

ENVIRONMENTAL QUALITY OF CITY STREETS: THE RESIDENTS' VIEWPOINT

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Almost all people in the city live on streets that also have to carry traffic. A conflict, therefore, exists between those who create the traffic and those who live on a street. Often, the same person may at one time be part of the traffic and at another time be a resident on the street. This report represents the viewpoints of those who live on the city's streets because transportation policies in the city have usually emphasized the traffic aspect. City streets have been looked on as a service for the comfort and convenience of motorists, and street improvements have been made to improve the efficiency of transportation rather than the livability of the streets. Certainly the city must have an efficient transportation system, but the people who live on streets are seldom considered in the determination of these policies. For this reason, the San Francisco Planning Department decided to carry out a small study of the quality of the environment along some of the city's main traffic streets to try to find out what effect traffic has on the street as a living environment.

•PROTESTS and research about the environment and the social impact of transportation systems have paid most attention to the problems created by new freeways through urban areas. Although these are the more dramatic instances of traffic impacts, the rapid growth of vehicular traffic has swamped residential streets in cities across the United States and in other countries. Traffic on city streets may affect as many people as traffic on freeways if not more people. In San Francisco, approximately 60 percent of the city's major streets (with over 10,000 vehicles daily traffic volume) are lined with residences.

Studies of urban streets (such as the current TOPICS program of the Federal Highway Administration) have concentrated almost exclusively on increasing traffic capacity through devices such as street-widening, signalization, and one-way streets, with no parallel accounting of the environmental and social costs of these alternatives. Owen (16) directed attention to the role that city streets play in the environmental quality of cities when he said that they are "the main corridors and front parlors" of the city, but even he did not point out that people also have to live along city streets.

To our knowledge, the only empirical studies of life on city streets apart from some studies of traffic noise have been those carried out in Great Britain (10, 14, 4). The Buchanan Report (10) has had a profound impact on British transportation and urban planning since its publication, particularly through its proposal for the creation of "environmental areas" of controlled traffic capacity of new and existing cities.

The investigation reported here is a small-scale attempt to identify the environmental concerns of those who live on city streets in San Francisco. It is a pilot study using observation and open response interview techniques and does not pretend to have statistical significance. The results, however, are suggestive. The project grew out of the San Francisco City Planning Department's concern over the increasing traffic on the city's streets and the side effects of street widenings and other proposed changes in the

street system. It was one of a series of studies of environmental conditions made in San Francisco during 1969 and 1970 (17).

STUDY STREETS

Of the street blocks selected for a general study of street living, the results from 3 streets only will be reported here because they serve as a model of the research approach and because they contrast the effects of traffic on similar types of streets. The street blocks chosen are adjacent north-south streets of similar residential character in the northern part of the city.

TRAFFIC

The major environmental differences among the streets are their traffic levels. The first street, called Heavy Street, is a one-way street with synchronized stop lights and a peak-hour traffic volume (at the evening rush hour) of 900 vehicles per hour. The second street, Moderate Street, is a two-way street with a peak-hour traffic flow of 550 vehicles per hour; the third street, Light Street, has a volume of only 200 vehicles at peak hour.

Speeds on all streets could rise to 45 mph or more, but only on Heavy Street is the speed controlled by the synchronized lights. Traffic volumes increased on Heavy and Moderate Streets 10 years earlier when they were connected to a freeway at their southern terminals. Through traffic is dominant on Moderate and Heavy Streets, and traffic composition includes more trucks and buses on Heavy Street than on the others.

POPULATION

The 3 study blocks are part of a residual Italian neighborhood with other white Americans and a small but growing Oriental minority. By social class and income, the streets are relatively homogeneous. Contrasts, however, occur in family composition, ownership, and length of residence.

Light Street is predominantly a family street where there are many children. Grown-up children are even returning to live on the street to bring up their own children. One-half of the people interviewed are homeowners, and the average length of residence is 16.3 years. Heavy Street, at the other extreme, has almost no children on its block. It is inhabited mostly by single persons of all ages from 20 years upward, and there are many old people, especially single elderly women, on the block. Average length of residence on Heavy Street is 8.0 years, and people are nearly all renters. Rents are also somewhat higher on Heavy Street, averaging \$140 a month among our respondents, whereas those on Light Street, average residence 16.3, average \$103 a month. Moderate Street is in between. Average length of residence here is 9.2 years and average rents are \$120. So, although the people are of the same type on all 3 streets, there is quite a difference in their age and family makeup.

ENVIRONMENT

The 3 streets are typical San Francisco streets with terrace houses or apartments built up to the building line; there are very few front yards and very few gaps between the houses. The architectural style ranges from Victorian to modern. They are either wooden, stucco, or brick finish, of white or light colors. They are pleasant-looking blocks. The streets are each fairly level, with a slight gradient to the south where there is a steep hill. They are close to various shopping and community facilities.

STUDY DESIGN

The method of study drew on 2 sources of information. The first source was a detailed interview lasting about an hour and taken with 12 residents on each block, composed of 3 equal age categories, the young (under 25), the middle-aged (25 to 55), and the elderly (over 55). This was not a very large sample but, because they represented about 30 percent of the households on each block, their attitudes were probably

representative of those on the 3 blocks. Second, we made systematic observations and, where possible, objective measurements of pedestrian and traffic activity on the streets.

The study design stemmed from earlier papers by Appleyard and others (2, 3) that proposed environmental criteria to be used in transportation system design. The criteria identified in the earlier studies were hypothetical in nature and for this investigation were slightly modified to cover the probable concerns of those living on urban streets.

In trying to reach an overall assessment of the environmental quality on each of the 3 blocks, we divided our task into 5 criteria categories to describe the character and day-to-day use of the street as well as the concerns and satisfactions of the residents. The residents were not told that we were primarily interested in the effects of traffic; the interview was introduced as a survey of what it was like to live on the street, what the resident thought of his street, and what the resident would suggest for its improvement.

The criteria categories were as follows:

1. Traffic hazard—concerns for safety associated with traffic activity;
2. Stress, noise, and pollution—from noise, vibration, fumes, dust, and feelings of anxiety concerning traffic;
3. Privacy and home territory—the residents' responses to intrusion from outside their homes, and the sense that part of street itself was an extension of their personal territory or turf;
4. Neighboring and visiting—the degree to which residents had friends and acquaintances on the block, and the degree to which the street was a community; and
5. Identity and interest—the degree to which the respondents of the 3 age groups were aware of their surroundings and the strength of each street's identity and were concerned for the external appearance of the buildings and the street as well as the degree to which the residents of the street felt that they were able to make adjustments and alterations to the street environment through planting, construction, and other means.

Each question in the interview was related to one of these categories, though some answers had relevance to more than one. The answers were rated by the interviewers on a 5-point scale as environmental quality ratings. Individual ratings were then aggregated by street for each question. No attempt was made to weight the responses in terms of their overall importance, although this report emphasizes the main points of concern for the residents as expressed in the interviews. Ratings are rather abstract interpretations of the way people feel, however, so in the following pages we shall explore more deeply their responses to each set of qualities. To make these findings more understandable to the reader of this report, we graphed the responses in cartoon form and quoted from the interviews. We show these in the Figures as examples of how to communicate research of this nature to the public. So far the report has met with considerable response in San Francisco.

TRAFFIC HAZARD

Accident counts were equally high on High and Moderate Streets (an average of 17 and 12 accidents per year over a 4-block length). The danger of traffic was of concern to inhabitants on all 3 streets but especially so on Heavy Street (Fig. 1). These findings are not surprising because "safe" intersections was the most repeated concern in the recent city-wide surveys of street inhabitants.

Heavy Street is a one-way street with synchronized stoplights, which enable bunches of vehicles, already with momentum from traveling downhill, to travel through at speeds of up to 45 mph. The fast speeds were frequently mentioned in the responses. The very heavy traffic volumes on Heavy Street also obviously make it unsafe for children, and even for people washing their cars. For residents trying to maneuver out of their garages, a one-way street has its advantages over a two-way street because the driver has to look only one way. Getting a car into a garage can be more difficult as the driver has either to swing across the traffic flow or to pull to one side and wait for a lull. Most of the safety problems associated with traffic, especially on Heavy Street, were experienced indirectly by seeing a large number of cars speeding down the hill and waiting for someone to make a false move. Several residents felt that the speed limit on Heavy Street should be reduced.

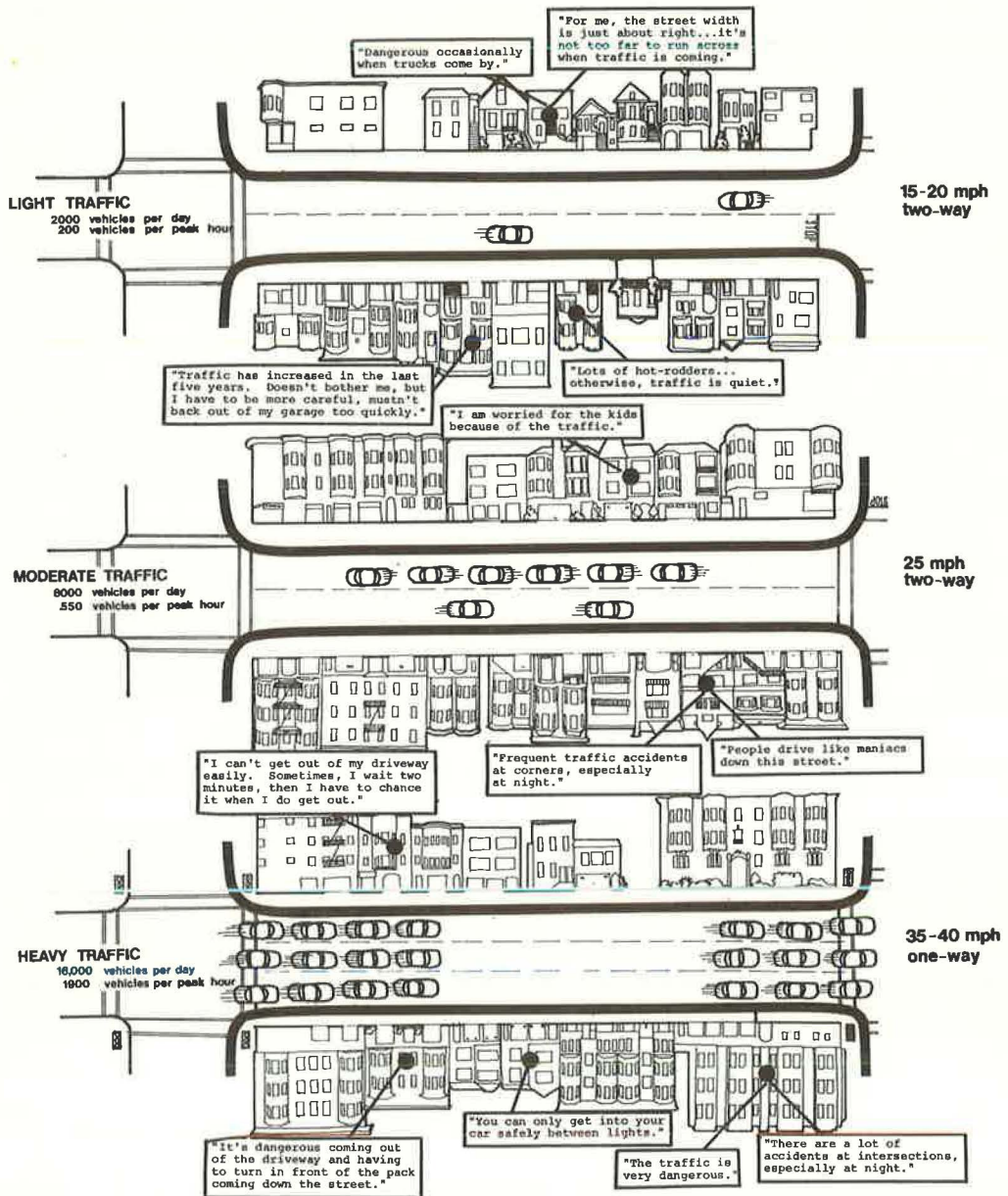


Figure 1. Traffic hazard.

At the other extreme, Light Street, which has only a small amount of through traffic, has problems of a different nature. Because the street is relatively empty of traffic, it tends to attract the occasional hot-rodder who is, in some instances, a greater menace than the steady stream of traffic on Heavy Street. He appears without warning, often jumping the stop signs at intersections, and is extremely dangerous for children playing in the street. The hot-rodder was found to be a problem on many otherwise quiet residential streets in the city. Another problem on a street that seldom requires precise traffic control is the temptation to park where it is immediately convenient. On Light Street, delivery trucks often park on the corner when making deliveries to the grocery and block the view down the cross street for motorists approaching the intersection.

The situation in the minds of those on Moderate Street lay somewhere between the 2 extremes, at some periods during the day tending toward one and at other times toward the other. However, as one respondent put it, "There have been some accidents and I am taking precautions."

Apart from the direct effects of traffic on the feelings of safety, there were some indirect effects. The continuous presence of strangers on Heavy Street, even though they were in automobiles, evinced some feelings of fear. One young housewife had frequently been hassled from passing cars, and some of the older ladies on Heavy Street were "afraid to stop and chat."

There was a consistent trend for all age groups to consider Light Street to be safe, Moderate Street to be neither safe nor unsafe, and Heavy Street to be unsafe.

TRAFFIC NOISE

Actual measurements of noise levels were made on all 3 streets (Fig. 2). The sound levels were determined by sound survey meters during 4 periods on a weekday; early morning, 6:30 to 8:30 a.m.; late morning, 11:00 a.m. to 12:30 p.m.; late afternoon, 5:00 to 6:00 p.m.; and early evening, 7:00 to 8:00 p.m. In each measurement period, 50 consecutive measurements were made at 15-second intervals at corner and midblock locations on each street. These measurements were translated into a useful measure of average conditions by calculating the percentages of time that the noise exceeded certain A-weighted decibel levels [dB(A)]. From these we computed a traffic noise index, a recognized measure of noise problems, that can be used to predict probable dissatisfaction due to noise (8). (It should be noted, however, that we did not take the customary hourly samplings during the full 24-hour period.)

On Heavy Street, noise levels were above 65 decibels for 45 percent of the time and did not fall below 55 decibels more than 10 percent of the time except in the early morning. These noise levels are so high that the traffic noise index reads right off the scale. The 2-minute sound level recording shows that the character of noise on the street was uneven because of the waves of cars that flowed down the street and the occasional noisy vehicle that exceeded 70 decibels.

On Moderate Street, sound levels were above 65 decibels for 25 percent of the time. By the traffic noise index, it would be rated 6.5 or definitely unsatisfactory. On Light Street, the quietest of the three, sound levels rose above 65 decibels only 5 percent of the time, which on the traffic noise index means that one-half the residents would consider it unsatisfactory and one-half, satisfactory. The 2-minute sample sound level recordings on Moderate Street show that the noise levels tended to be more variable than on Heavy Street but in the same range, whereas the sound level chart on Light Street shows an ambient noise level much lower than that on the other 2 streets.

After the danger of traffic itself, traffic noise, vibrations, fumes, soot, and trash were considered to be the most stressful aspects of the environment on these 3 streets. Response ratings to the first general question were strongly negative, 4.5, on Heavy Street and negative, 3.3, on Moderate Street.

On Heavy Street, the noise was so severe that one elderly couple was forced to try to catch up on sleep in the daytime. Many, especially the older people, were unable to be objective about the other characteristics of their street because these stresses appeared to color totally their perceptions of their environment. Adjectives such as "unbearable" or "too much" or "vulnerable" were typical of the responses.

As with traffic hazard, the large mass of vehicles was not always the major problem. It was often the lone individual or the minority use that disturbed the situation. This was certainly true of Heavy Street where the large majority of cars were reasonably quiet and passed at a smooth even flow. The real offenders were sports cars, Volkswagens, buses, and trucks. The steady drone of traffic was certainly bad, but the random deep-throated roar of a bus or large truck, with the accompanying shudder that rattled every window, unnerved the most hardened resident, especially when it continued day and night. The screeching of brakes at the intersections added to their distress.

Residents on Heavy Street petitioned for a sign prohibiting trucks and buses. The sign was installed but failed to mention buses. It was small and the same color as the background, so it was not often seen. In any case, the law was not enforced, so truck

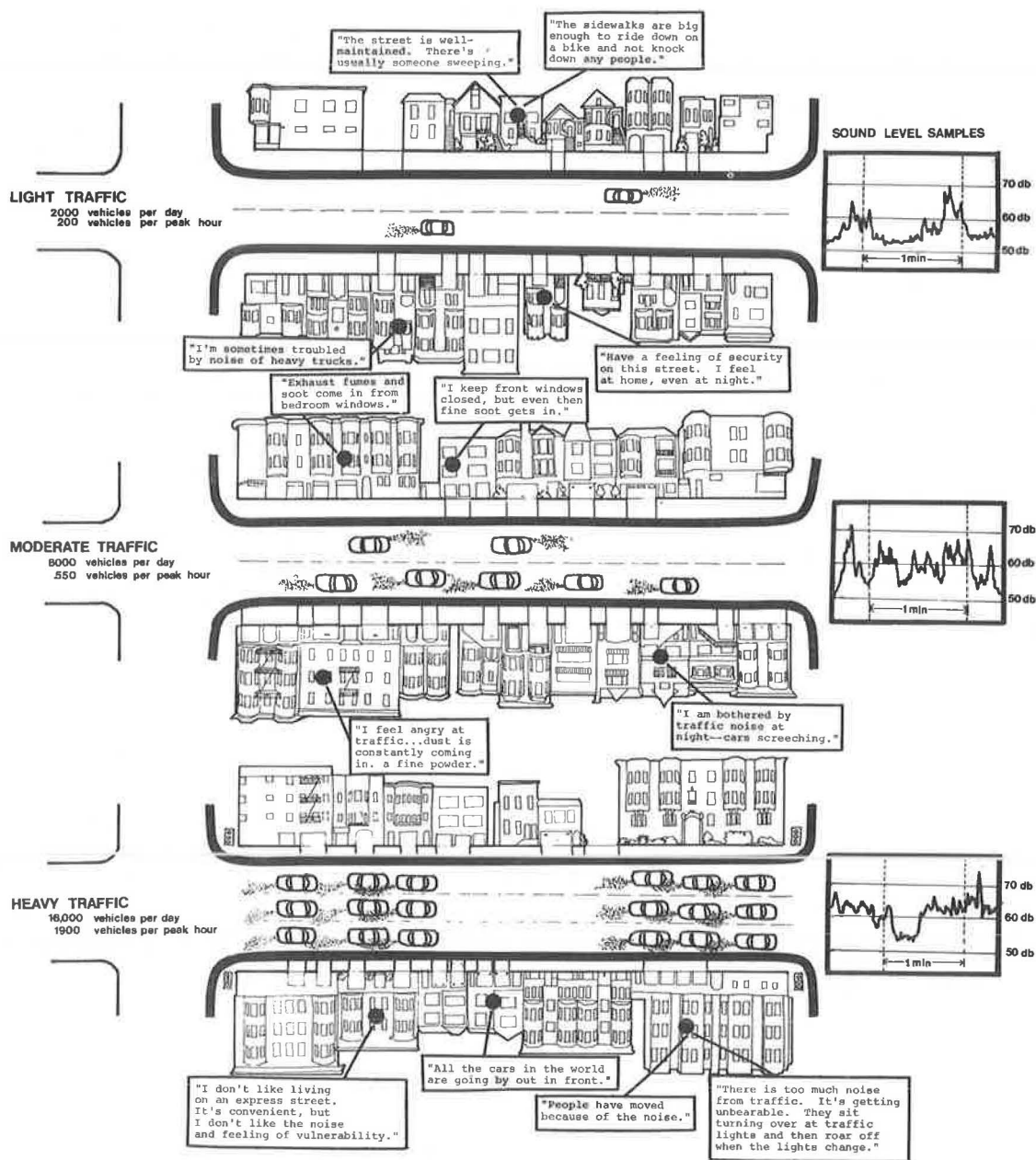


Figure 2. Noise, stress, and pollution.

drivers had learned that they may continue on their way with impunity. Such noise problems were not so acute on Moderate Street, where people were more bothered by the fumes, dust, and soot that penetrated into their living rooms and bedrooms. Light Street had a few complaints of occasional noise.

OTHER FORMS OF POLLUTION

The condition and cleanliness of the buildings on the 3 streets were generally good. Maintenance and clean appearance were clearly important to all the inhabitants. Heavy

Street was constantly on show to outsiders who were traveling through it, and the owners of the buildings were careful to maintain a high standard of cleanliness despite the "disgusting amount of litter." The appearance of a quality environment was, therefore, maintained—and paid for through higher rents. Because the street did not encourage people to be outgoing, however, tenants were reluctant to accept responsibility for the street itself, so they avoided picking up trash and were slow to defend the street against vandalism and abuse.

On Moderate Street, concerns for trash, dust, and soot were specifically referred to were more pronounced than on Heavy Street. This street was at that moment going through a difficult stage. Traffic and traffic problems were increasing, and yet there was no clear demarcation of responsibilities between public territory that was the responsibility of the city and local territory that was the responsibility of the residents. People in parked cars had been observed dumping the contents of ash trays and beer cans into the gutter. Even so, it was still seen as a "good respectable place to live," and sidewalk maintenance by the local inhabitants had helped to keep up the appearance of the street.

Light Street was very seldom seen by outsiders, and so the issue of maintenance was a local matter. This street was also seen to be changing, and residents had noticed signs of deterioration. As one resident put it, "The quality of [Light Street] is getting better in that people take great care of their properties, but worse in that there is more traffic and more cars on the street." Indeed, the responses showed that many inhabitants took an interest in looking after the cleanliness of the street and some had planted their own trees.

The only other inconvenience mentioned was the crowdedness of parking conditions. Many suburban commuters and users of the nearby shopping center were parking on these streets and taking up parking spaces of the residents. Responses to questions concerning the adequacy of street lighting, garbage collection, climate, and convenience indicated that the streets were considered to be without serious problems.

In reaction to all these issues, each age group found Heavy Street more severe, and the old and middle-aged groups found Moderate Street worse than Light Street. The only exceptions were people under 25 who were more critical of Light Street. People on Light Street tended in many cases to be more aware and more critical of their street, while those on Moderate Street were more apathetic.

NEIGHBORING AND VISITING

A series of questions was asked inhabitants about the friendliness of the street, the numbers of friends and acquaintances they possessed, and the places where people met (6). Each respondent was shown a photograph of the buildings on the street and asked to point out where any friends, relatives, and acquaintances lived.

On Light Street, inhabitants were found to have 3 times as many local friends and twice as many acquaintances (9.1 friends and acquaintances per person) as those on Heavy Street (4.2 per person). The diagrammatic network of social contacts shown in Figure 3 clearly indicates that contact across the street was very much more rare on Heavy Street than on Light Street. The friendliness on Light Street was no doubt related to the small amount of traffic but also to the large number of children on the street and the long length of residence of the inhabitants. The statements of the inhabitants corroborate this. They considered it "definitely a friendly street."

On Heavy Street, there was very little social interaction. With few if any friends (0.9 per respondent), the residents considered it not to be a friendly street. While it might be argued that this was primarily a consequence of the life style of those living on Heavy Street (12), the sense of loneliness came out very clearly, especially in the responses of the elderly. As for Moderate Street, there was a feeling that the old community was on the point of extinction. Some respondents said, "It used to be friendly; what was outside has now withdrawn into the buildings. People are preoccupied with their own lives." Some of the families had been there a long time, but these were diminishing. As other respondents put it, "It is half-way from here to there, an in-between street with no real sense of community." There was still a core of original

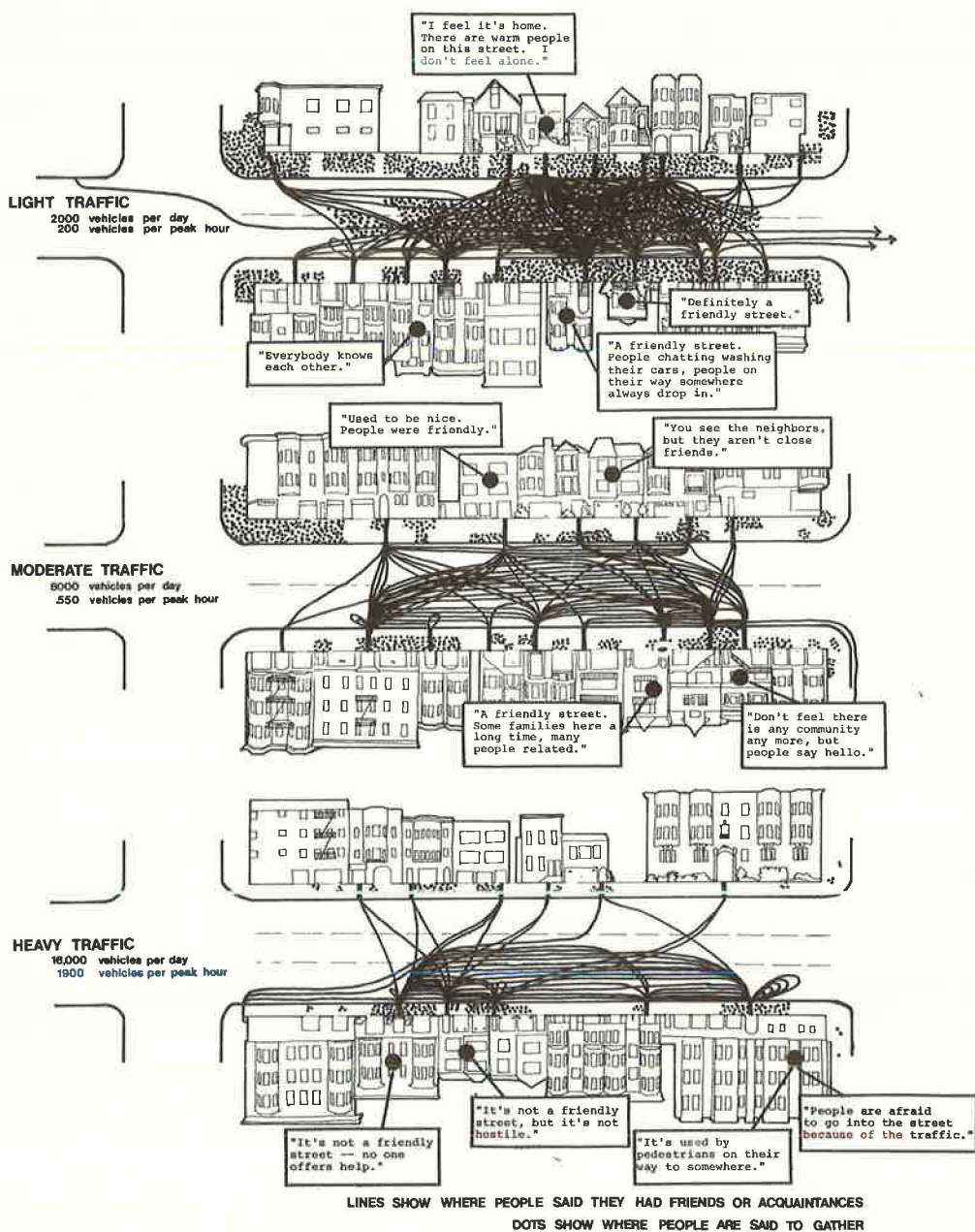


Figure 3. Neighboring and visiting.

Italian residents lamenting that "there are no longer any friends around here." The average number of friends and acquaintances per respondent was only a little higher (total 5.4 per person) than on Heavy Street.

There were sharp differences among age groups. The middle-aged people on the 3 streets possessed a similar number of friends, although those on Light Street had more acquaintances. They were probably more mobile and better equipped to make

friends than the other groups. The young and the old, on the other hand, who had many fewer social contacts on Heavy Street than on Light Street appeared to be more affected by the amount of traffic.

From the notations of street activities drawn by the subjects on the map of the streets (Fig. 3), it can be seen that Light Street was the most heavily used, mostly by teenagers and children, yet even here respondents said that "children used to play on the street but now with a car every two minutes they go to the park." Moderate Street had lighter use, more by adults than by children, and Heavy Street had little or no use, even by adults. The use on Heavy Street was by middle-aged and elderly people on the sidewalks, walking to or from somewhere and seldom stopping to pass the time of day with a neighbor or friend. Reports regarding Moderate Street indicated that the sidewalks were more heavily used by adults, especially a group of old men who frequently gathered outside the corner store. Children and some teenagers played more on the eastern sidewalk, probably because most of their homes were on the eastern side and they did not like to cross the road except at the crossings. As for Light Street, though people continued to use the sidewalks more than any other part of the street, often the whole of the street was in use with children and teenagers playing games in the middle of the street. The sidewalks were also extensively used by children, especially because of their popular gradient and width. Again, a corner store acted as a magnet for middle-aged and elderly people, and a tennis store across the road attracted a small group of young adults. Front porches and steps on Light Street, and to a certain extent on Moderate Street, were used by adults for sitting on while chatting with friends and by children for playing. The lack of them on Heavy Street was regretted.

In conclusion, there was a marked difference in the way these 3 streets were seen and used, especially by the young and the elderly. On the one hand, Light Street was a lively, closely knit community whose residents made full use of their street. The street had been divided into different use zones by the residents. Front steps were used by adults for sitting on while chatting; the sidewalks, by children for playing and by adults for standing on while passing the time of day, especially around the corner store; and the roadway, by children and teenagers for playing more active games like football. However, the street was seen as a whole and no part was out of bounds. This full use of the street is paralleled by an acute awareness of the physical environment as will be described in the section on identity and interest.

Heavy Street, on the other hand, had little or no sidewalk activity and was used solely as a corridor between the sanctuary of individual homes and the outside world. Residents kept very much to themselves so that there was no feeling of community at all, and they failed to notice and remember the detailed physical environment around them. Moderate Street again seemed to fall somewhere between the 2 extremes. It was still quite an active social street, although there was no strong feeling of community and most activity was confined to the sidewalks where at that time a finely sensed boundary separated pedestrians from traffic. The ratings reflect the differences among the 3 streets, particularly the perceived lack of meeting places for old people and play places for children on Heavy Street.

PRIVACY AND HOME TERRITORY

A number of questions were asked to determine whether inhabitants felt they had sufficient privacy and whether they had any feelings of stewardship over their streets. Again response ratings to key questions were more negative on Heavy Street.

General reaction on Light and Moderate Streets was very favorable, especially among middle-aged residents. Great pride in their homes and street was evident in their remarks. On Heavy Street there was little peace and seclusion, even within the home, and residents struggled to retain some feeling of personal identity in their surroundings.

Perception of individual privacy was high throughout this area, and this came in part from the feeling of "privacy and seclusion that exists in any middle-class area," as one respondent put it. Inevitably, in a tightly knit community, like the one that existed on Light Street, life on the street tended to intrude more into a person's home than it would on a less friendly street, but the residents had achieved a good balance

wherein they maintained their own household privacy and yet contributed to the sense of community. As one woman enthusiastically put it, "Only happiness enters in." Children and young people often preferred that their street not be secluded as they liked to be part of things and hated to be cut off. Light Street was a very good example of a quiet street, well placed in relation to other facilities. A satisfactory balance had been achieved between a feeling of privacy and seclusion, and contact with the outside world. Even Heavy Street was enjoyed for its activity by one respondent who said, "I feel it's alive, busy, and invigorating." However, for the majority, the constant noise and vibration were a persistent intrusion into each home and ruined any feeling of peace and solitude.

Figure 4 shows the residents' conception of personal territory. Even though legally a householder's responsibilities extend to the maintenance of the sidewalk immediately

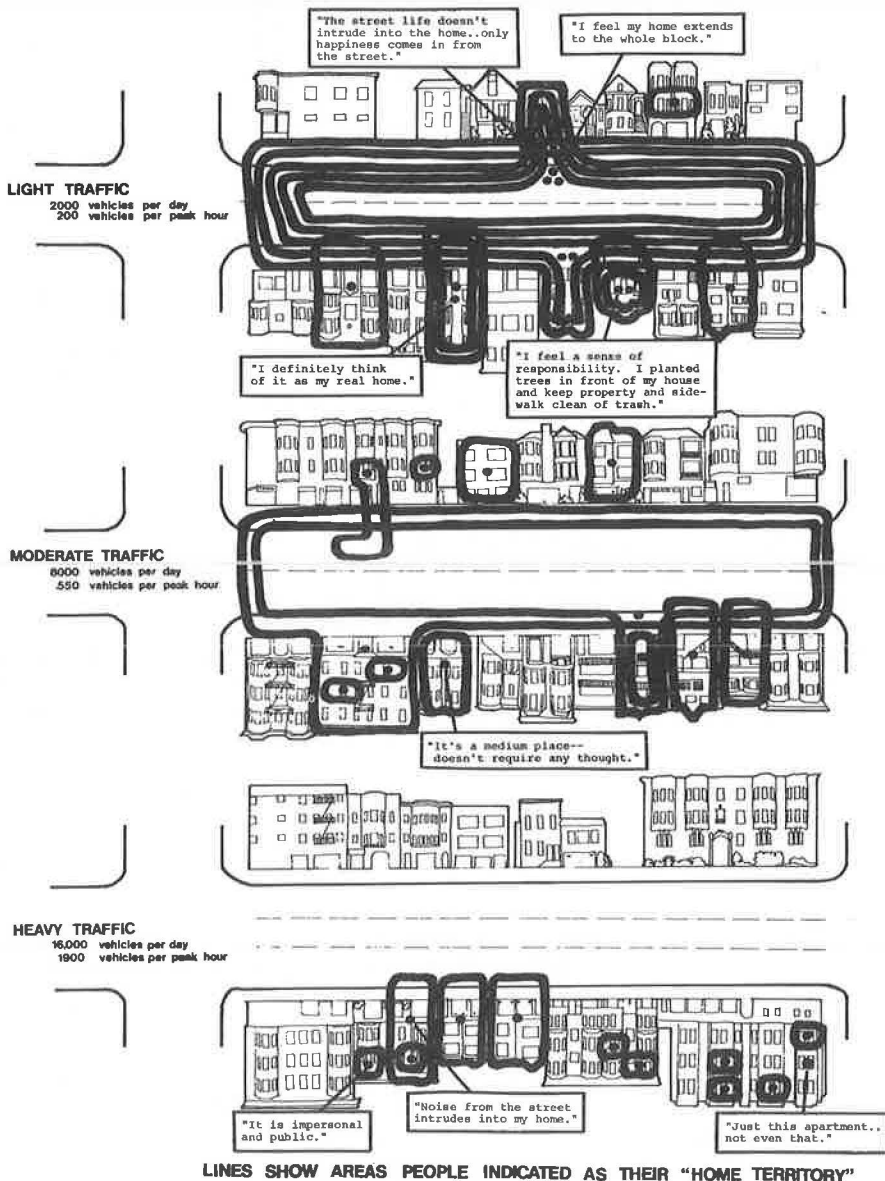
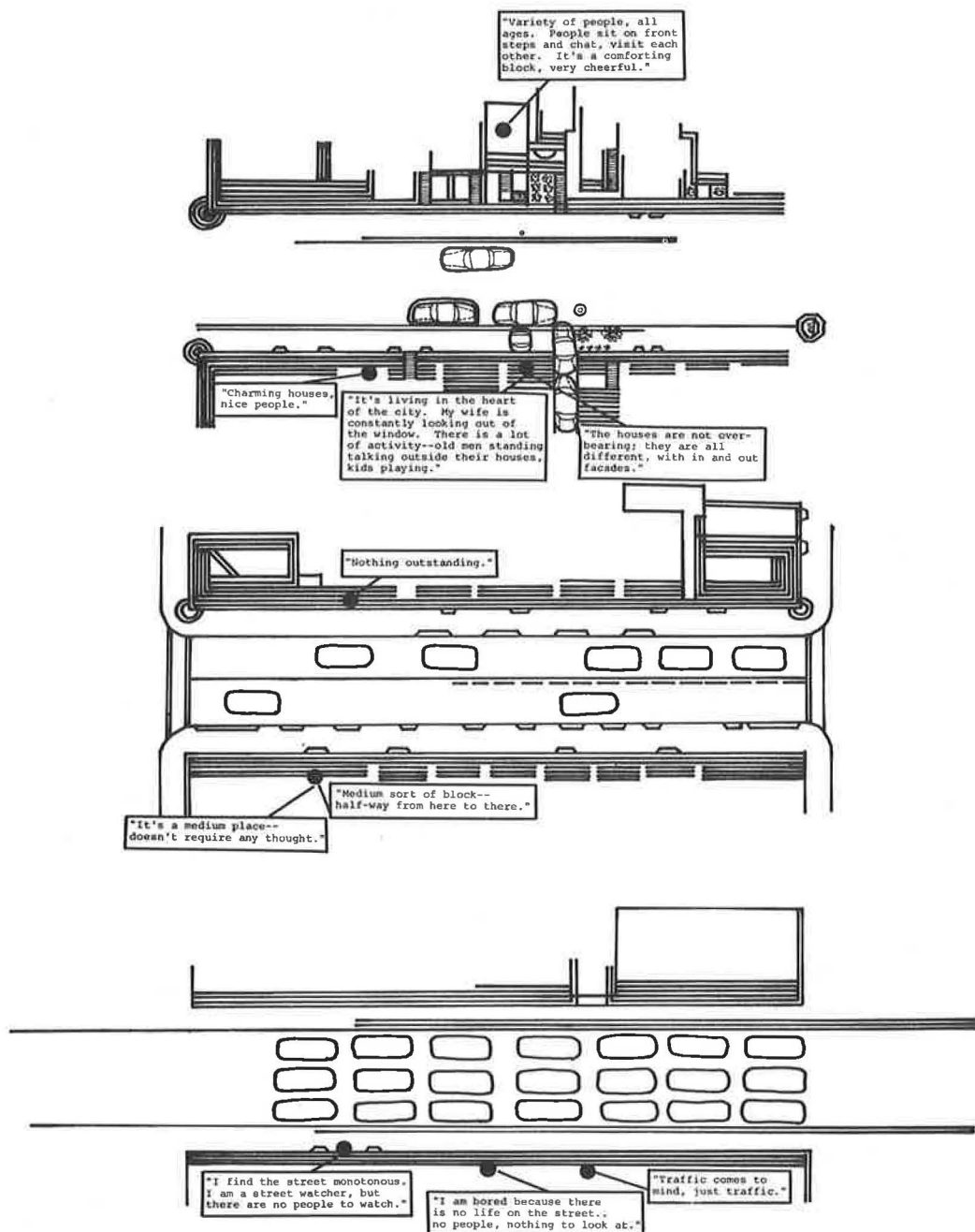


Figure 4. Home territory.

outside his building, residents on Moderate and Light Streets considered part or all of the street as their territory. However, the Heavy Street residents' sense of personal territory did not extend into the street, and for some, mostly renters in the large apartment blocks, it was confined to their own apartment and no further. This pattern of



COMPOSITE OF MAPS PEOPLE DREW OF THEIR STREETS
LINES INDICATE NUMBER OF TIMES FEATURE WAS DRAWN BY RESIDENTS

Figure 5. Identity and interest.

territorial space corresponds to the pattern of social use of each street. The contrast between the territorial restrictions of those living on the highly trafficked street and the territorial expansiveness of those on the lightly trafficked street is one of the more salient findings of the study. A consistent pattern evident in the ratings accurately reflects the tone of people's remarks wherein Heavy Street was seen as considerably less private, and also less identified with than the other 2 streets, especially for those people most likely to be confined to the street, the young and the old.

INTEREST AND IDENTITY

Each street dweller was asked to recall all important features of his street, to judge whether his street was in any way different from surrounding streets, and to draw a map of his street.

Figure 5 is a composite of all the maps drawn. The responses to the questions were much richer in content—and more critical in character—on Light Street than on the other 2 streets. This can be partly explained by the greater differentiation of front yards and smaller houses, but it clearly stemmed from an increased awareness of the street environment by the residents themselves.

Interest in the street as evidenced by their maps varied by age group. Light Street had tremendous appeal for children who recalled individual buildings, front yards, steps, particular parked cars, manhole covers, telegraph poles, and even the brickwork setting around the base of a tree. Many of these elements were obviously encountered during their play on the street. On Moderate Street, where there was less street activity, the maps of children and young people were accordingly less rich.

Middle-aged people on the other hand seemed to be aware of more facets of the physical environment. Their recollections included a combination of buildings, details of the sidewalk and roadway, and the traffic itself. Their images of their street were more impressions than precise recollections. For them, Light Street was seen as a collection of individual buildings with detailed differences in front yards and porches. Moderate Street was much more straight-walled with accurate detailed memories of driveways, pedestrian crossings, and road markings (possibly because it was seen as a traffic route with finely defined boundaries). Heavy Street was seen almost overwhelmingly as a continuous traffic corridor, straight-sided without a break for cross streets and packed with cars. The traffic itself was an easily identified characteristic of the busier street. Whether this identity was good or bad is another matter.

As for the responsiveness of the street environment to the needs of the street dwellers, Light Street once more showed up well. Already 2 trees had been planted along the sidewalk, other plants were thriving in the occasional front yards, and flower boxes were prevalent. On Heavy Street, the sidewalks were too narrow to allow anything except the very small bushes that flanked the doors of 1 or 2 apartment buildings.

STUDY CONCLUSIONS

1. The intensive traffic conditions on Heavy Street did, in fact, lead to considerable stress and suffering. Those people who had found it intolerable, especially those with children, had moved elsewhere, and the people who lived there at the time of the survey either had withdrawn from the street or had never become engaged in it. They only used it when they had to, they had few local friends and acquaintances, and they had become oblivious to the street as a living environment. If they could, they lived at the backs of their houses. For those who treated it as a transient residence, this condition was tolerable; but those who had to treat it as a permanent residence, because they were too old or too poor to leave, found it an intolerable condition.

In contrast, those who lived on Light Street were very much engaged with it. They saw it as their own territory. Their children played on the sidewalk and in the street. They had many friends and acquaintances (more than twice as many each as those on Heavy Street), they noted many more features of the street when they were asked to make a drawing of it, and they were generally much more aware of their street. Despite all this, the rents on Heavy Street with its inferior living environment were higher, perhaps because the apartments and the street were more available to a transient population, through their higher exposure and turnover.

As for those who lived on Moderate Street, their living conditions lay somewhere in between the other two, but their level of satisfaction was lower than their middle position might suggest.

From our results it appears that we can draw some conclusions about the effects of traffic on the environmental and social quality of these streets. (Figure 6 shows a comparison of the characteristics of the 3 streets. The following questions were chosen to determine street livability shown in Figure 6: For traffic hazard, What is traffic like on this street? How would you describe it? Does it bother you at all? For stress, noise, and pollution, Is there anything that bothers you or causes you nuisance on and around this street? For neighboring and visiting, Where do people congregate on the street, if at all? For privacy and home territory, Where do you feel that your "home" extends to? In other words, What do you see as your personal territory or turf? For identity

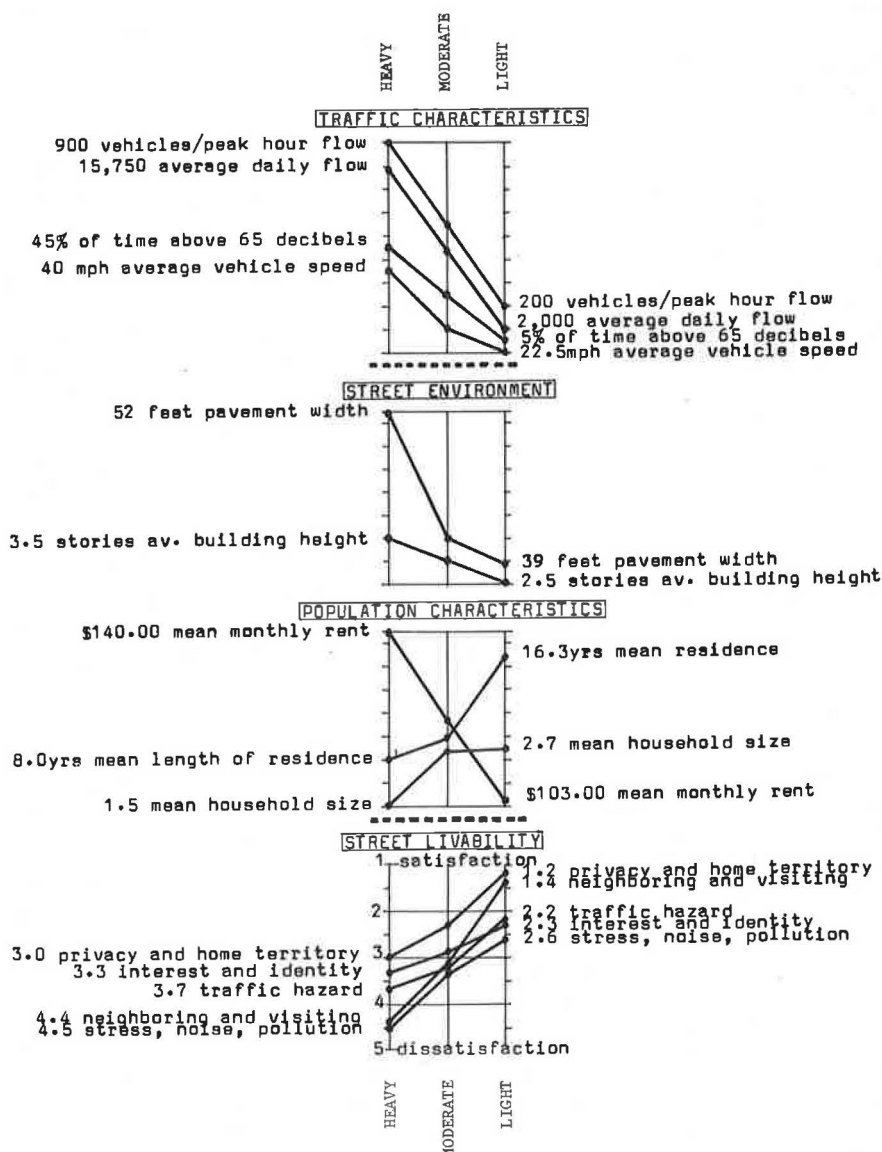


Figure 6. Summary of characteristics of 3 streets.

and interest, Do you find your street and the life that goes on there interesting? Do you get bored by life on this street? Do you find it monotonous?)

a. Heavy traffic activity was associated with an increase in the number of apartment buildings and decrease in the number of single-family homes and number of families with children. The income levels of the residents remained the same or increased.

b. Heavy traffic was associated with a drastic decrease in social interaction or street activity. Conversely, a quiet street with little or no traffic and with families promoted a rich social climate and strong sense of community.

c. Heavy traffic was associated with a withdrawal from the physical environment. Conversely, the street with low traffic showed evidence of acute, critical, and appreciative awareness of and care for the physical environment.

d. It seems fair to say, then, that in this case objective and perceived environmental quality deteriorated with increased traffic.

2. There are some exceptions to these conclusions. Moderate Street suffered from ambiguity of identity because it was undergoing a change in character, turning from a quiet residential street into a major traffic corridor. Many subjects were more dissatisfied than those on Heavy Street, because they chose or were brought up to live on Moderate Street for its livability and it had not turned out that way. Their original expectations for the environment were higher than those of the residents who chose to live on Heavy Street and the disappointment was, therefore, greater.

On Light Street the sporadic hot-rodder was in some ways perceived as being worse than the traffic on Heavy Street for similar reasons. When people expect traffic to be heavy, traffic is tolerated. When they expect it to be light, a hot-rodder is especially intrusive. People were dissatisfied with the lightly trafficked street when their environmental expectations were not realized either through relative decline from a previously higher quality or from deviant traffic behavior.

3. The pattern of interview responses suggested that the issues of safety, stress, condition, pollution, privacy, territoriality, and neighboring were of primary concern to the inhabitants of all the trafficked streets. Issues such as identity, interest, appropriateness, and self-expression were not considered important until the former reached a tolerable level.

4. The general trend was toward increased traffic on each of the 3 streets with the prospect that the environment of each street would decline further.

POLICY IMPLICATIONS: PROPOSALS AND STANDARDS

Policy usually has to be made without the benefit of adequate research, and this project is no exception. Environmental improvement proposals were made by assuming that there are different levels of investment. Many of them were suggested by respondents in the interviews.

Environmental Proposals

1. The broadest implication of this study is that through traffic should be eliminated or at least reduced in the residential areas of the city by devices such as improvements in public transit, controls on the use of streets for traffic, and location of parking facilities in closer relationship to freeways.

2. Vehicular traffic should be more concentrated on the main arteries of the city, where there is less residential development, by increasing their capacity through techniques such as separated grades, selective widening, and parking controls.

3. Residential streets should be protected from through traffic by blocking them altogether, or by devices such as rough pavement surfaces, necking down entrances, bending alignments, landscaping, and sidewalk treatment, all of which would slow traffic down to a residential pace. For inhabitants on Heavy Street, only slight adjustments in traffic speed and composition would have resulted in a marked improvement.

4. On streets where traffic flows and speeds cannot be reduced, ways of ameliorating conditions were proposed. These included sidewalk protection by means of trees, low walls, and hedges; provision of alternative play spaces to divert children's activities away from the dangerous street; protection of residences from glaring street lights

and other visual distraction by the planting of trees or using other devices; clear definition of parking spaces; and encouragement of inhabitants to exercise some interest in their own front yards and sidewalks through provisions for private planting, benches, and the like.

Environmental Standards

The ultimate policy aim of research in this field should be to set environmental standards of livability for residential streets. We have proposed a set of criteria that might be termed Environmental Rights for those who live on residential streets. These rights are no more than generalities at this time. We do not have specific scales by which achievement of those rights can be measured, neither do we know which levels or ranges are desirable, nor do we know how important they are or will be to different population groups. The Buchanan Report (10) identified certain groups including the young and the elderly as particularly "vulnerable" to traffic hazard and nuisance. All we know is that they might be very important.

Even with our lack of evidence, it is still necessary to begin formulating what might be acceptable environmental conditions on residential streets. We need sets of environmental performance standards—environmental capacities to which traffic levels should conform. These standards will have to be measurable, whether in terms of decibels, accident rates, or measures such as delay times for pedestrians crossing the street (10). Standards are needed such as those now being applied in Great Britain as guidelines for the reorganization of traffic in residential areas, even though they are still relatively unsubstantiated by empirical research (7, 15). A national program for the improvement of environmental conditions on urban streets should be initiated.

The environmental problems described in this paper have not caused public protest, neither are they as dramatic as some of the more remote ecological disasters; yet they have an impact on the everyday life of millions of people in this country, for everyone lives on a street. This is an environmental problem that has somehow been "hidden" from the public eye.

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