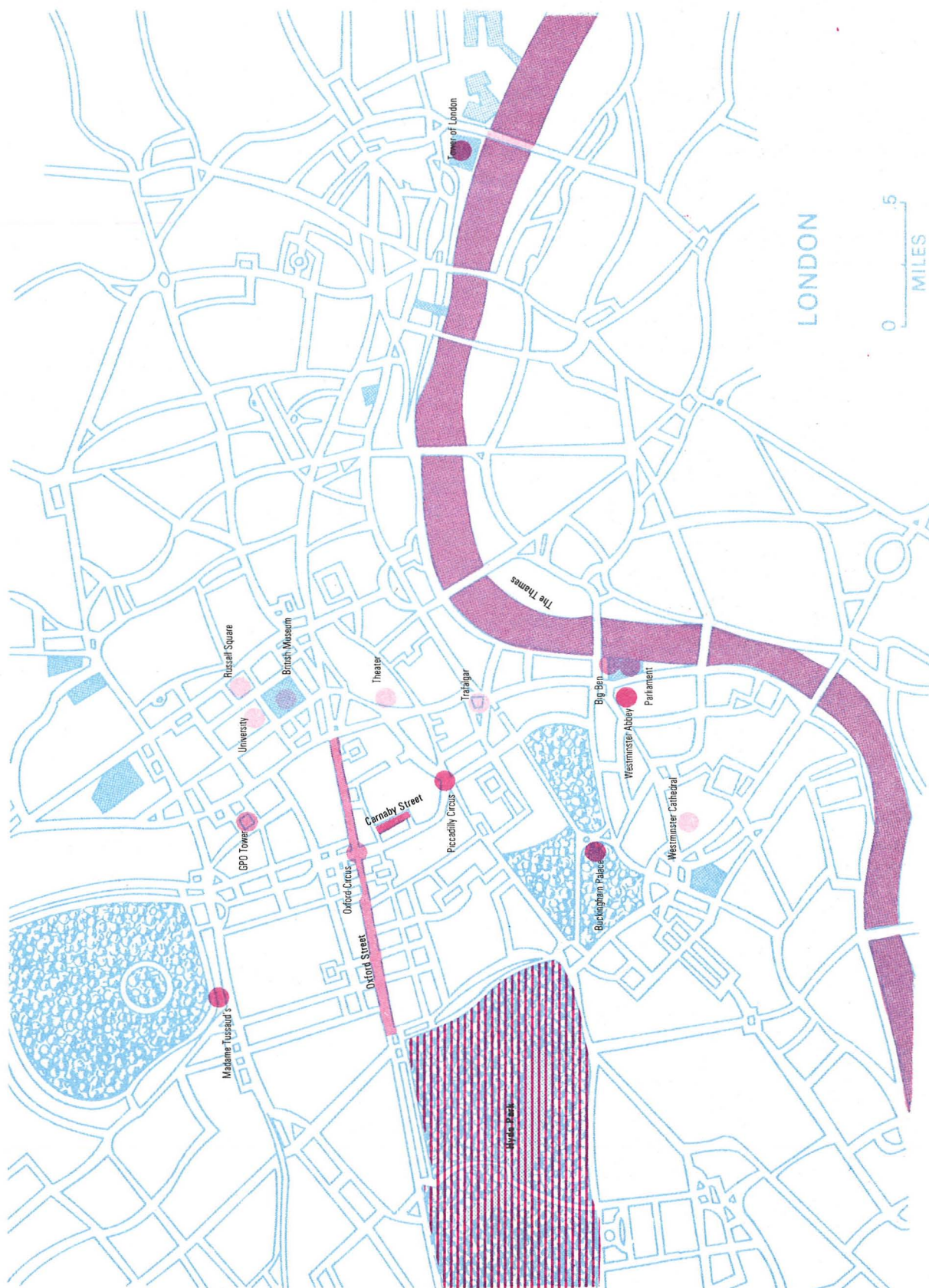


Figure 14.7 Where Group L went (n=34)

proximate to the dorms. The Group L map shows 10 lines, only one of which is proximate to the dorms. In the matter of areas, the Group K map shows a single area, while the Group L map shows twelve. That is, Group K has drawn fewer items, nearer the dorms, than has Group L, which has drawn more items scattered over the whole of London. The maps are drastically and amazingly different.

An explanation of this difference might be sought in 1) experience of vastly different nature between the groups; 2) perceived differences of experience between the two groups; 3) some other difference. If Figures 14.6 and 14.7 were not sufficient, it can be stated in general terms that the experiences of both groups were technically identical. That is, theoretically Group K and Group L went to the same places in the same order and at the same times by virtue of the tour itinerary. As we well know, this was true only in theory, and yet the deviations were never great. Thus, we missed St. Paul's on the tour and failed to penetrate the interior of Westminster Abbey, but otherwise underwent similar experiences. Serious deviations can occur during the students' free time, and yet, given the general nature of the tour, such deviation is highly unlikely. Thus, for example, a great deal of free time was spent by both groups shopping on Carnaby Street, visiting Madame Tussaud's and so on. Hence, the explanation of the differences between Figures 14.8 and 14.9 must be sought elsewhere.

The maps displayed as Figures 14.6 and 14.7 show quite clearly that the perceived difference between the experiences of the two groups was not great. If it was not in life identical, it was not perceived as identical either. And yet, though the figures are not identical, they certainly are sufficiently similar to be incapable of providing an explanation of the differences between Figures 14.8 and 14.9. Compare the first pair with the second and you will see what I mean. (It might be noted that in both K figures, there are more places located near the dorms, although the difference between the K List and the K Maps remains striking.)

Consequently, we must look for an explanation of the differences still further afield, and for all of that, I don't think we need to look too far, for clearly, there was one major distinction between Group K and Group L: that Group K had not participated in the pre-departure phase of Project Group L, was not anticipating map drawing exercises, had not fooled around with the point-line-area method of mapping, did not carry around the Environmental A handbook, and so on. The obvious explanation of the differences between the content of the K and L sketch maps is that the kids in Group L had, to one degree or another, mapping on the mind, and, to one degree or another, were, in point of fact, talking with maps.

I have plunged into this discussion with a glance at the results of the content analysis because the evidence, clearly laid out before you, is dramatic, decisive, and from my point of view needs no further argument. However, there are those who would wish to see the evidence displayed in other formats and to their demands I now turn.

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The evidence from the content analysis that has been mapped does not, of course, include all the quantitative information extracted from the sketch maps. For example, only those places mentioned by 12.5% or more of the responding populations have been mapped. Thus, there is no way of knowing from an examination of the maps anything about the total numbers of places mentioned, nor the total number of times these places were mentioned. There is a further complication that cries out for explication: the issue of the role played by the List of Places that Group L had first seen while engaged in the Predictive Morphology of London. (This List of Places may be reviewed on page 94.) With these concerns in mind we turn to an examination of a pair of tables providing another view of the results displayed in Figures 14.6 through 14.9.

Before we look at them, however, I must explain the difference between the terms "item" and "instance" as used on the tables and throughout this discussion. The number of "items" refers to the number of distinct places, such as the Tower of London, the GPO Tower, that were listed or drawn on the maps. The number of "instances" refers to the total number of times the "items" in question were mentioned. Thus, the Tower of London might have been mentioned fourteen times. This counts as one item and fourteen instances. Not displayed is the number of instances per individual item. This information can be found on Figures 14.6 through 14.9. Here we show only the total number of instances for the total number of items. Thus Group L listed 66 places 347 times, or gave 347 instances of 66 items. I should also point out the meaning of "on List" and "off List." When you find on the Table the remark "23 Items on List" it means that 23 of the items generated can be found on the List of Places given to Group L. On the other hand, "23 Items not on List" means that this number of items is not to be found on the List of Places given to Group L. Such items came all unaided from the heads and experiences of the kids themselves. Since these figures will prove crucial in unmasking the role played by the List of Places, I'd observe them with care.

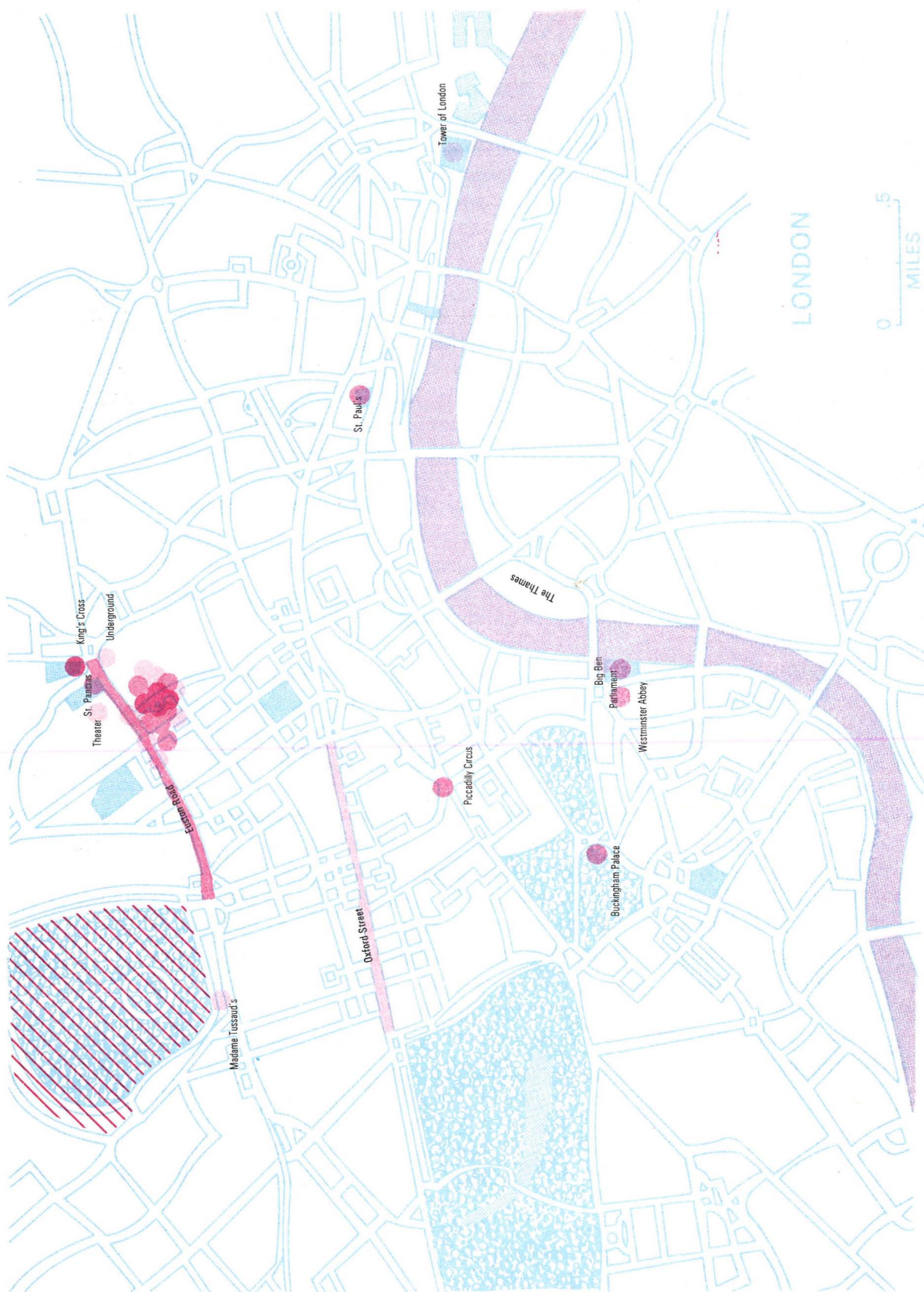


Figure 14.8 Content of the Group K maps (n=43)

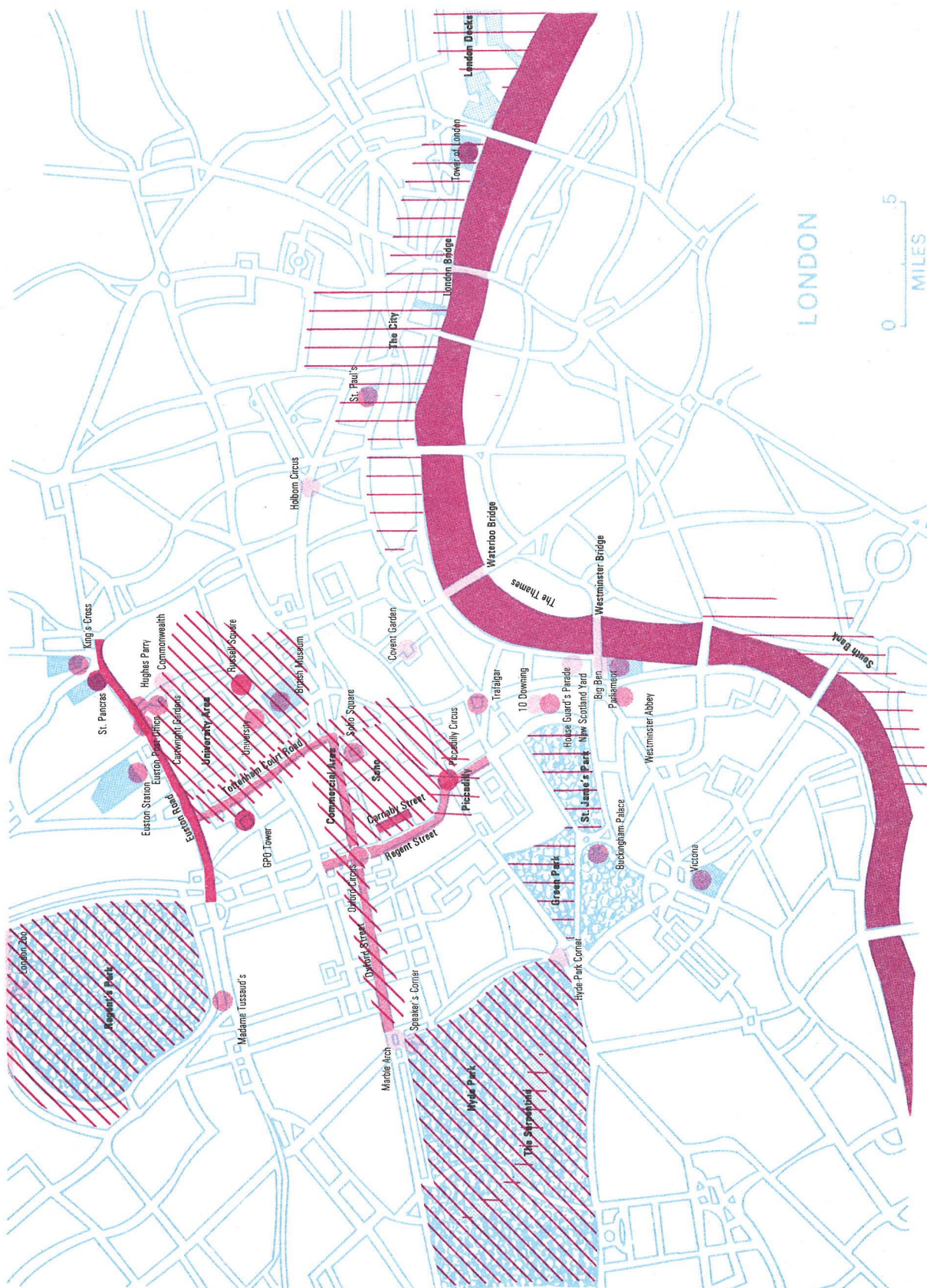


Figure 14.9 Content of the first Group L maps (n=36)

TABLE 14.0

CONTENT ANALYSIS OF GROUP L (n-34) AND GROUP K (n-43) LISTS OF
PLACES VISITED

GROUP L		GROUP K	
Total Items	66	Total Items	81
Total Instances	347	Total Instances	562
Points		Points	
Items	46	Items	60
Instances	347	Instances	432
Items on List	23	Items on List	19
Items not on List	23	Items not on List	41
Instances on List	175	Instances on List	282
Instances not on List	85	Instances not on List	150
Lines		Lines	
Items	12	Items	15
Instances	57	Instances	62
Items on List	10	Items on List	8
Items not on List	2	Items not on List	7
Instances on List	54	Instances on List	54
Instances not on List	3	Instances not on List	8
Areas		Areas	
Items	8	Items	6
Instances	30	Instances	68
Items on List	7	Items on List	5
Items not on List	1	Items not on List	1
Instances on List	11	Instances on List	45
Instances not on List	19	Instances not on List	23

As might be expected from the fact that Group K is nearly a quarter again as large as Group L, the total number of items and instances generated in the list context is greater for Group K. Since this is your first acquaintance with such a table, let me give you a tour, pointing out the highlights. First of all notice the decrease in total numbers as we go from points to lines to areas. In other words, in this verbal instance, the kids could name far more points than lines and more lines than areas. This is just what we should have expected. To understand the normalcy of this, pick a city and try to list as many point, line and area phenomena

as possible. You will readily see that you know more points than lines and more lines than areas. This also makes rational, as well as experienced, sense, for as areas are composed of lines (geometrically speaking) so lines are composed of points. It only makes sense that such a hierarchy should obtain, and I shall herewith cease to prate about it, only requesting that you notice how this fact holds for all the tables of the content analysis that we shall have occasion to see.

Now turn to the relationship between items and instances in regard to their being "on list" or "off list". Take the Group L points. Forty-six point items were mentioned in all. Of these, 23 appear on our List and 23 don't. It is, however, easy to distinguish between these two sets of 23, for the 23 items that do appear on our List generate 175 instances, while the 23 that do not appear on our List generated less than half as many. This is to say, that the "on list" items were mentioned by more kids than the "off list," or, that the unlisted items probably include those places discovered or remarked idiosyncratically by individual kids, items probably not part of the ordinary tour itinerary, items probably not hitherto known through the mediums of TV and magazines. "Off list" items are not sights or tourist attractions, but more likely of the nature of important or striking orienting and navigational and functional cues. Examples of these are subway entrances (particularly those at Russell Square and King's Cross), American style eateries, pubs, buildings under construction, distinctive apartment complexes, the dormitories themselves and so on. The reason they were excluded from our List of Places must be obvious. They are locally important in the first place, and were likely as unknown to Bob or me prior to arrival as to the kids. (Certainly they never appeared on the National Geographic Society map of London!)

So the first thing we want to note about "off list" places is that that are likely highly local in character, and unlikely of interest beyond an individual or small group. Note that the local character of Group K's interests that shows up on the sketch maps, is already prefigured here in the greater number of "off list" items and instances (in all but one case, where the number is the same for both groups). But now note, that although no one in Group K ever saw the List of Places, they were capable of mentioning nearly as many of the "on list" places as Group L was. Thus Group L mentions 40 listed items and Group K mentions 32. In terms of instances, Group L mentions its "on list" items 240 times, while Group K mentions its "on list" items 281 times. In other words, Group K was clearly not at a disadvantage in this listing operation by virtue of not having previously used the List of Places. If anything, it seems to have hindered Group L's ability to come up with names. None of this should be surprising, given the fact that neither group used the List of Places in creating their lists of places visited, and that both groups had highly

similar experiences in London.

However, the situation is wholly different when it comes to the content analysis of the sketch maps as Table 14.1 shows.

TABLE 14.1

CONTENT ANALYSIS OF THE FIRST MAPS OF GROUP L (n-34) AND THE
MAPS OF GROUP K (n-43)

GROUP L		GROUP K	
Total Items	176	Total Items	128
Total Instances	839	Total Instances	709
Points		Points	
Items	84	Items	89
Instances	455	Instances	594
Items on List	37	Items on List	18
Items not on List	47	Items not on List	71
Instances on List	331	Instances on List	169
Instances not on List	124	Instances not on List	425
Lines		Lines	
Items	50	Items	29
Instances	211	Instances	86
Items on List	23	Items on List	10
Items not on List	27	Items not on List	19
Instances on List	126	Instances on List	34
Instances not on List	75	Instances no on List	52
Areas		Areas	
Items	42	Items	10
Instances	173	Instances	29
Items on List	20	Items on List	9
Items not on List	22	Items not on List	1
Instances on List	89	Instances on List	24
Instances not on List	84	Instances not on List	5

First of all, note the decrease in items mapped as we move from points to lines to areas, but note especially that the decrease is far more drastic in the case of K than it is for L. Group K maps more points than L, half as many lines, and less than a quarter as many areas. This

difference can clearly be attributed to the emphasis placed on lines and areas in the Environmental A mapping system, which leads to a more balanced view of the composition of space. But even as K maps more points, note that the bulk of these are "off list," and that the bulk of the L items are "on list." Ditto for the instances. Most of the K points are local. Most of the L's are scattered all over London. Most of the K lines are local (off list), while most of the L lines are of more general interest (on list). The situation is reversed for areas. This is understandable given the fact that the Environmental A mapping system primed the eyes of the L kids for areas and the fact that the number of areas on the List of Places is paltry to say the least. But paltry as they are, they are also the famous obvious areas: Regent's Park, Hyde Park, the East End, the West End and so on. It is these obvious, famous, areas that Group K latched onto. The third thing worth noting about this table is that despite the fact that Group L consisted of fewer kids, it generated more items and instances, reversing the normal order of things.

Comparison shows that the Environmental A mapping system had little effect on the generation of verbal information, although certain spinoffs were being felt simply by virtue of being part of Project Group L. When it comes to drawing maps the effects of the Environmental A mapping system are immediately apparent and quite overwhelming. Three aspects of this effect can now be isolated. 1) The Group L kids had a more balanced conglomeration of points, lines and areas, as opposed to the point-heavy view of Group K; 2) The points, lines and areas mapped were of London-wide significance, as opposed to the local, personal significance of the K places; 3) Group L mapped more places and with far greater consensuality.

The second point mentioned above, that the K places were local, the L places London-wide, may need further elucidation. To this end I have prepared a further series of tables that examines the places mapped in terms of distance from the dorms. The space of London has been divided into three envelopes. In the smallest envelope we find Cartwright Gardens, any mention of the four residence halls (Hughes Parry, Commonwealth, Bentham, and Canterbury—there were others, but not mentioned), the hotels surrounding the gardens (small, private hotels), the gardens themselves, the tennis court, and the four streets immediately incident to the gardens (Marbledon, Marchmont, Leigh and Hastings), but excluding any shops and so on that might appear on these streets beyond the Gardens proper. These are included in the next larger envelope.

This larger envelope included everything beyond Cartwright Gardens but within a 1/3 mile radius, including Gower Street at Euston Road, Euston Square, Euston Station, St. Pancras Station, King's Cross

Station, Gray's Inn Road, Guilford Street, Russell Square, all of London University on or within Gower Street and so on. Everything outside this circle comprises the outermost envelope, as long as it is in greater London. Thus we exclude Oxford, Stratford-on-Avon, Bladon and so on.

The inner envelope is entirely and exclusively visible from the doors of the residence halls; the middle envelope is within a five-or-six minute walk of the residence halls; the space of the outer envelope is bus and subway space. The percentages on the following tables refer to the percent of the points, lines, or areas on either the list or the sketch maps, in the given envelope. I think the tables are self-evident.

TABLE 14.2
PERCENTAGES OF POINTS, LINES AND AREAS LISTED AND MAPPED
BY GROUPS L AND K FOR SPACE ENVELOPE:
CARTWRIGHT GARDENS

Group L LIST					Group K LIST				
	Item	%	Instances	%		Item	%	Instances	%
Points	2	4	5	2	Points	3	5	21	5
Lines	0	0	0	0	Lines	1	7	1	2
Areas	0	0	0	0	Areas	0	0	0	0
Group L MAPS									
Points	4	5	39	9	Points	9	10	142	24
Lines	2	4	6	3	Lines	3	10	14	16
Areas	1	2	1	1	Areas	0	0	0	0

Note that, in the Group L List, within this inner envelope, only two point places were located (4% of all points mentioned), these 2 points mentioned a total of 5 times, (2% of the total instances of points mentioned). Within this inner envelope, Group L listed very few places. The same might be noted of Group K, although they did list significantly more lines in this Cartwright Garden envelope. Both groups listed few places inside this inner envelope.

When we turn to the sketch maps the situation is quite different. The frequency of mention for Group L remains low, more or less on the order of frequency of mention for the list. But this is not true of Group K. In regard to points and lines, 10% of both of them were found within this

inner envelope, more than twice the number for Group L. Neither group found many areas in the vicinity of Cartwright Gardens—no big surprise since the entire envelope can scarcely be said to amount to a single block.

Our conclusions from Table 14.2 are that neither group was markedly dormocentric on the list, and that Group K was decidedly more dormocentric on the maps than was Group L. Now, let's look at the next envelope.

TABLE 14.3

PERCENTAGES OF POINTS, LINES AND AREAS LISTED AND MAPPED
BY GROUPS L AND K FOR SPACE ENVELOPE:
1/3rd MILE

Group L LIST					Group K LIST				
	Item	%	Instances	%		Item	%	Instances	%
Points	10	22	33	13	Points	21	35	90	21
Lines	1	8	2	4	Lines	3	20	3	5
Areas	0	0	0	0	Areas	0	0	0	0
Group L MAPS					Group K MAPS				
Points	19	23	144	32	Points	61	69	444	75
Lines	10	20	41	19	Lines	12	41	43	50
Areas	6	14	22	13	Areas	0	0	0	0

Reminiscent of the previous table, both K and L bat in similar ranges when it comes to the list. Even here K is heavier in this envelope of space than is Group L. But not alarmingly. On the other hand, it is alarming when we turn to the map information. Group K located 69% of its points within a third mile of the dorm (more than twice Group L), and these points accounted for a full 75% of the points instanced. Forty-one percent of the lines were located here.

Conclusion: without prior instruction about mapping, Group K produced dormocentric maps; with prior instruction, Group L produced even at this early stage maps of the city of London. That is, instruction-less map drawing, at least in this case, produced highly domocentric maps, maps of the home or dorm area. It would seem proper at this point to consider the conclusions reached about egocentric, domocentric and coordinated systems of reference by researchers employing an instruction-less mapping approach. I have, however, no intention of doing this, for

the simple reason that neither have the authors concerned, in their published work, made sufficiently explicit the exact nature of the mapping situation, nor have they described in adequate detail the nature of the analysis employed in reaching their conclusions. I will note that Hart and Moore consider the domocentric (or fixed) approach genetically prior to a coordinated approach in both the ontogenetic and microgenetic case (Hart and Moore, 1971, 45-59). Yet we have clearly shown that the domocentric products of Group K were produced later than the coordinated products of Group L, and that this difference can be attributed to the nature of the mapping instructions and mapping situation alone and entirely.

In other words, the minimization of the mapping instructions, far from insuring an "objective" product minimally influenced by the apparatus of the investigator, is bound to insure incomparable results that are highly domocentric in character. On this basis, I am tempted, nay forced, to conclude that conclusions reached by scientists employing such techniques in regard to the production of their data, and specifying insufficiently the exact nature of the analysis technique, be, from this point on, disregarded in their entirety. This goes not only for remarks about systems of reference employed by mapping subjects, but for remarks about "route" and "survey" type maps as well. In other words, I reject out of hand any conclusions reached in prior investigations using as a data source sketch maps produced by uninstructed mappers. Furthermore, we must reject the developmental scheme advanced by Hart and Moore, at least in the microgenetic case, to the extent that it is based on such data (e.g. Appleyard, 1969, 1970; Rand, 1969; Lee, 1964; et cetera).

TABLE 14.4

PERCENTAGES OF POINTS, LINES AND AREAS LISTED AND MAPPED
BY GROUPS L AND K FOR SPACE ENVELOPE:
BEYOND RADIUS 1/3 MILE

Group L LIST					Group K LIST				
	Item	%	Instances	%		Item	%	Instances	%
Points	36	78	227	87	Points	39	65	342	79
Lines	11	92	55	96	Lines	12	80	59	95
Areas	8	100	30	100	Areas	6	100	68	100
Group L MAPS					Group K MAPS				
Points	65	77	311	68	Points	28	31	150	25
Lines	40	80	170	81	Lines	17	49	40	50
Areas	36	86	151	87	Areas	10	100	29	100

To drive my last point home still more completely, note how poorly Group K's maps reflect Group K's lists. Of the points Group K mentions, 65% are in greater London, but only 31% of the points mapped are out there. In other words, Group K's maps poorly reflect the state of its knowledge, the extent of its experience. On the other hand, the Group L maps reflect the Group L lists very nicely. The Environmental A mapping system allows Group L to reflect its experience and knowledge graphically. Lacking instruction in mapping, Group K fails to graphically approximate the nature and extent of its knowledge and experience. What use are its maps in regard either to the study of Group K or London? None. The close correspondence between the two L products gives us some hope that the two schedules are getting at something that may in fact be there.

In Lynch's original study, the verbal responses were much richer than the graphic responses in general and in respect to linear elements in particular. Lynch says that "the correlation between an individual sketch map and the same person's interview was in some cases rather low," that the sketch maps "tend to have a higher threshold," and concludes that the sketch maps "are not a good index of known connective structure" (Lynch, 1960, 144-45). I think that these discrepancies are readily explained by the nature of the mapping task set his respondents.

While my particular philosophy about the practice of science has resulted in the fact that there are no explicit hypotheses to be found anywhere in this report, we did have goals of a more general sort that we wished to satisfy. These goals, set forth in Chapters 2 and 3, include among them the following two:

- 1) That field mapping by a naive population using a directed and uniform mapping technique has enormous educational potential: specifically, that our group would be better able to cope with the space of tremendously complex urban environments than the control sample.
- 2) That social science investigations can be mutually beneficial to scientist and subject; that ultimately the subject can participate with the investigator.

To a certain extent, the comparison of the Group L and K London products has shown that we have successfully achieved these goals. As we gathered data, Group L learned and effectively employed a graphic expressive technique. Thus, to a certain extent, the benefit has been mutual. Our fulfillment of the first goal is obvious. Group L, to the extent that they

felt no fear in mapping the city of London as a whole, is clearly coping more successfully with a complex, urban environment.

I V

Let's concentrate on Group L. Figure 14.10 shows the analysis of the first London maps again. I have duplicated it here for your convenience. Are there any general remarks that we might make about this map that we have not already made? I think we might note that very few of the points displayed were not seen on the all-day sightseeing tour taken on the bus. The few that were not seen included Victoria Station, Soho Square, Holborn Circus and points closely associated with Cartwright Gardens. We must also note that none of the points, as well the lines reported, was mentioned with a frequency exceeding 75%. All of the lines were encountered on the sightseeing trip with the exception of Carnaby Street and Euston Road. These correspond to Soho Square and the Cartwright Garden points. Taking the points and lines together, we conclude that the bulk of them are important, visible, tourist attractions and of such a nature as would be visited on an introductory sightseeing tour. The remaining items fall into two distinct groups: those associated with Soho-Carnaby Street and the "Mod" phenomenon, and those associated with the locality of the dorms. None of these items is highly consensual. All of the mapped areas, with the exception of Regent's Park, fall into the same three classes: those seen on the tour, those associated with Carnaby-Soho, and those around home. Again, none is mentioned with a frequency exceeding 75%. The inclusion of Regent's Park allows us to postulate a fourth class of items: those associated with a trip to Madame Tussaud's. This trip often includes a visit to the London Zoo, Regent's Park and the Planetarium. That the bulk of the items mapped were seen on the sightseeing tour indicates two things: the impact of that tour and the fact that in their individual wanderings the kids have yet to visit similar places with great frequency.

Regarding the issue of imageability, all of the items mapped are highly imageable. The points are all landmarks or highly consistent and strong path intersections: Oxford Circus, Holborn Circus, Piccadilly, Trafalgar and so on. Some have both attributes: Piccadilly is at once an unforgettable landmark and a node. The same holds true for the lines mapped. They are all distinctive, visible paths and in some instances landmarks as well. Such landmark-lines include Tower Bridge, Carnaby Street, the Thames and Regent Street. The areas mapped at this stage are all either strictly delimited in life (the parks fall here) or imbued with strong internal characteristics, such as Soho, the City and the London Docks. (A word might be said here concerning the delimitation of the City on these maps. I have not followed strict London usage in drawing

the boundary of the City around the ancient square mile towards the Tower, but have included in the City all those areas that the kids wanted to include and only those areas. Thus the City is not shown in its full extent to the north and wanders perhaps a little farther west than is kosher.) The kids all felt a distinct gap between Trafalgar and the City, a distinct weakening of visible connectivity. This will show up more clearly in Chapter 17. The south bank varies considerably on the kids' maps and bears little correspondence to the Londoner's south bank. For the kids, it was the visible part of the city south of the Thames. It is mentioned, but with frequencies consistently less than 25%.

In general, the results of the analysis for the first set of maps show us an image of London that could be gained readily in one or two days, and I am probably justified in calling it the American tourist image of the city.

Figure 14.11 shows us the results of the second set of maps. Regarding the points, there has not been a significant increase in their number, but there has been an increase in consensuality. Although no point is mentioned by more than 75% of the kids, more points are mentioned more than 50% of the time. Clearly more kids have made it over to Madame Tussaud's and some have gone to Westminster Abbey to get a chance to see the inside. However, this is not the situation that holds for the lines. There has been an emphatic increase in their number and the image of London has gained in connectivity. The surface of the map is immeasurably richer in this respect. Furthermore, consensuality has increased. Euston Road is mentioned more than 75% of the time. This indicates that the kids are moving around by themselves increasingly and that all this movement is not underground. Turning to areas we see that the surface of London is being discriminated into areal segments, and that there is increased consensuality. Hyde Park moves up over 50% frequency, and the City moves over 25% frequency of mention. Note as well that the extent of London being covered is growing as well. Chelsea appears for the first time. Thus the kids are not confining their mapping activities to increased detail at home, but are moving out into greater London with growing assurance. Note the growth in size of the south bank, the discrimination of the University Area into the University Area and Bloomsbury, the appearance of Victoria, as well as a market region within the City.

Nothing is different about this map and the previous one in regard to the issue of imageability, except that the separation of the University of London from Bloomsbury must have required greater experience than was indicated on the first map. However, with regard to the issue of legibility, it is a different story. The first map of London,

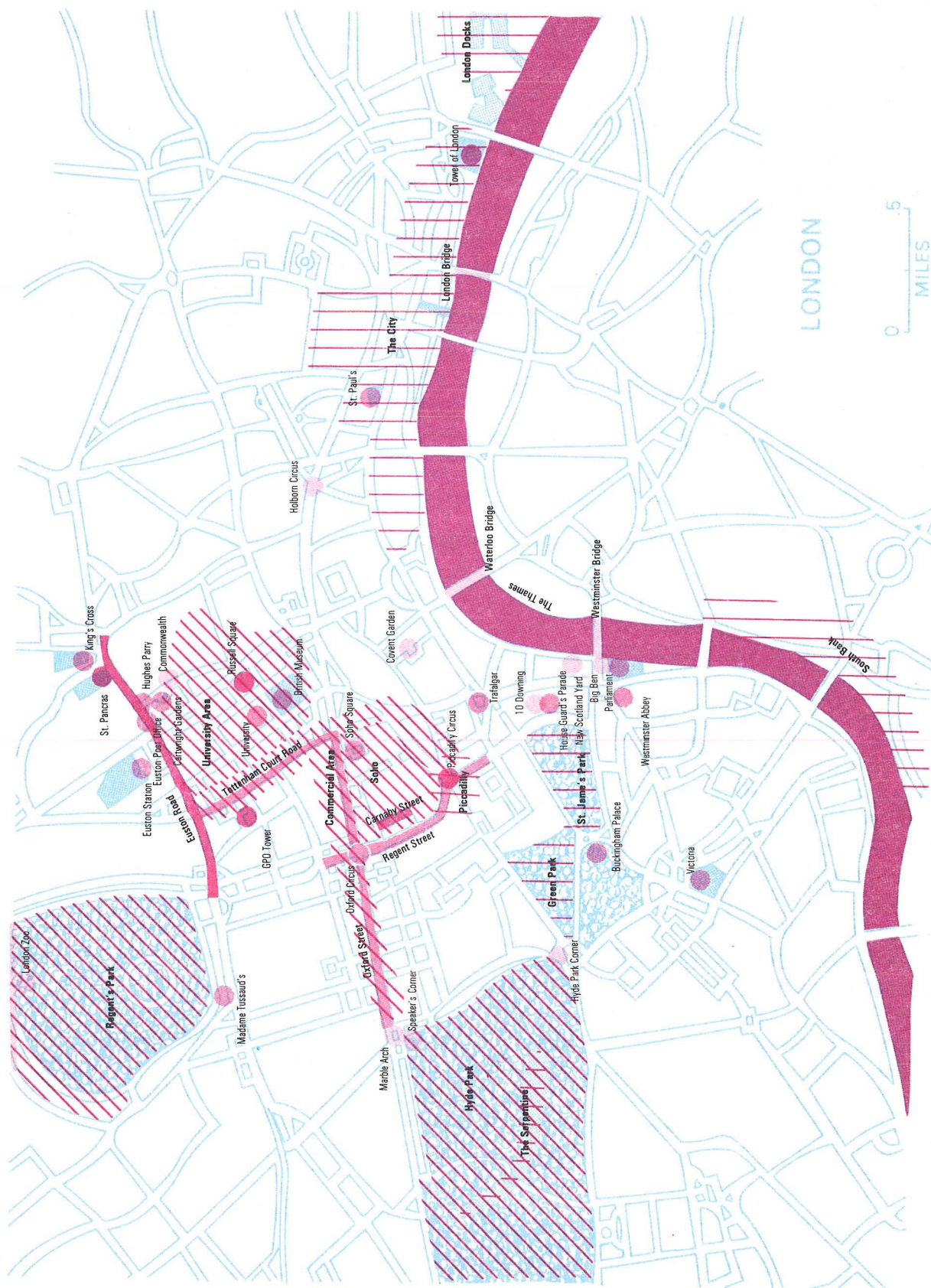


Figure 14.10 Content of the first Group L maps (n=36)

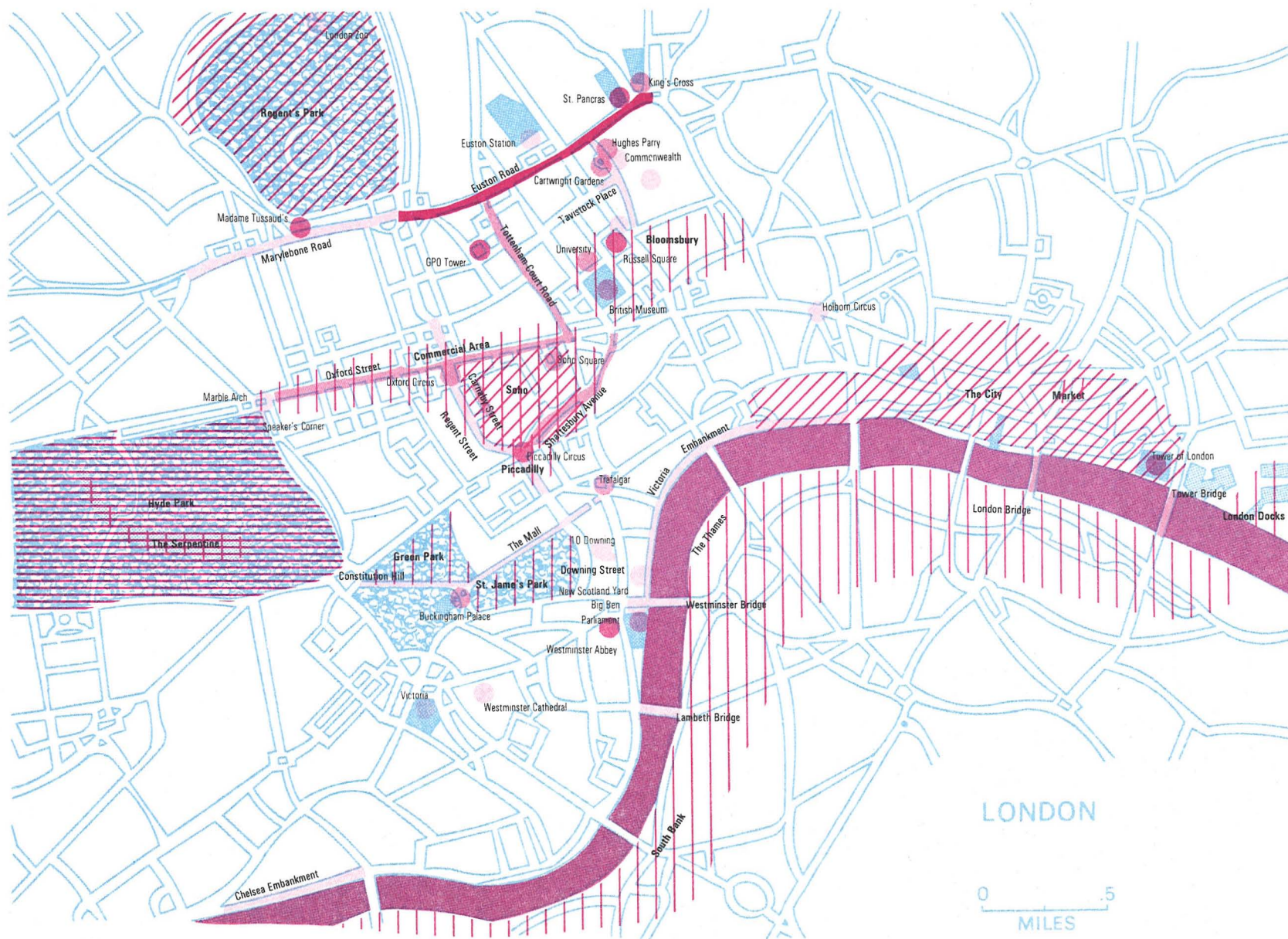


Figure 14.11 Content of the second Group L maps (n=27)

with its lack of connections, provided no legible pattern for the city as a whole. The second map surface shows that increasing experience of the environment is turning London from an experience of floating points into a fabric that is beginning to hang together.

In general, a comparison of the first map with the second shows: increased areal discrimination, significantly increased connectivity and legibility, a slightly richer surface generally, and a definite increase in consensuality.

Figure 14.12 shows us the results of the analysis of the third set of London maps. With regard to the points, they have increased markedly in number, especially when the smaller number of mappers (19 as opposed to 39 and 27) is considered. On the second London map 27 kids generated a total of 79 point items, while only 19 kids on the third map generated 84 point items. (All of these were of course not mapped in Figure 14.12.) Consensuality increases as well, especially locally. The nature of the points continues to be tourist oriented—famous, highly imageable, sights. The story is the same with regard to the lines. There has been an increase of seven lines (Totals remained the same; 43 lines for both maps; instances were up from 188 to 202, again with a smaller number of mappers) and a terrific increase in consensuality: the Thames and Euston are now mentioned more than 75% of the time; Marylebone, Oxford and Carnaby are mentioned over 50% of the time; and fourteen other streets and bridges are mentioned over 25% of the time. Most of the new streets play a critical role. They are not simply new streets, but tie the pre-existing pattern together. Thus High Holborn ties Shaftesbury Avenue into Oxford and carries it into the City via Holborn and Kingsway. Portland Place ties Regent Street and Oxford Street into Marylebone and Euston. Thus Piccadilly Street ties Constitution Hill and Park Lane into Regent Street and the giant node of Piccadilly, while Park Lane ties Oxford Street to Piccadilly and Constitution Hill. This third map is admirably tied together. Recall the sequence: first map, few scattered streets; second map, more streets better connected; third map, lots of streets tightly connected. This sequence takes place under a point system that varies only slightly.

The same is true of the areas. We have increased consensuality, spotlighted by the mention of Hyde Park over 75% of the time and of Regent's Park over 50%; but Green Park, the Serpentine, London Docks, Piccadilly, Soho, the University Area and Bloomsbury are all mentioned with increased frequency. We have lost one area and gained two. The gain has been in an amazing discrimination of the heart of the city. We see not only Soho and Piccadilly, but also a larger commercial area, an entertainment district, and a distinct area around St. Giles Circus.

By this stage of the experience we are in the presence of a rich collective image of the city, now transcending the ordinary tourist image. This shows up in its pure form only in the points displayed. Otherwise we are approaching an image of the city that might be generated by a group of natives. Areal discrimination has become quite fine and the networks of streets is highly connected. Compare this image of London with the images of Boston collected by Lynch from natives of Boston and I think you'll see what I mean. Progress in coming to terms with London has not involved the recognition of new points. These were for the most part seen and remembered from the first day's tour, if not already known from media images. But it is hard to spell out the extent and character of whole areas on TV or in magazines and it is next to impossible to suggest the nature of the underlying network. These are what have been learned in the seven days that Group L spent in London, and these are what have increased in richness from map one to map three.

At this stage we are in the presence of a city loaded with highly imageable point, line and areal phenomena, and in the presence of a city that can deliver them in a legible manner. Needless to say, London does not have the legibility of a city like New York, but seven days seem to be sufficient to garner at least a decent facsimile of such legibility.

Figure 14.13 shows the fourth London map. The number of kids completing a fourth map was only four. Consequently I have displayed only those points, lines and areas that the three of the four mapped in common. The consensuality of this image is impressive. These four kids showed five areas, five lines, and three points in common. Three of the four kids showed an additional seven points in common. The four kids generated a total of 81 items on their maps, a rather amazing figure. A few general remarks can be made about this map. None of the points, lines or areas shown were missing from the first map. That is, the consensual image of four kids drawing their fourth map had already appeared on the first map. That is to say that this map shows the guts of the London image. And what is the guts of the London image? In terms of points, it consists with two exceptions, of very famous places: the Tower of London, Parliament with Big Ben, Buckingham Palace, Piccadilly Circus, Soho Square, Madame Tussaud's, the GPO Tower, and the British Museum. These have in most cases strong international associations, are commonly seen in advertisements, movies, are practically items of folklore. The two exceptions are strong local images: Russell Square and St. Pancras Station, both certainly widely known—nay, universally known—in England itself. A similar, though less strong case, can be made for the lines. As our native guide pointed out, Oxford Street is England's Fifth Avenue, Carnaby Street is internationally renowned, and the Thames needs no introduction at all. Only Euston Road is less

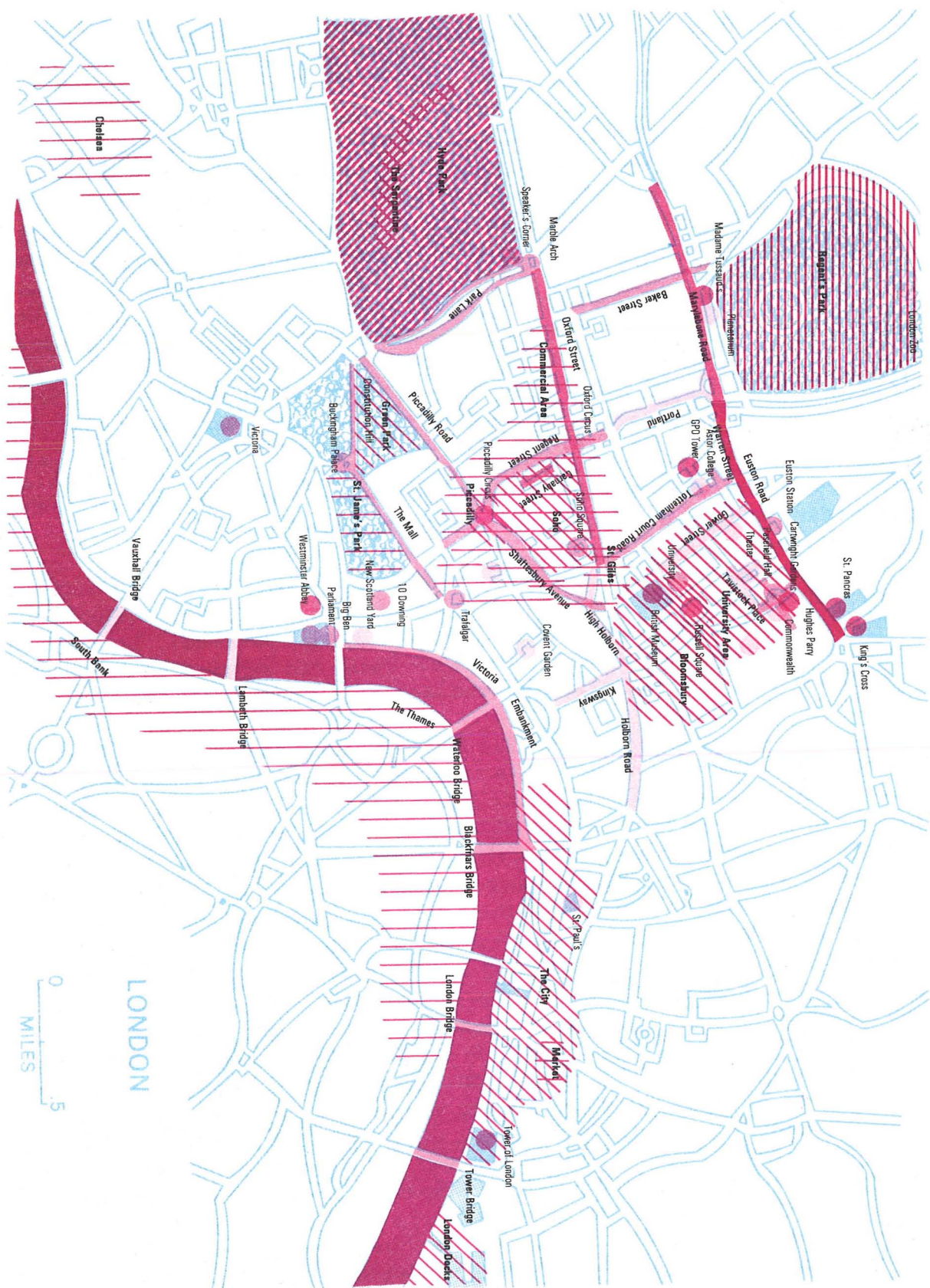


Figure 14.12 Content of the third Group L maps (n=19)

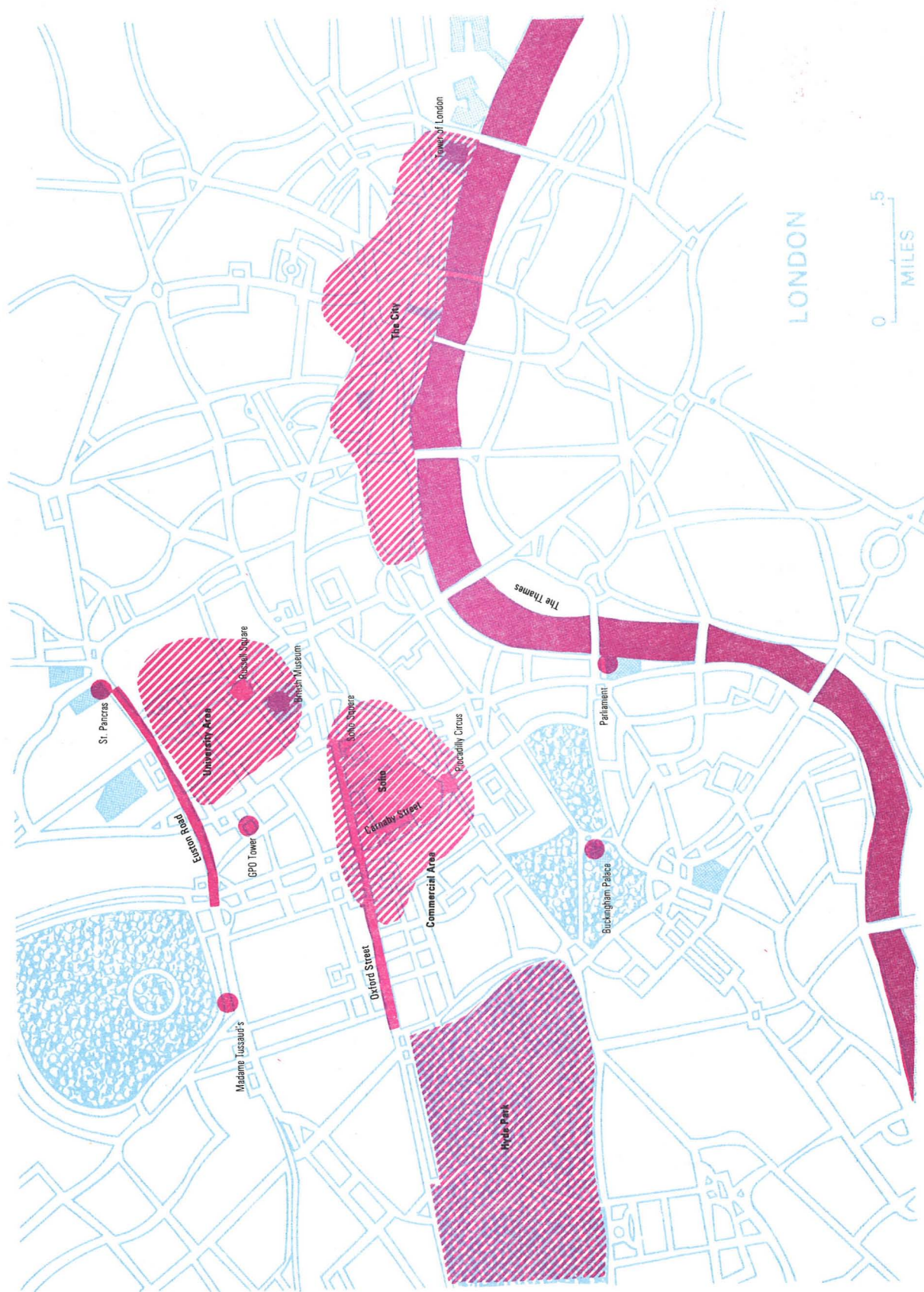


Figure 14.13 Content of the fourth Group L maps (n=4)

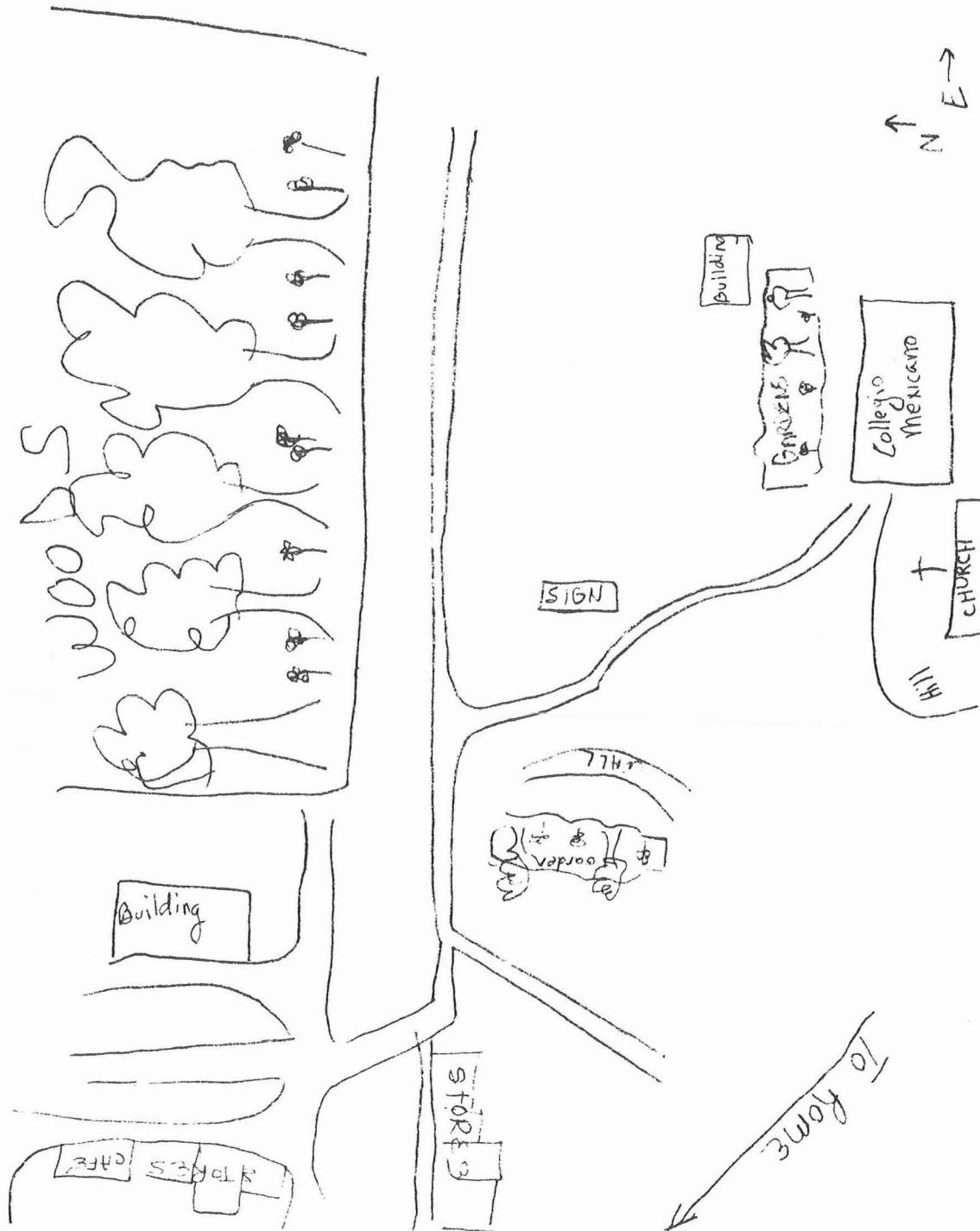


Figure 14.14 A Group K map of Rome

widely known, and is of local importance. Ditto for the areas: Hyde Park, Soho, and the City are items famous beyond the shores of England, while the University Area is of local importance. The guts of the image of London for the kids of Group L consist of a few places of local or particular significance and those things in London that they knew before they came.

Before they knew them as isolated incidents, events of history or the background to movies. Now they could put them together in a whole living, breathing city.

V

The sort of analysis just performed for the content of the Group L maps would not have been possible in the case of the Group K maps. On the one hand, the Group K maps were exclusively of a small area centered on their dorm. On the other, they were composed of symbol systems so disparate as to practically exclude any analysis at all as regarded the city of London. The question as to whether this was true for Group K in London only will not be answered. The analysis is similar to the comparison made between the two groups in London and will be merely sketched in here. First of all I direct you to Figures 14.14 and 14.15. These are two Group K maps pulled at random, both showing Rome. The difference between the symbols systems used on the two maps leaps to the eyes. In Figure 14.14 the emphasis on the area immediately around the dorms is apparent, the dorm being in this case the building labeled Colegio Mexicano. The immediate area is shown in loving detail and is in fact quite accurate both as to content and relative location. The direction to Rome is off by 90° but then that is just the point. The unprepared Group K mapper has not been watching the relations of the macro-landscape and fails to deal with them. Figure 14.15 wanders farther afield, but note the manner in which Rome proper is squashed into the lower third of the map almost as an afterthought, while the area around the dorm is expanded all out of proportion. Furthermore, St. Peter's, the Piper Club and the Trevi Fountain are on the wrong side of the Tiber, assuming west to be at the top of the image as proclaimed by the setting sun and the location of the castle, an item visible from the dorm. Both figures are maps drawn from a variety of points of view. We have aerial perspectives, low obliques, and frontal views. We also have schematic symbols and pictorial symbols. While the two maps are in and of themselves absolutely delightful products, they are rather useless from the point of view of this project. (Frankly, these two maps, from any other point of view, are vastly more engaging than anything produced by Group L. But then Group L was not trying to be cute, humorous, pictorial and so on.)

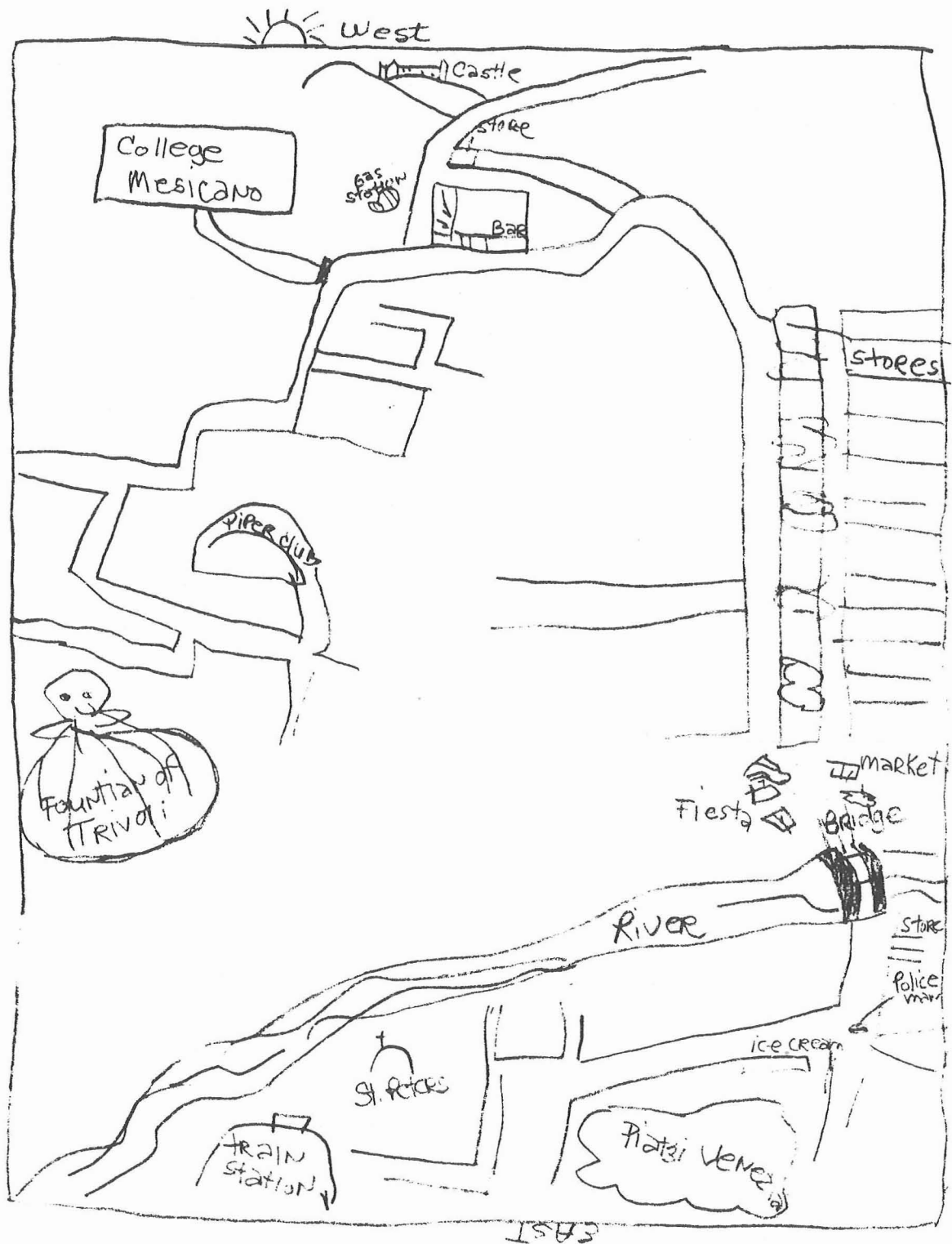


Figure 14.15 A Group K map of Rome

I shall not display the results of the lists drawn up in response to our question, "Where have you been, what have you seen in Rome." The two groups generated nearly identical lists, moreso than was the case in London, since we had no trouble with the tour this time. I will simply state that the actual and perceived experiences of the two groups were identical. With this point in mind, compare Figures 14.16 and 14.17. While the divergences are not as remarkable as they were in London, they are along the same lines. Group K has located the bulk of its points around the dorm. Group L has merely noted the location of the dorm. Group K has located nine points in the rest of Rome, with relatively low frequencies of mention. Group L has located fourteen points in the rest of Rome with a great deal of consensuality. Note that St. Peter's, the Spanish Steps and the Coliseum have been mentioned by more than 75% of the kids. Group L has mapped items farther north and farther south than Group K, including the Olympic Stadium in the north (passed by the buses on entering Rome for the first time) and the Baths of Caracalla to the south (pointed out on the guided tour). Note that all Group K lines are to the west of the Tiber and show great detail around the dorm, that Group L lines include five bridges on the Tiber, the route traveled by all buses entering Rome for the first time, as well as one of the major arteries of downtown Rome. Group K did remarkably well with the areas, though not as well as Group L. The K map shows four areas, all highly visible and with low frequency of mention. Group L shows nine areas, the Vatican over 75% of the time, and some of low visibility (like the rural area near the dorms, and downtown Rome).

There is no need to continue this comparison. The results are clear. Without the Environmental A mapping system, or some surrogate, without a prior disposition to map, Group K has drawn predominately domocentric maps. They did a similar job in London and would probably have done so in Paris had they had the chance. They will no doubt, continue to do so until they are taught (or learn) a mapping system. With this, we dismiss Group K from our discussions.

Before looking at the results of the Rome content analysis, it might be beneficial to glance at a few individual Group L maps. I have pulled four of them at random and they are reproduced as Figures 14.18 through 14.21. The first in the series is the first map of Rome drawn by Tracy Cummings. She has drawn a highly connected map of Rome first time out. This map probably lacks a great deal in terms of its usefulness for the majority of map users. In fact, I would guess that only Tracy Cummings would find this map useful as a guide to Rome. Nonetheless it is important to note that she deals with Rome as a whole, has numbered all her lines, labeled all explicit points, and tried to reduce the unholy chaos of Rome to order. An impossible task. Compare Tracy's tight

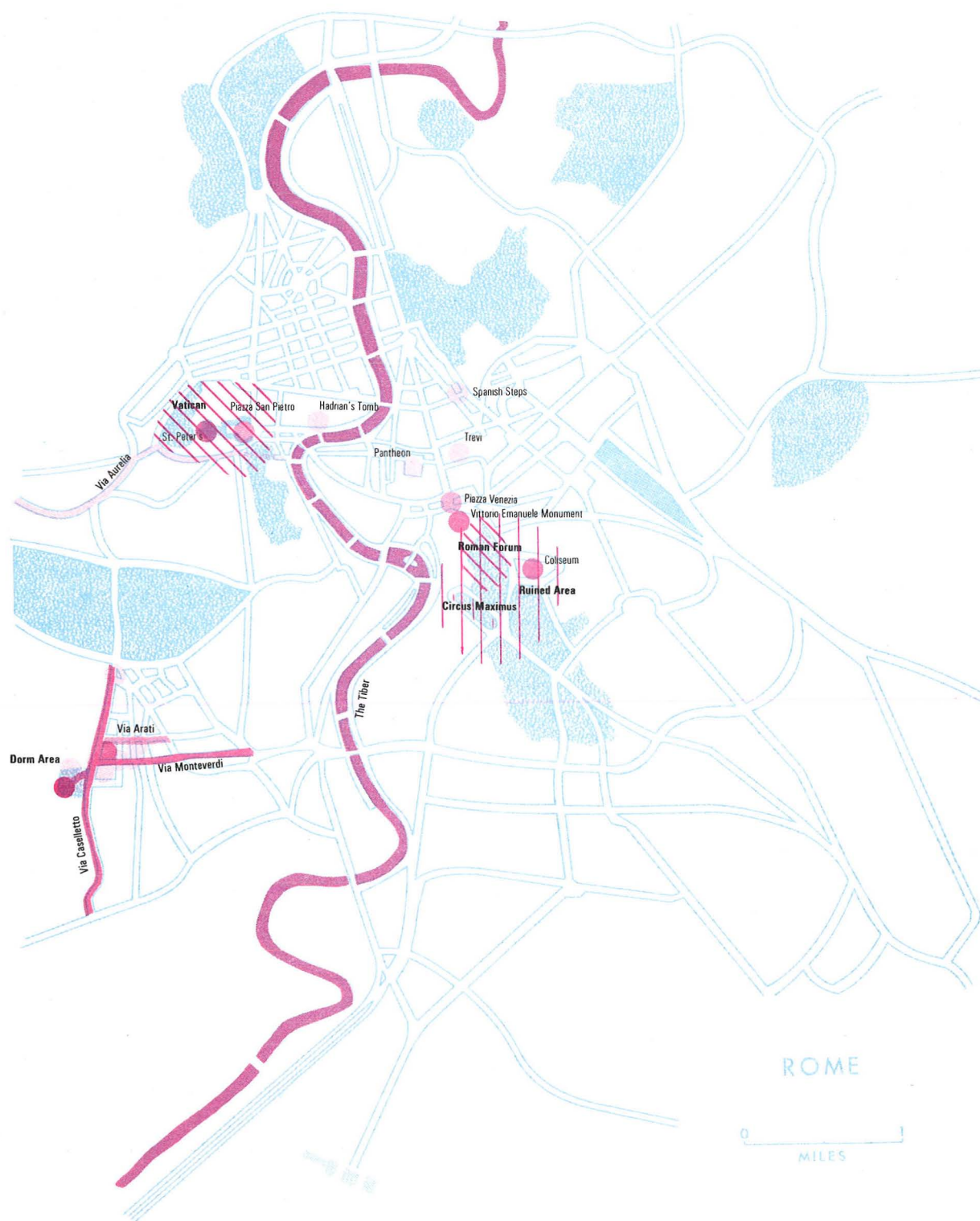


Figure 14.16 Content of the Group K maps (n=36)

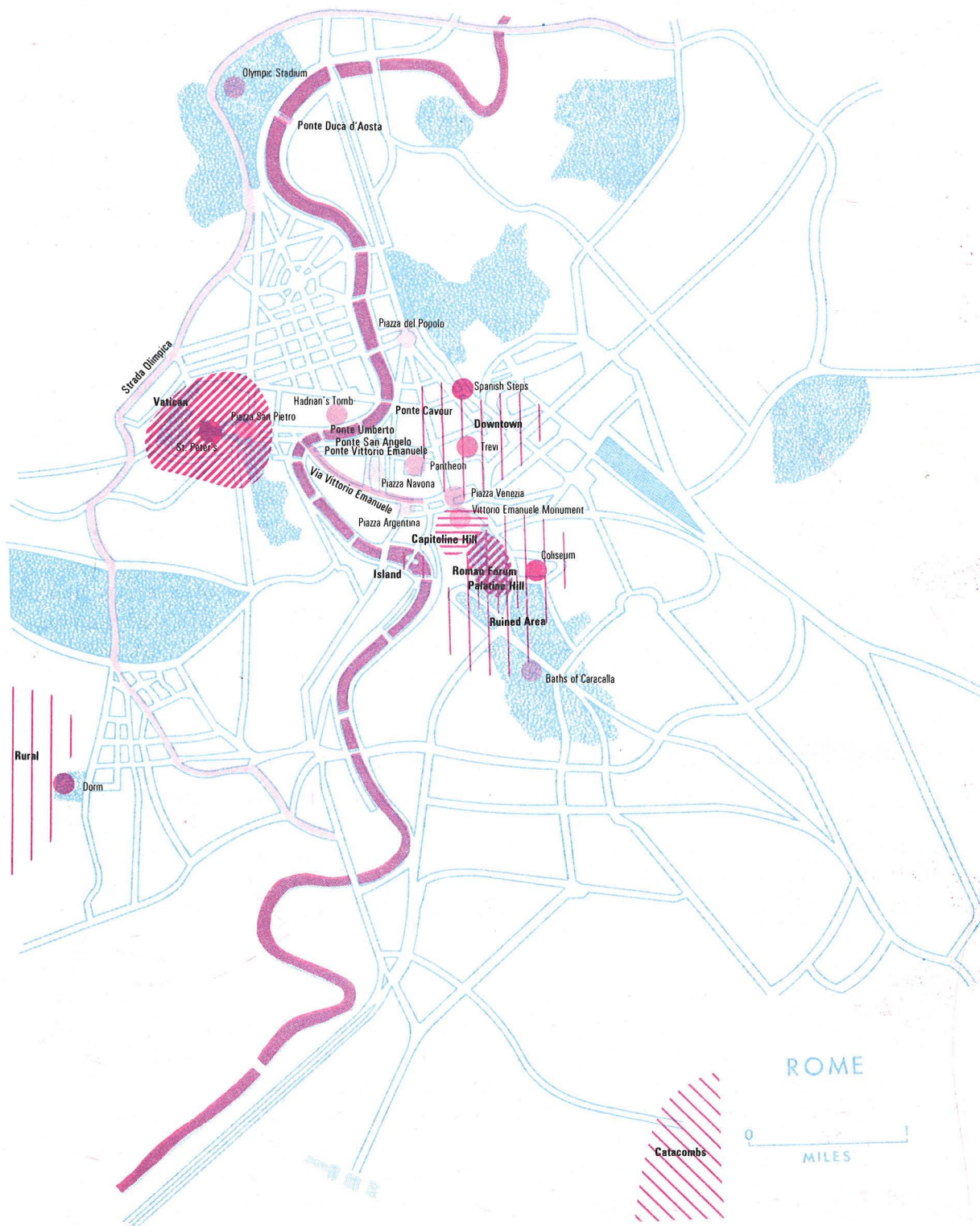


Figure 14.17 Content of the first Group L maps (n=33)

image with Vanessa Garrison's first map of Rome (Figure 14.19). This map is open, shows the Tiber outside the mapping system, and could probably be used, with a few modifications, by anyone. General orientation is correct and she has tried to draw a network connecting the places seen on the tour with some degree of verisimilitude. Both these maps show an effort to reduce Rome to order, an attempt that exceeds anything tried in London at this stage of acquaintance with the city. I would attribute this superhuman effort to the discussions I had held with each kid about the London maps on the bus trip coming into Rome (on the very day before these maps were drawn).

The second map of Therese Montaigne (Figure 14.20) is characterized by excessive caution. She has given us the cardinal points and within this geographic space has located only those items of the Roman landscape about which she feels confident. And she has made only two minor mistakes: the Coliseum and the "Wedding Cake" are flipped and the tunnel is on the wrong side of the river. Otherwise she has outlined the parameters of the space in Rome with great accuracy and no little insight. Bill Brown's third map of Rome (Figure 14.21) is likewise set within the context of geographic space and within this context operates with great success. He has included a variety of streets that show amazing comprehension of the Roman street pattern, although the Via del Corso-Piazza del Popolo complex is located too far east and south. Bill happened to have spent some time with Omar Lenz riding about Rome on a motor scooter and this fact shows up in this map.

The things that should be noted about these four maps is the generic similarity. The differences—with regard to the symbol system used and the area of the city covered—are minimal, and yet each map is capable of saying something about the person that drew it. Group L maps are sufficiently comparable not to cause the scientist trouble, and yet sufficiently distinct to allow him to talk about the mappers themselves.

VI

We naturally start at the beginning, with the first Rome map, reproduced for your convenience as Figure 14.22. Rather than do the same sort of analysis that I did for London—which you can carry out by yourself—I shall comment on anomalies and make a few comparisons with London. The points are, of course, simply tourist points, all highly imageable, far more imageable than anything in London with the sole exception of the striking GPO Tower. The monuments in Rome are truly monumental, are the heart and soul of the city, and are distinguished by their incredible juxtaposition, modern beside ancient beside baroque. Rome doesn't simply have a large church, it has the largest church in the

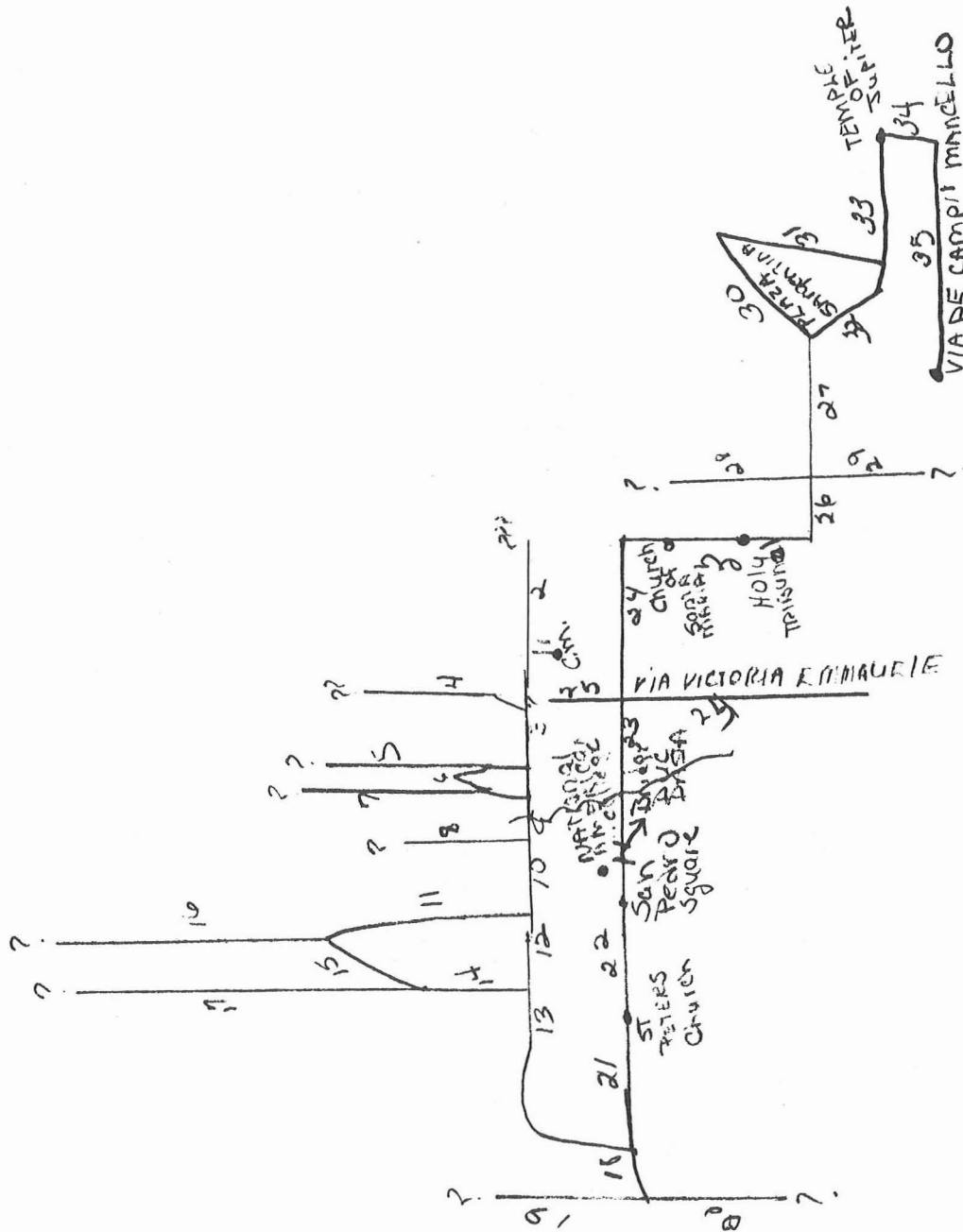


Figure 14.18 First Rome map: Tracy Cummings

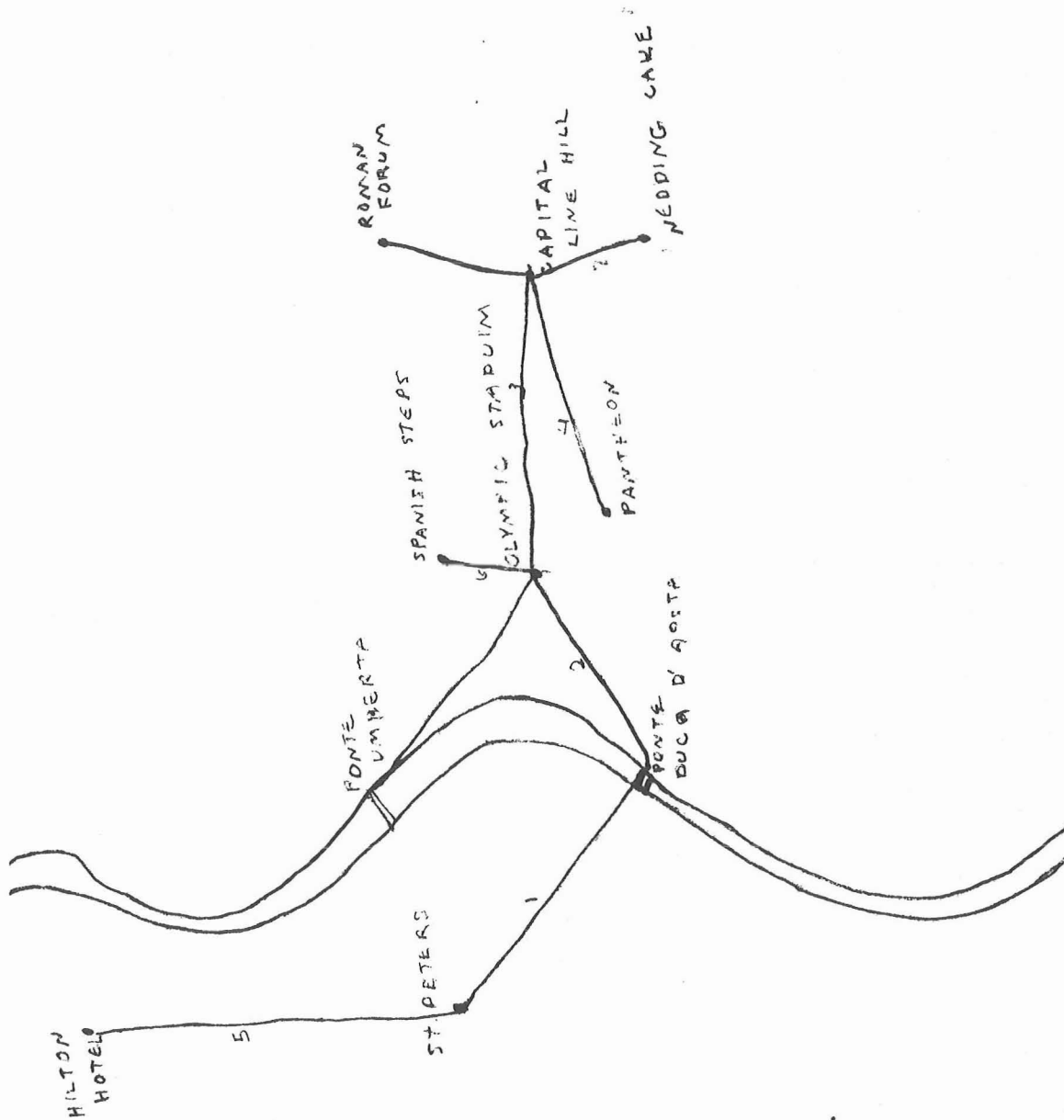


Figure 14.19 First Rome map: Vanessa Garrison

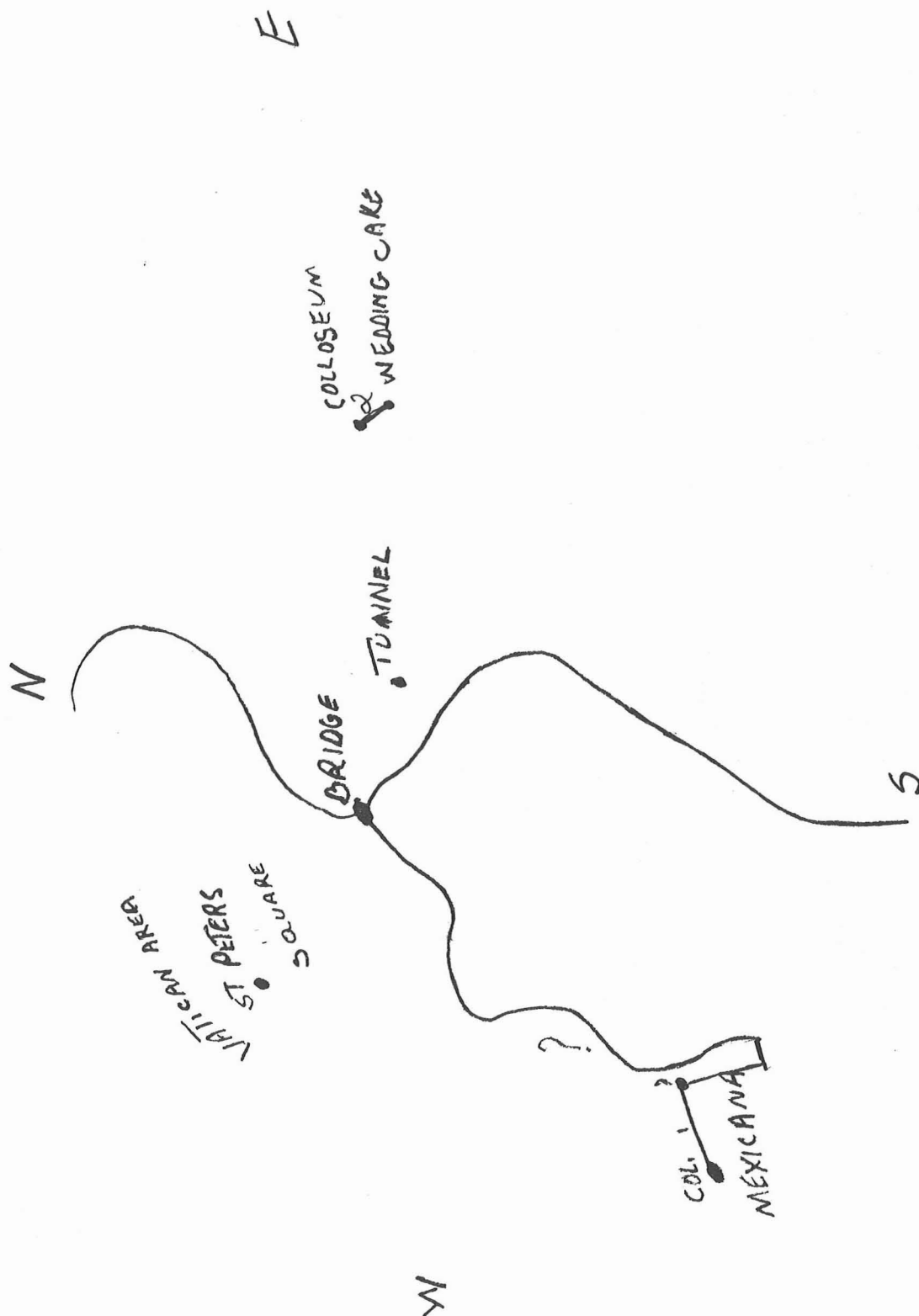


Figure 14.20 Second Rome map: Therese Montaigne

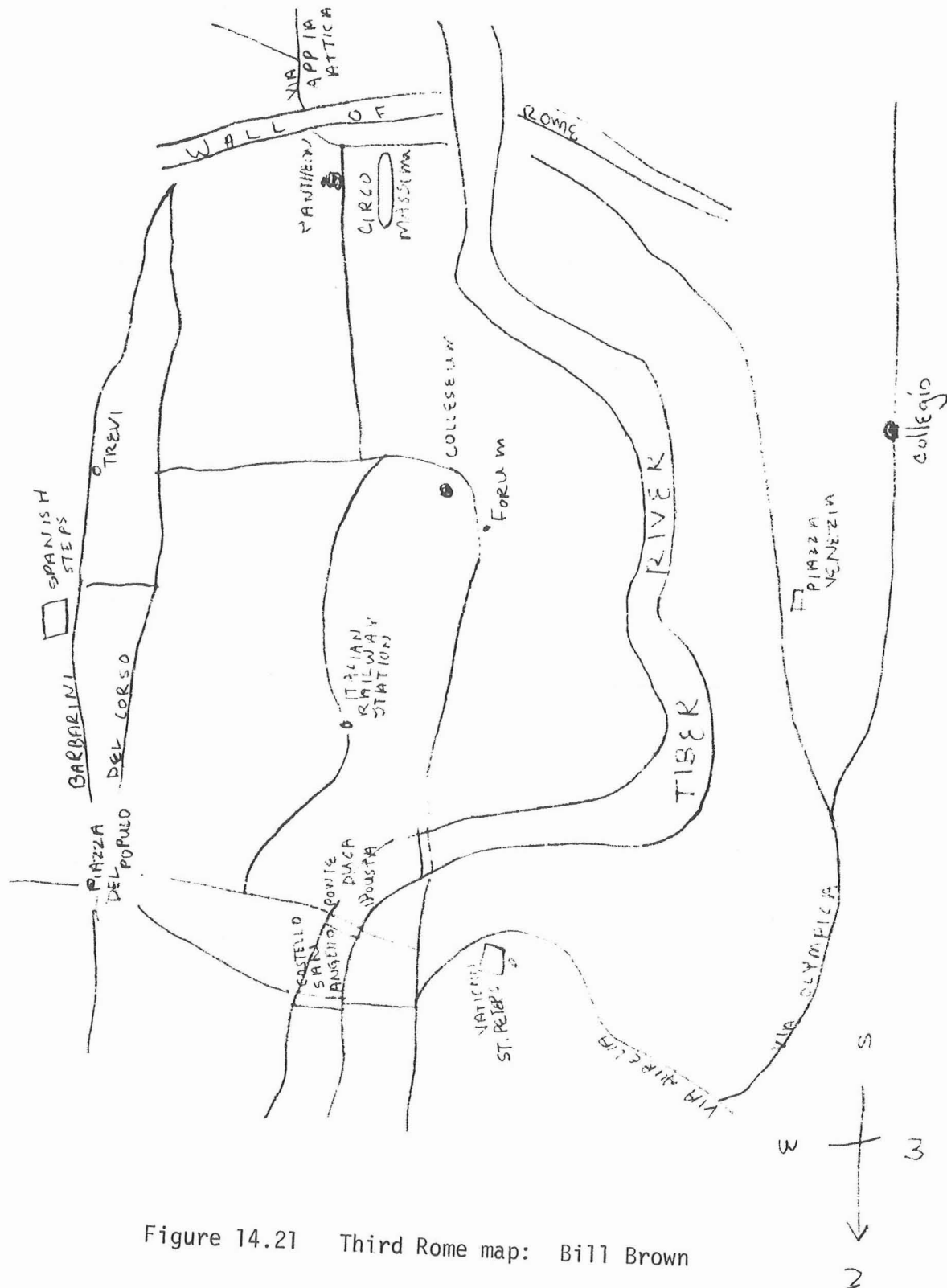


Figure 14.21 Third Rome map: Bill Brown

Christian world; it doesn't simply have a memorial to a loved and dead leader, it has one so gaudy as to be called the "Wedding Cake;" it doesn't have a nice baroque square, it has one designed by Michelangelo himself. Everything about Rome is couched in superlative terms. If someone could ruminate about the history associated with the Tower of London, they can become eternally lost in the history of the Coliseum. Rome has only one problem. None of these monuments make sense together, except for historical sense; they stand out like sore thumbs, and are connected by the most confusing jumble of streets I have ever seen for an area so large. And now look at the first Rome map. The points are clear enough and rather consensual, moreso than was the case in London on the first map. But the lines are tentative, tightly associated, penetrating only slightly the maze that is the street pattern of Rome.

The striking thing about the areas are twofold: first the discrimination of the heart of Rome into six overlapping areas is a fact that I don't think would have happened without a strong set in the minds of the kids toward mapping areas. And then there is that rural area hanging onto the dorm. Rome is so small that fields amounting to countryside can be seen from the dorm itself. This caused extensive comment among the kids and will continue to show up with increasing frequency.

Comparing Rome with London: London is larger but more clearly organized than Rome, at this stage of the mapping process.

Figure 14.23 bears out this point and another more general. In London we saw that the points that appeared on the first map were the points that continued to show up on subsequent maps without significant change, except regarding consensuality. This is borne out in Rome. Few points have been added and in this case they are only slightly more consensual. The Piazza Venezia has moved up over 75% frequency of mention, but little else has happened. As was the case in London, it is the lines that have flowered on this map. Seven major arteries have been added on this map, as well as increased detail locally and heightened consensuality generally. The Tiber is now mentioned by at least 75% of the kids, and the Via del Corso and Via Caseletto by more than 25% of them. What has been drawn on this map is a first: a connected route from the dorm to the drop off spot in Rome. In Rome each morning and afternoon buses left the dorms for Rome, for the Piazza Venezia. One of the frequently used routes can be traced on this map. It starts on the Via Caseletto, proceeds up the Via Olimpica, turns right onto the Via Aurelia, crosses the Tiber and coasts down the Via Emanuele Vittorio. From this snake of a route we find feeders leading to St. Peters, to the Coliseum and to the Piazza del Popolo. Given the nature of the street network of Rome it is no mean feat.

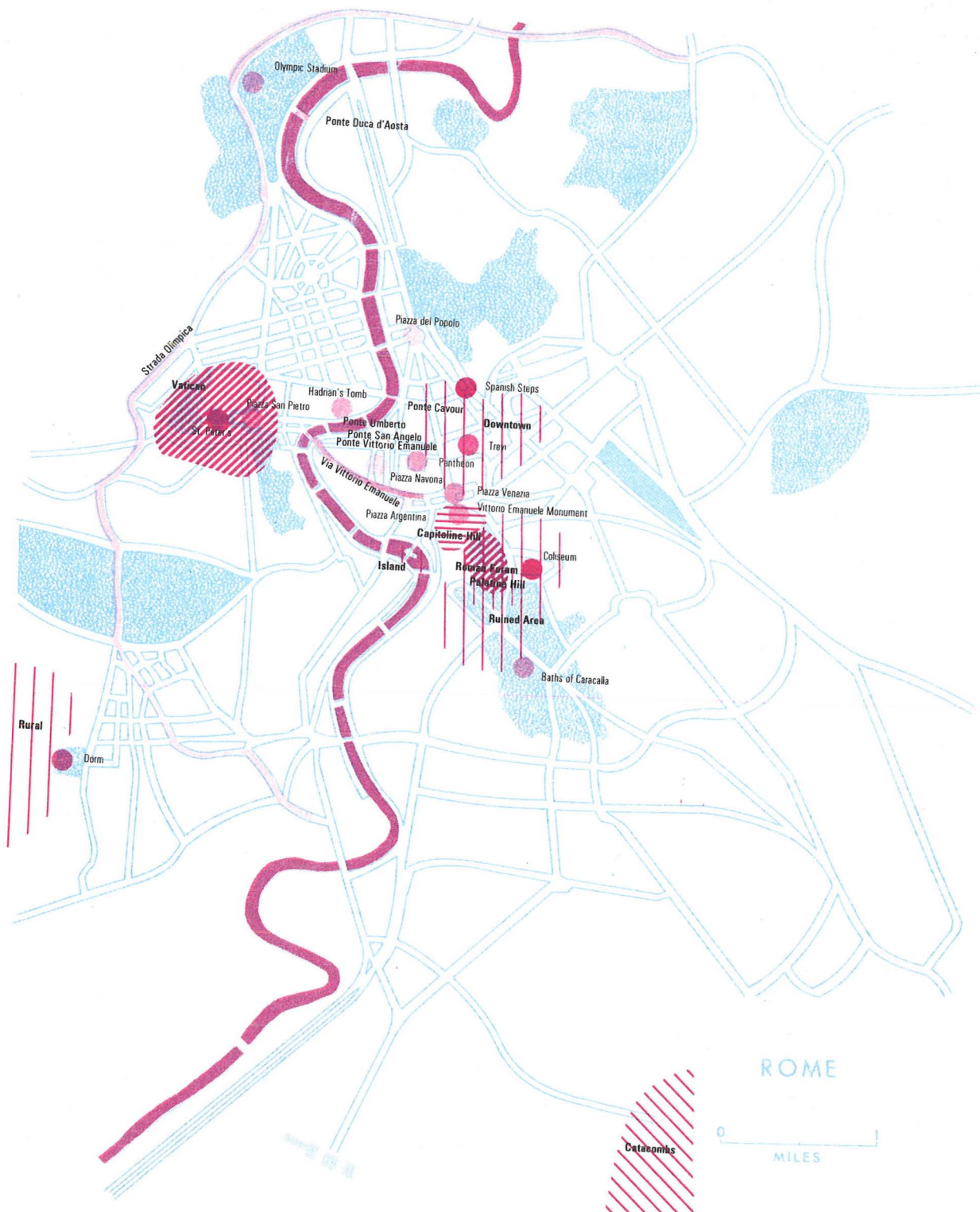


Figure 14.22 Content of the first Group L maps (n=33)

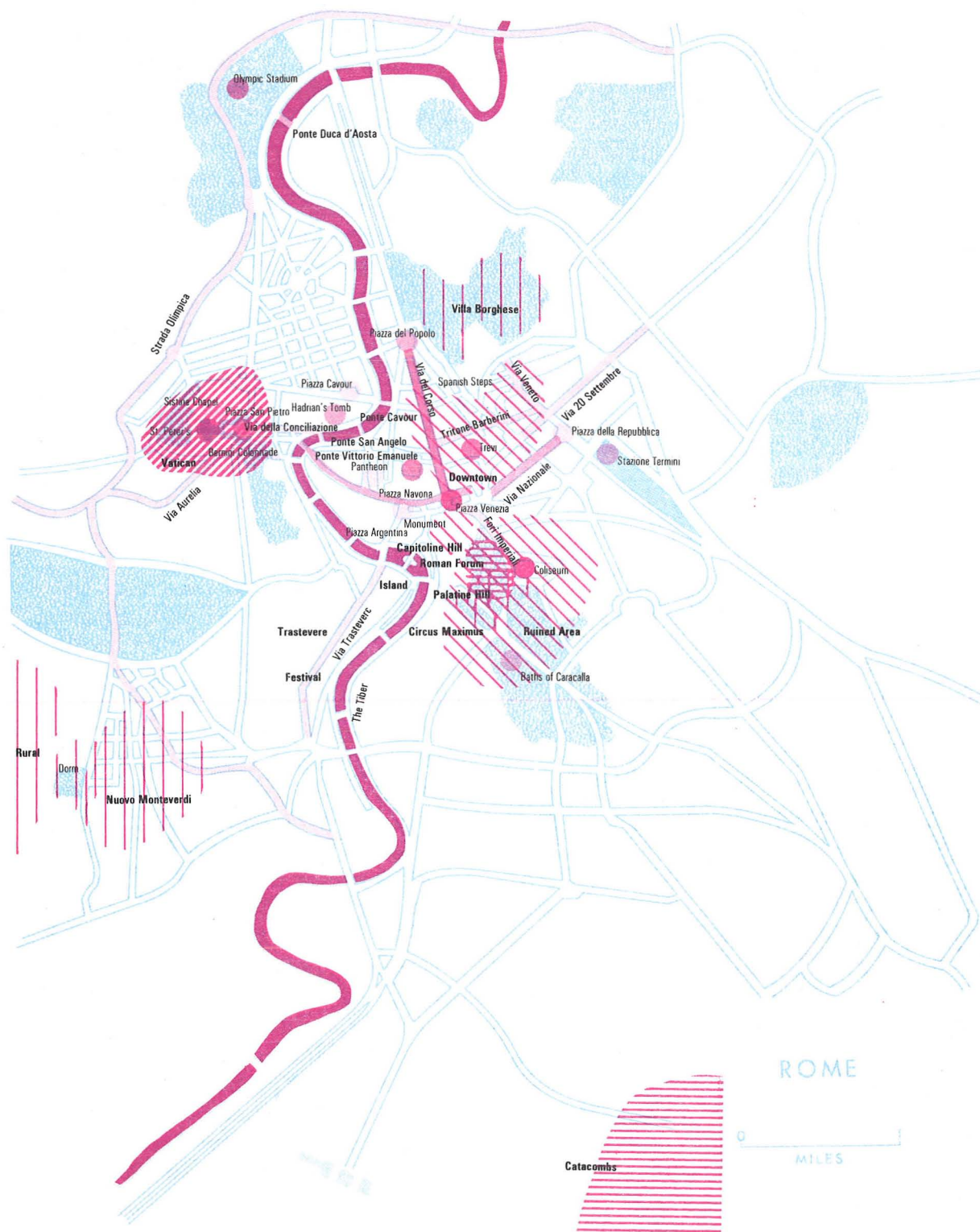


Figure 14.24 Content of the third Group L maps (n=24)

VII

There are no Group K maps of Paris for reasons explained earlier, and the number of Group L maps was less than half those collected in Rome and London. A glance at Figures 14.25 and 14.26 will establish immediately the generic similarity of the Paris product to those acquired in London and Rome. In Figure 14.25 we have Rhoda Noyes' first Paris map. It consists as do all Group L maps of points and lines with the typical violation of the rules to draw the river. Rhoda has also given us a picture of the Arch of Triumph. A couple of things are apparent: this city differs from both London and Rome by being focused on its river. Clearly the points of interest on Rhoda's map are either in, on, or along the river, for the river acts as a strong organizing influence. This was definitely not the case in London where the river acted as the southern boundary of the known world, nor in Rome where its role was more central but still peripheral. The only other line Rhoda has drawn is the Champs-Elysees, a strong, obvious boulevard. Similar remarks might be made about Vittoria Palazzo's second map of Paris (Figure 14.26). The river is clearly the central object of greatest concern and as usual has been the occasion of a violation of the point-line-area method. She has, however, included two additional streets: Avenue New York, possibly because of the name (Vittoria comes from New York) and the Boulevard Jourdan, on which is located the dorm, in this case one of the colleges of the Cite Universitaire. The critical thing about the maps once again is their clarity and comparability. However, these two examples are somewhat typical in the sparseness of the detail. Paris was a time of travail in the collection of the maps. Drawing the maps was sometimes a pain and sometimes a joy, but it was always with emotion.

The first Paris map is shown as Figure 14.27. The points on this map are not as prominent as they were on the first map in either London or Rome, and in fact this is a clue to one of the differences between the cities. Paris, despite the Eiffel Tower and the Opera (mapped here by more than 75% of the kids), is not a city of monuments. E. A. Gutkind has grappled with this problem, the problem being that there somehow seems to be nothing in Paris to talk about. His conclusion is: "What is invaluable is the atmosphere, the spirit of Paris—in brief, the imponderables, which belong just as much to the essential nature of a city as its external appearance and physical form" (Gutkind, 1970, 238). And yet, as much as I agree with him, this spirit must have an abiding place. Certainly, it is not in the monuments that we will look for this, but rather in the streets and parks of this great city. So I see in the particular points located on this first map merely those things that were seen on the sightseeing tour. Period. Paris, however, is to be found in the lines. Several things are amazing about the lines displayed on this first map of Paris. In the first

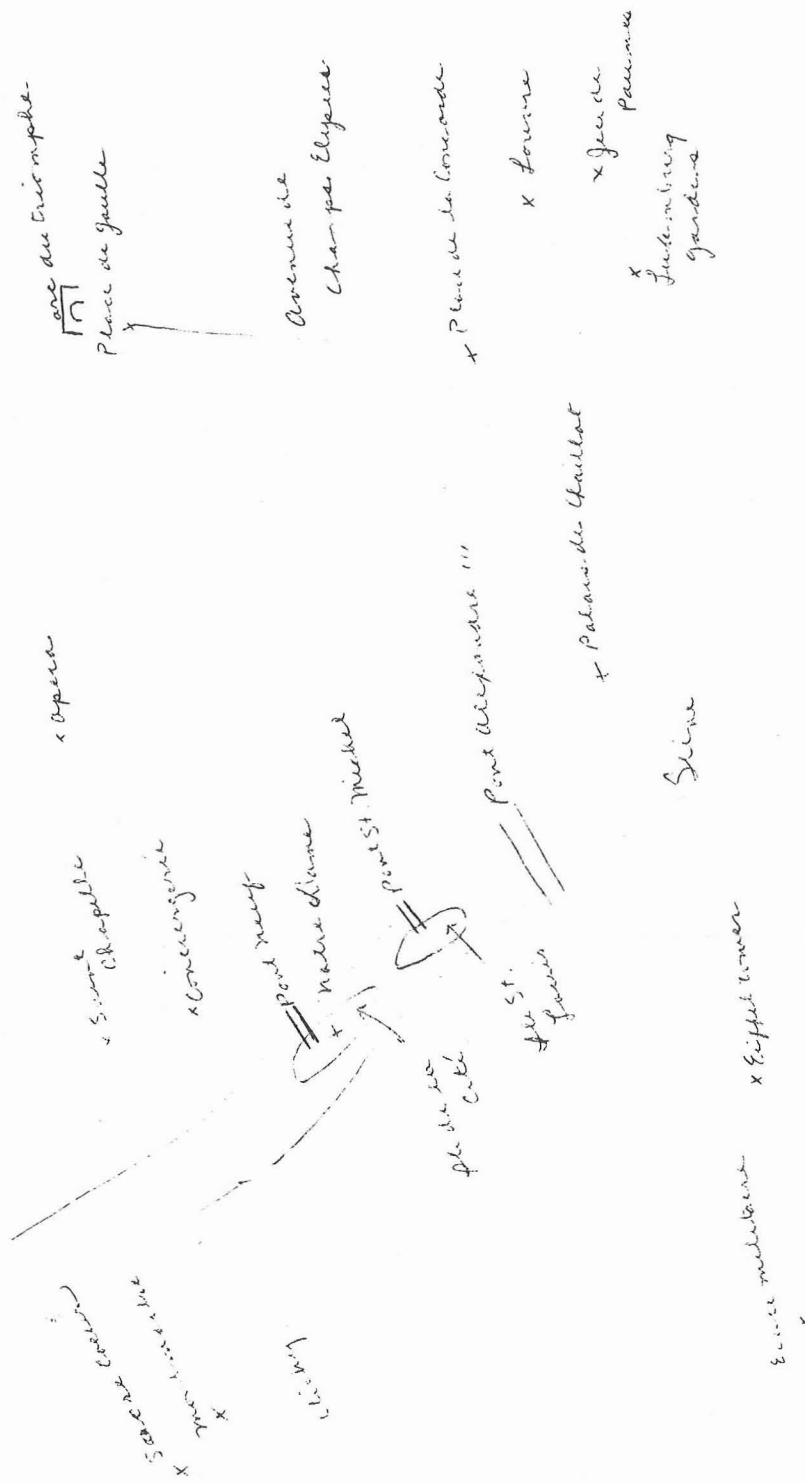


Figure 14.25 First Paris map: Rhoda Noyes

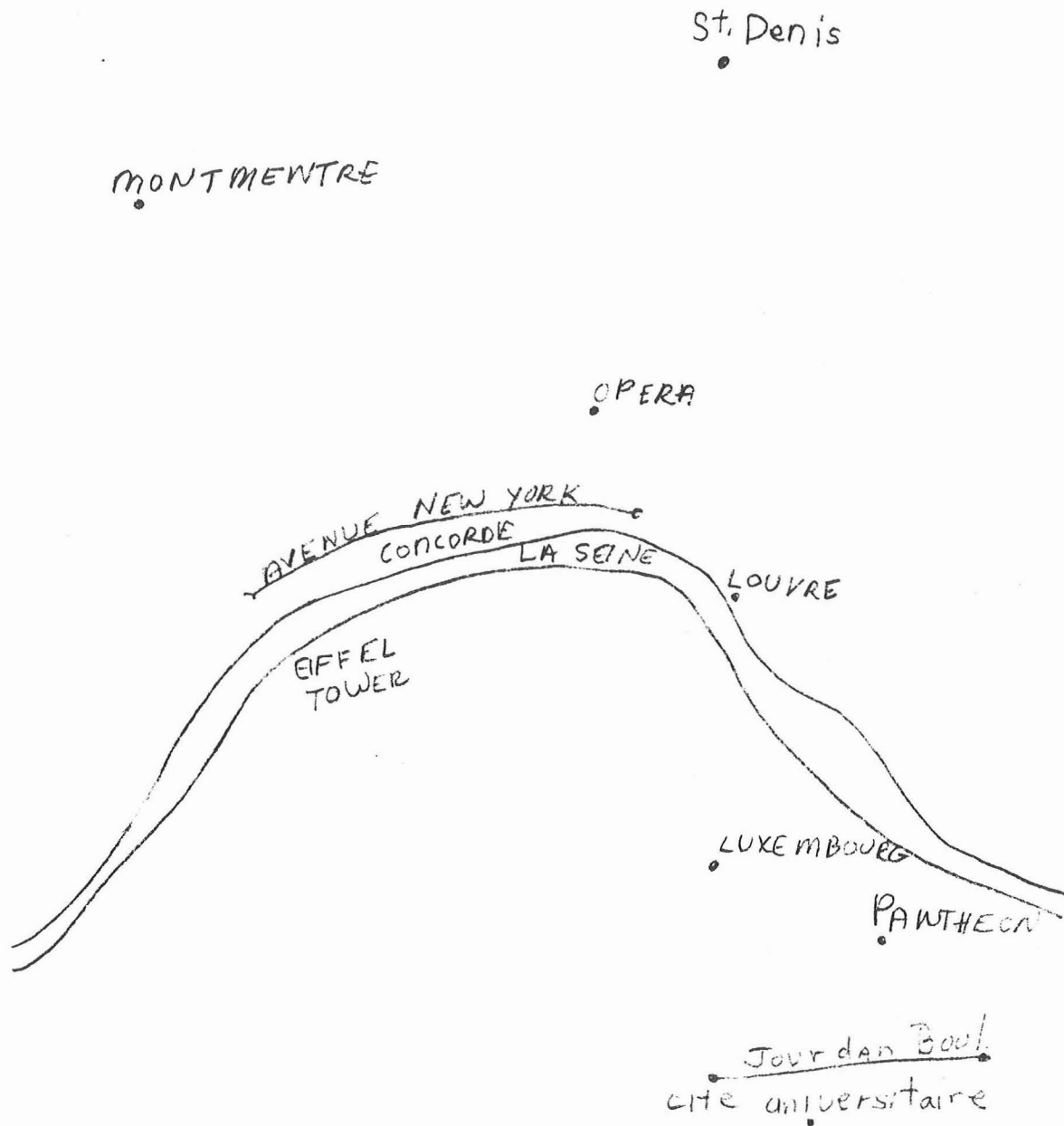


Figure 14.26 Second Paris map: Vittoria Palazzo

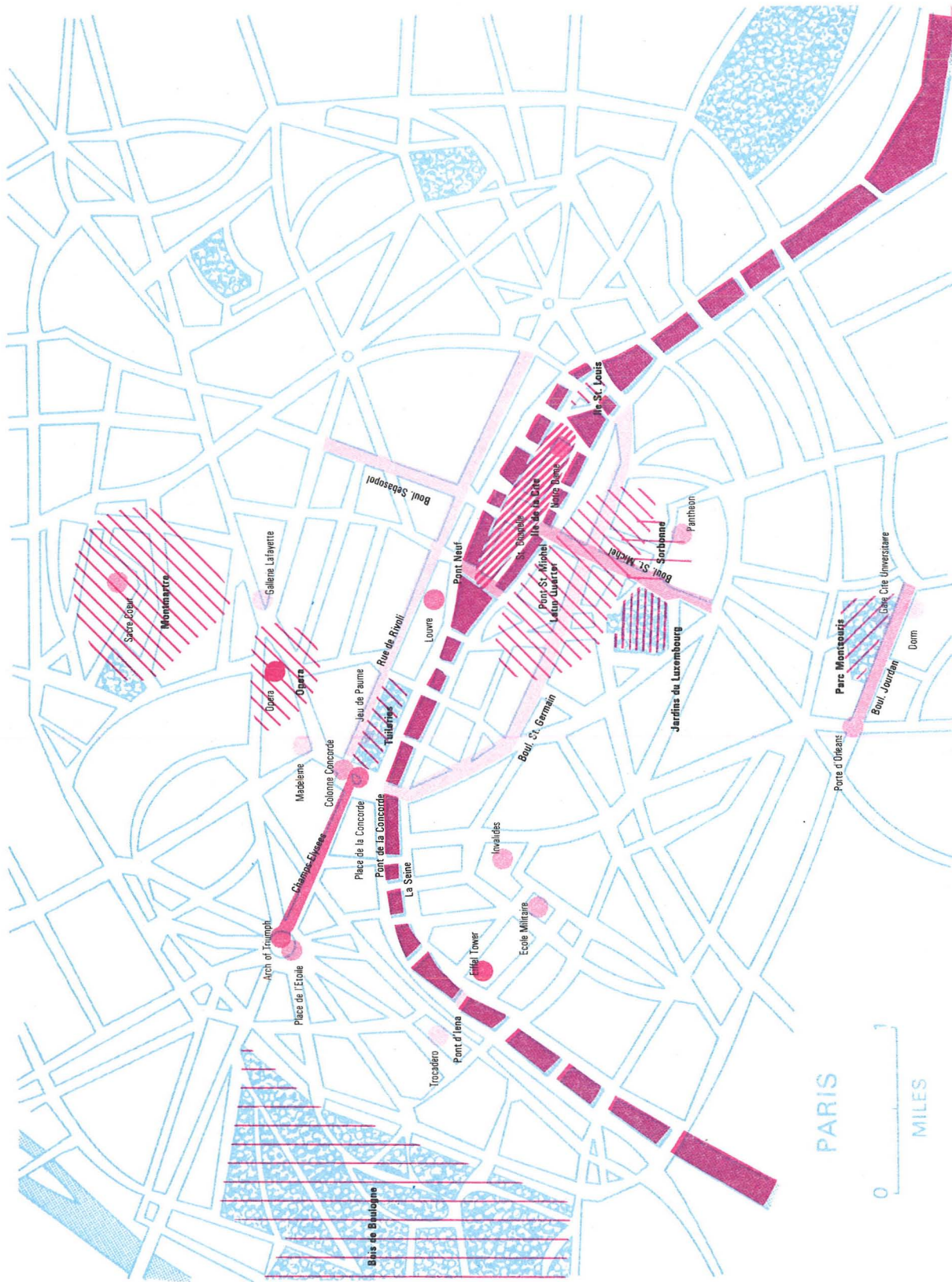


Figure 14.27 Content of the first Group L maps (n=16)

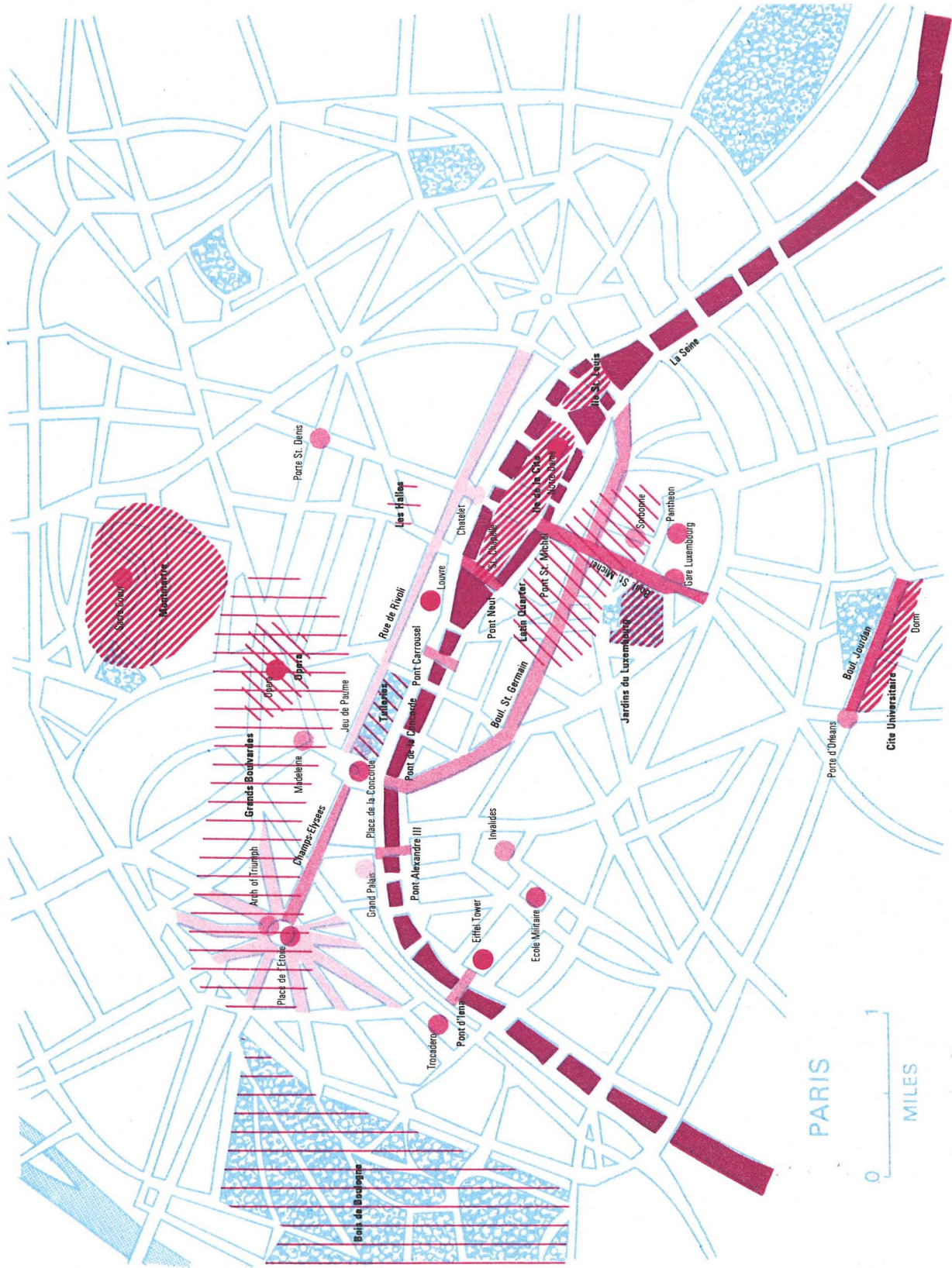


Figure 14.28 Content of the second Group L maps (n=10)

there is the large number. No other first map shows such an abundance of linear elements, and no other first map shows these elements with such marked consensuality. This is a first map and yet the Seine is already mentioned by more than 75% of the kids; this is a first map and yet the Champs-Elyesses is mentioned by more than 50% of the kids; this is a first map and yet three other lines are mentioned by more than 25% of the kids. It is remarkable. And not only are there lines but these lines comprise the beginnings of a tightly connected network. The Champs-Elyesses ties into the Rue de Rivoli and the Boulevard St. Germaine at the Place de la Concorde, and both these streets branch off into the Boulevards St. Michel and Sebastopol. Nor have we ever seen so many areas on a first map, and I have failed to map the two most frequently mentioned areas: the Right and Left Banks. And yet, given what we have there is a remarkable consensuality about the areas, including the mention of the Ile de la Cite and the Cite Universitaire by more than 75% of the kids, and the Luxembourg Gardens by more than 50%.

Generally, it is a remarkable first map, deviating from our other first maps both in respect to the large numbers of lines and areas and in regard to their degree of consensuality. Rather than attribute this difference to the kids, I would attribute it to the variant nature of the environment being mapped. The nature and number of points is more or less what we have come to expect as normal.

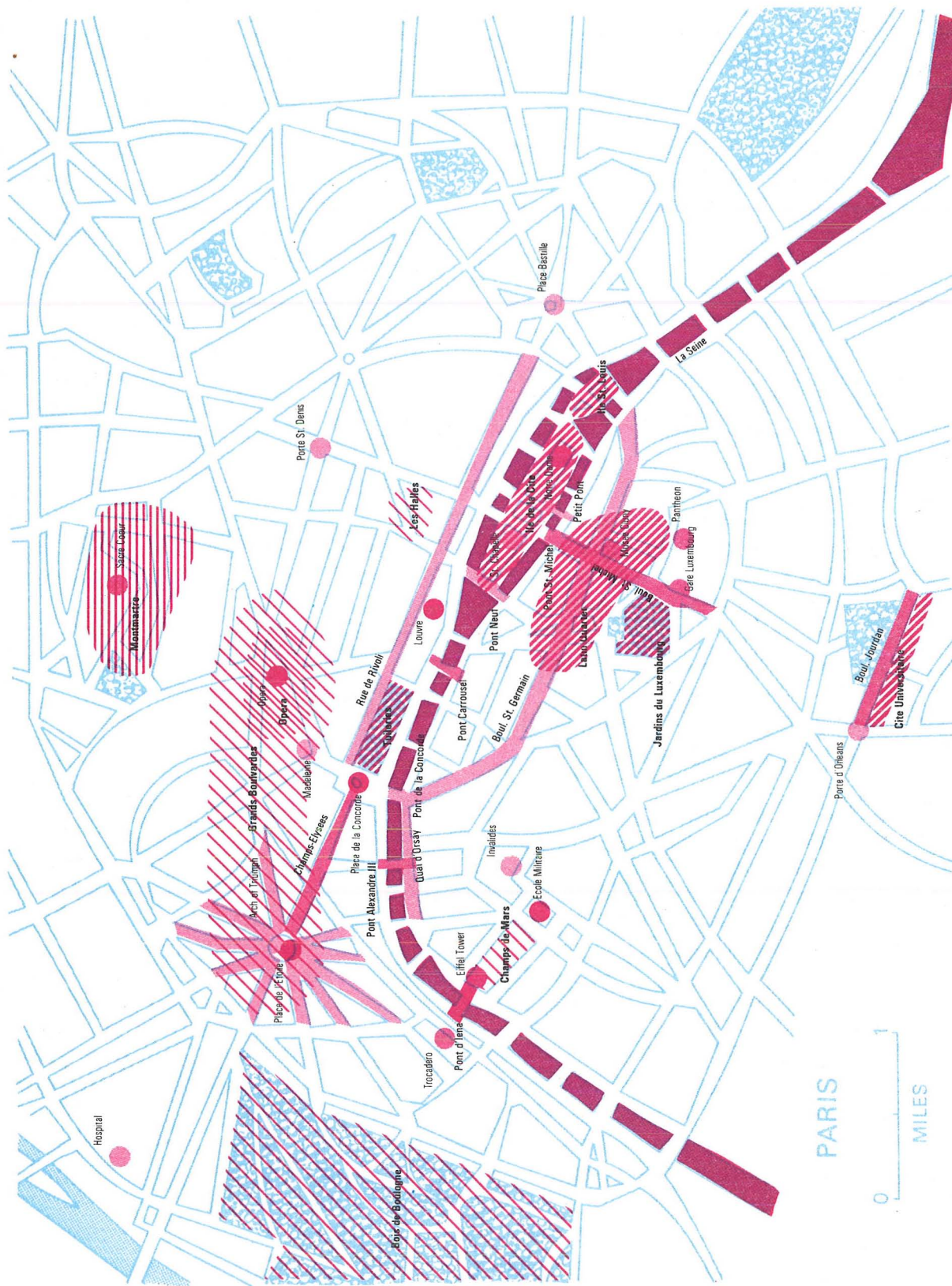
The second Paris map was produced from an analysis of only ten sketch maps. There is nothing methodologically wrong with this, but the small number of kids has a dampening effect on one's tendencies to generalize. But then, from the relationship between the fourth and first London maps, with numbers of kids running from 4 to 36, we might expect in the case of small Paris samples to be dealing with the heart, rather than the complete expression of the image. At any rate, this is the position that will be taken. In regard to the points shown on this second map it is seen that there is little change, except for increasing consensuality, and although this has come to be expected on second maps, some of the increase is likely due to the small sample. All of the places mentioned by at least eight of the kids are world renowned: the Eiffel Tower, Notre Dame, the Louvre and the Opera. Of the balance mapped, some also fall into this category of fame, while others would not be familiar to those not acquainted with Paris itself: the Jeu des Paumes, the Chatelet, the Portes St. Denis and Orleans, and the Metro stop at the Luxembourg, for instance.

But the continued florescence of the lines is not a function of sample size for we saw nothing like this on the fourth London map. This is once again simply remarkable: twenty-five lines have been mapped,

and if twelve of these come to us as a unit, they are nonetheless real for that. The knowledge shown by the kids of the bridges is astonishing. In all three cities they were able to distinguish a number of bridges, but seven exceeds anything we have seen, and none of these bridges are as imageable as the Pont San Angelo or the Tower Bridge. But then, bridges were crossed in London and Rome with nothing like the frequency with which they were crossed in Paris. This emphasizes once again the central role of the Seine in the image, and in Paris, which shows up in the fact that it appeared on all ten maps for total consensus, a very rare event for any size population. Going from map one to map two we have lost only one street: the Boulevard Sebastopol, a street that emphatically does not lead to the heart of Paris. There is another factor which might lead to the legible character of the Parisian street system and that is the plethora of maps that litter Paris like waste paper litters New York. There are quite simply everywhere. London was also exemplary in this regard, but doesn't hold a candle to Paris, for in addition to maps at every Metro stop—including the variety that light up your route and invite play—every bus-stop has a map of the route and every bus contains several maps of the route WITH THE MAP OF PARIS SCREENED BENEATH IT. This is astounding. Paris, not that illegible to begin with, has gone out of its way to clear up the slightest obscurity. This may well be one of those imponderables that makes staying in Paris such a pleasure. There is never a hesitation about taking a bus, no faint-hearted contemplation of route numbers, but instead a map. Paris is path conscious and the kids' maps reflect this.

This path consciousness is carried over into the areas for there, as big as sin, is an area characterized by its paths! Les Grands Boulevards are a problem for the pedants. Created by Haussmann in the 19th Century they are alternately condemned and admired. Edmund Bacon called them the "life-giving boulevards of Haussmann" (Bacon, 1967, 179) while Gutkind says of them and their creator: "Haussmann was not the initiator of a new era but an opportunist who, in a fireworks of ostentatious and hollow grandeur, glorified the ambitious aspirations of a parvenue society" (Gutkind, 1970, 198). And of course Haussmann is right, but only as far as Haussmann is concerned. What matters, as Gutkind realizes ultimately, is what goes on on those boulevards and what they mean in terms of life. Let a Frenchman tell us: The singer is Yves Montand. The writers, Jacques Plante and Norbert Glanzberg. The occasion, Yves' One Man Show at the Theatre de l'Etoile in Paris, 1958. I wish you could hear it:

I love to hang around the big boulevards. There's so much to see. I love the booths and the bazaars, the



displays and the lotteries. I'm not a millionaire. I can't pay for diversions every day of the week. So when work ends, I slip between Saint Denis and the Boulevard des Italiens. That's where the great heart of Paris beats, where moments of history are written everywhere... And coming to my room like an appeal, is all the clamor and the lights of the bewitching world of the big boulevards. (Translated by J. Spencer)

The title of the song, like the name of our area, is Les Grands Boulevards, and the song explains the attraction of these streets like no scientist ever could. All the "grand boulevards" are not located within our region, nor would the region shown probably be called "Les Grands Boulevards" by a Parisian, but its inclusion is certainly indicative of the fact that the streets of Paris are pervasive in its image in a way that the streets of Rome and London never were.

The rest of the areas need little comment except to note the increasing consensuality. Monmartre, both Seine islands, the Luxembourg, and the Cite are all mentioned by at least eight of the kids.

Generally, it is the second map that we would expect given the first one, showing all the traditional changes from first to second maps with a special emphasis on the paths.

The third and fourth Paris maps have such small populations as to make remarks about them entirely speculative. The number of kids who drew the third map was eight and the number who drew the fourth map was three. I remember sitting with Des Jencks in a small cafe near the Gare Luxembourg and hearing him justify the fact that he wasn't going to draw me any maps. His reason was simple: I would never get thirty maps of a given type and hence would not be able to make significant statistical measures of their content. If only that myth had never been born, maybe I would have at least one more mapper for each session. But there's no use crying over spilled milk.

On the third map I have displayed only those results agreed upon by at least two kids. The image is practically identical to that of the second map. Only one new point appears and this is the American Hospital. We have lost several points. There is a certain perverseness about the way the lines hang on, nay, grow, for we have added the Quay d'Orsay and lost nothing. The same is true of the areas: we have added the Champs des Mars. In effect, eight kids have produced a richer surface purely as the result of continued experience than ten kids, or

sixteen kids, did with less experience. I don't know that there is much more to say about Figure 14.29.

Figure 14.30 is another story, a saga in perserverance. The points have faded to the minimum, and yet these are not all famous places. The Cluny Museum is a small thing crammed with Medieval art, the American Hospital has no claim to fame, the Gare Luxembourg is not remarkable in any way, and the Porte d'Orleans is just a large intersection. This map is not comparable to the fourth London map. This is not the guts of the Parisian image as that was for London. These points were mapped by kids continuously exploring and extending their experiential and geographic horizons. But they have not been able to hold the level achieved by eight regarding lines. There has been a disastrous fall-off from the third map, even taking into account the fact that I have only shown those places mapped by two of the three kids. This is the guts of the tourist street network: the Seine, the Pont Neuf, the Boulevard St. Michel and the Rue de Rivoli. But there has been no such decline in the number of areas mapped and astoundingly we even find new ones: the Sorbonne has become an area in its own right and the Bois des Vincennes has added to round off the city to the west. Taken as a whole, this final map of the trip is a tribute to the kids that drew it, and their desire to see something finished. At the same time it is a tribute to a city that could not be plumbed in the days available, that kept growing, ending in an image that continued to grow through turmoil and decimated numbers. The whole collection of Paris maps is such a tribute. Whatever they say about the genesis of map making and the acquisition of geographic knowledge, they say infinitely more about compassion and understanding.

VIII

It would perhaps be reasonable to aggregate all the Paris maps into one map, all the Rome maps into one map, all the London maps into one map, in an attempt to assess the aggregate image of the city. Perhaps. But for our purposes here it would make no sense whatsoever, for our primary concern is not with the image of the city, but the way that image changes through time with growing experience. The series of eleven maps showing the results of the content analysis speak to this point. They do not say, nor are they capable of saying, anything about the relations of the things displayed on our maps. They speak merely to the presence or absence of certain things and the increase or decrease in these things. This is not all there is to the growth of an environmental image but it is a vital component. On the relevant points the series of eleven maps speaks definitively and unequivocally and somewhat surprisingly.

- 1) The changes that take place from map to map do not take place in the same way for points, lines and areas. These map elements vary in number at different rates and the fact that they do so gives substance to our intuitive claim that the three phenomena are real. At least for the pedestrian tourist or the tourist ferried by bus drivers, the distinction between landmarks and nodes made by Lynch seems to be worthless, as does the distinction between edges and paths. When these distinctions are eliminated it will be seen that Lynch is also dealing with points, lines and areas. The variant behavior of these three elements justifies our treating them separately.

- 2) The role played by point phenomena seems to be most crucial in the early stages of landscape acquaintance. The points that appear on our maps appear in great part on the first map and do not significantly increase or decrease in number thereafter. This was true for London, Paris and Rome. But this is also capable of inference from the distinction between points and other elements geometrically. Points are the simplest of the three elements, and hence most readily cognizable, imageable. A point can be taken in at a glance, whether a piazza or tower. Points can be contemplated as objects wholly at once. A tour takes you from one point to another, on the scale of cities from monument to monument, on the scale of continents, from one city to another. The points have a clarity that the intervening matrix lacks. The points are used as anchors for the other elements. Thus point knowledge appears to be genetically prior, reasoning from the geometric character and reasoning from the evidence presented on our eleven maps.

- 3) The second map in each city was characterized by an increase in the number of lines. This was least marked in Paris where lines appeared in abundance on the first map. In the case of Rome and Paris the second map marked the springtide of lines, while in London they continued to proliferate on the third map. Lines are intermediate in complexity between points and areas, being composed of points and making up areas. The appearance of lines on the first map of

London and Rome was equivalent to the appearance of points. The lines were not included in their role as paths but in their role as sights. Thus in London it was not the path character of Oxford and Carnaby Streets that insured their appearance, but their character. It is on the second maps that streets begin to appear in their role as paths, emphasizing connectivity, building a network that goes from point to point. Lines are genetically subsequent to points and precursive to areas. The evidence of our eleven maps speaks to this, though the Paris evidence is somewhat confusing.

- 4) Areas which appear on first maps, do so as points. Hyde Park for instance is not known as an area when it first appears in London, but as a place, a point, a thing with unknown extent but imageable aspect. Areas begin to appear as areas on the second map, but in all three cities it is the third map that shows the greatest number of areas, with the equivocal exception of Paris. This is clearest in London, but is also true in Rome. It particularly applies to areas that are not bounded such as parks. Thus the appearance of neighborhoods like Chelsea comes after the appearance of areas like Green Park. Chelsea has no boundary and its existence is attested to by no walls. Its existence must be discovered and its extent remains forever elusive and subject to debate. This is the only element for which this is true. Points have clearly marked substance. Lines are invariably labeled. Unbounded areas are the only exception, and are consequently most difficult to cognize and the genetically final stage of the acquisition of geographic knowledge. This is not to say that new lines and points are not recognized when one has reached the stage of areal definition, but that first points were recognized and located vis-a-vis one another, and then these points were connected by lines and finally areas in which the points and lines are embedded are discovered.
- 5) This genetic sequence is not independent of the nature of the environment. Overly assertive points may prolong their importance into other higher stages (Rome), while the lack of linear

clarity may retard development of a network until many areas have been established (Rome). Strong paths may accelerate the development of a network before or concomitantly with the establishment of a pointillistic net (Paris). This is not to say that the genetic sequence described above is not followed in Paris and Rome. It is, but rates of appearance are affected strongly by the environment.

- 6) Understanding this genetic sequence and the roles played by point, line and area phenomena allows us to outline the components of a legible city in a systematic way not hitherto attempted. A legible city (or other landscape) must contain a sufficiency of point phenomena to allow the construction of an image. These points must be highly imageable. These points must bear a useful relationship to the linear component which will be the second stage of acquaintance. Thus the London Zoo, not tied into the street pattern is of no value in this process and no one in Group L was able to link the London Zoo into the network of London streets. Finally the points and lines must bear some relationship to the areas delimited or the ability to discriminate areas will lie dormant. Using these criteria in the absence of data allows us to assess the legibility of any city. New York has strong points that can be cognized and remembered before the city is reached no matter how you approach it. These points are tightly tied to the street pattern and both work subsequently together to define areas. It is possible to come to grips with New York in a single day. How many people know at least two boundaries of Harlem without ever having been in New York? This is a feat and it's possible because the essential points, lines and areas of New York can all be communicated with reference to each other, building on the markedly imageable character of such points as the Empire State Building, the World Trade Center, the skyscrapers of Midtown Manhattan and so on.

A legible city is built on imageable points. These points add up into legible networks. These networks define legible areas. The whole is an imageable

city. Taking London as an example, it would be possible to quantify this sequence and establish the dimensions of "sufficient" vis-a-vis an area of given extent, though an even more detailed study using a larger and more varied sample would make the results more generally useful. But four groups of all kinds—adult, kid, Black, White, Chinese, American, male, female, rich, very rich, poor, student—go to Europe every summer. The task is susceptible of accomplishment and cries aloud to be done.

These six conclusions can be even more briefly summarized:

- 1) Points, lines and areas are the best divisions of the urban environment.
- 2) Recognition and organization of points precedes the recognition and organizations of other elements.
- 3) Recognition and organization of lines follows that of points.
- 4) Recognition and organization of areas follow that of lines.
- 5) This genetic sequence is not independent of the environment.
- 6) Understanding of this genetic sequence can lead to the construction of a quantifiable model of imageability susceptible of application in the absolute absence of a sample population.

That's enough for any one chapter to conclude.