Patterns of Use in an Urban Natural Park Setting

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Abstract

The variables associated with park use in an urban natural environment were examined in two studies, with a focus on (a) the effects of age, gender, and group size on activity; and (b) the effects of these demographic variables and activity on intended park destinations. The first study surveyed 150 patrons of Point Pleasant Park in Halifax, Nova Scotia, 75 males and 75 female park patrons participated. The results of Study 1 were limited, but a factor analysis yielded 5 environment types (edges, roads, paths, historical sites, and miscellaneous sites) that were used in some of the analyses of Study 2. The second study explored the same effects as Study 1, but utilized naturalistic observations of over 5000 park patrons in Point Pleasant Park. The observational data supported some of the expected effects for the demographic variables as predictors of activity. As expected, edge environments were most generally preferred, but there was also support for the effects of the demographic variables on environment preference such that there was a curvilinear relationship between age and presence in edge environments. The results are discussed in terms of the extent to which the park is utilized and by whom.

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The urbanization of the natural environment provides some challenging conditions for its human inhabitants. One problem inside city limits is the loss of the natural environment. Trees are removed. Riverbeds are lined with cement. Land is covered with asphalt. To offset these changes, we create city parks where varying amounts of natural space are provided. These provide a wide range of natural and semi-natural environments. The question arises as to whether or not the limited natural urban land space is maximally utilized.

In his article *Rethinking our Park Spaces*; Tom Clancy (1993) suggests that limited urban land space requires a reevaluation of current park use. This survey data from Ontario indicated that general outdoor leisure activities were shifting from sports like snow-mobiling, fishing and football to activities like walking, orienteering and swimming. Indeed, expensive leisure activities may be declining due to rising costs and increasing interests in the protection of the natural environment. Similarly, individual leisure activities such as walking and cycling are on the increase because they are inexpensive activities that are less dependent on specific weather conditions. The tendency towards more natural, low-impact activities is reflected in the increased use of urban natural parks (Clancy, 1993).

The purpose of this project is to examine the variables that affect park use in an urban natural park environment, and to determine the extent to which various park environments are utilized and by whom. Two studies were conducted at Point Pleasant Park in Halifax, NS. The first deals with park patrons' reported intentions to visit various park areas identified via a questionnaire. The second deals with park behavior trends as they were observed in the natural park setting. The majority of the research reviewed in this paper is limited to publications of the 1980s; the apparent lack of more recent work suggests that there is ample room for new research to make a contribution.

The literature reviewed below examines demographic variables, their relation to park activity, their relation to environment preference, and overall environment preference. Relevant research will be presented in four sections: (a) an overview of Point Pleasant Parks from a historical perspective; (b) an overview of recreation patterns in parks from a historical perspective; (c) the relation between age, gender, and group size and park activities; and (d) the relation between age, gender, group size, park activity and park environment preference. The hypotheses of the present study are specified as they arise in these areas, and are additionally presented at the end of the introduction for ease of reference.

The History of Point Pleasant Park

Located between the Halifax Harbour and the Northwest Arm in the southern section of the Halifax City Peninsula, Point Pleasant Park was first used by the Mi'kmaq Indians as summer fishing grounds. In 1749, the site (initially called Sandwich Point) was chosen by Edward Cornwallis and his officers as a prime location for a new settlement. A short time later, however, it became obvious that the shore waters lacked depth and the area was too exposed to southeast gales, so the site was abandoned for a more suitable one further up the Harbour, from which the present day city of Halifax has grown (Kitz & Castle, 1999, p.15).

In 1762, the fear of a French invasion prompted the Council of War to order the erection of two batteries: Point Pleasant Battery, and Flagstaff, where the remains of a chain and timber boom are identified by an iron ring fixed into the bedrock. During the American Revolution (1775-1783), the two original batteries were reconstructed and Black Rock Battery, Chain Rock Battery and Northwest Battery were also erected (Kitz & Castle, 1999, p.16).

When war broke out between the British and French in 1793, the defenses at Point Pleasant were strengthened once again. General Ogilvie, the commander of the Halifax garrison, ordered the reconstruction of two of the five batteries. The remains of these two, Point Pleasant Battery and Northwest Battery, still exist, as does the additional fort Ogilvie erected and named for himself. In 1794, when Prince Edward replaced Ogilvie as military commander, he reinstated the chain and timber boom across the Northwest Arm and ordered the construction of a central fort on higher ground as defense against a land invasion. The Prince of Wales (or Martello) Tower was completed in 1797 and remains standing in the park today. By 1860, high-powered rifle guns made much of Point Pleasant's fortresses and batteries obsolete. Fort Ogilvie was reconstructed and Martello Tower was converted into a central magazine. The Cambridge Battery was also erected - the remains of which are still visible (Kitz & Castle, 1999, p.18).

Point Pleasant opened officially as a park in 1873 when the British agreed to lease the land to park directors for one shilling per year for 999 years. However, in the 1890s, the buildings were still being prepared for military purposes, and Fort Ogilvie and Cambridge Battery were converted to modern breech loading guns. By World War I, the

Cambridge Battery was no longer usable, although Fort Ogilvie remained in use as a coastal artillery position until 1943 (Kitz & Castle, 1999, p.46).

While the Fortresses and Batteries at Point Pleasant were never called into action, a Memorial Day service is held on site every year. The Sailors Monument bears witness to the Battle of the Atlantic, which was fought close to the shores where the monument stands.

Today, Point Pleasant Park is one of a few urban natural parks in Canada. The park's 186 acres of natural primary woodlands are threaded with many miles of paths and graveled roads; and house one of the very rare natural heather patches in North America. A saltwater beach is situated on the eastern shore and there are many picnic areas throughout the park with benches and tables and barbeque facilities. Four separate washroom facilities are available throughout the Park and canteen facilities are offered during the summer months. The Park is opened to the public from 6:00 am to dusk year round and in recent years has been host to 'Shakespeare by the Sea', outdoor theatre presented against the backdrop of historical buildings.

The History of Urban Recreation

The history of urban recreation planning provides an interesting perspective on today's park settings. Urban recreation patterns emerged during the 1600s that were different from present day leisure patterns. With urban parks virtually non-existent, recreation primarily consisted of tavern sports such as dog and cock fighting, and outdoor events such as hunting and fishing. As the population in the American colonies began to grow, recreational activities began to diversify. Common lower-class activities included dancing, horseracing, gambling, and drinking. Upper-class activities were different, including field sports, card playing, and theatricals (Gold, 1973).

With the growth of industrialism in the early 1800s, indoor sports became popular. Spectator sports such as boxing and foot races were common and the gymnasium, commercial theatre and burlesque shows became popular. Water sports like boating and swimming also became accepted activities. From 1850 to 1900, organized sports such as baseball, bicycling, croquet, archery, tennis, and football gained prominence. During the first half of the 20th century, higher standards of living, new technologies and increased leisure time affected leisure patterns. The invention of the automobile and the development of public transit meant that people could pursue wider rural outdoor recreation. As a result, large park systems were developed and the Recreation Movement began (Gold, 1973).

During the 1930s, the Depression had a surprisingly positive influence on the Recreation Movement. Attendance at commercial recreation facilities was reduced because of limited family resources, which created a demand for public facilities. This demand led to work programs employing thousands of people to develop and expand recreation areas.

During World War II, emphasis was placed on the values of recreation for members of the armed forces, industrial employees, and civilians (Doell, 1954). Local communities acquired federal assistance to provide leisure services. The post-war period, up to 1960, saw a large increase in urban development. The rapid expansion of all types of recreation areas was unprecedented as disposable income and leisure time increased for most North Americans. However, government attention, up to 1970, focused on rural recreation opportunities with little interest in urban park developments.

Recently, there has been renewed interest in urban park facilities with more natural environments. This interest emerged with the Environmental Movement of the 1970s. Today, with limited urban land available and dwindling government funds, scientific studies of urban recreation parks are important. The studies examine urban park issues such as user demographics and the types of activities occurring in the parks. This work helps to ensure that the limited urban land space is optimally used.

The Effects of Age, Gender, and Group Size On Park Activities

Some of the more obvious demographic variables that have been examined with respect to their effects on urban natural parkland use are age, gender, and group size, although it is important to note that these have been examined primarily for their separate, rather than interactive, effects on park activity.

Age

Particular types of activities have commonly been associated with the different stages of life. It has been noted that some of these age-associated activities have undergone changes within the past 40 years. For example, Shanas, Townsend, Wedderburn, Friis, Milhj and Stehouwer (1968) noted that senior citizens increased their leisure activities over rates previously recorded. The change in the leisure patterns of this group was defined by Cain (1967) as the acceptance of the legitimacy of leisure by the aging population. Cain (1967) suggested the attitudinal shift began with the newer generations that had extra free time, more vacations and wealth. Bultena and Wood (1970) conducted a study of changing levels of participation in leisure activities from adulthood to retirement age. Golf was the only activity preferred more by retirees, but walking and swimming were also rated highly as post-retirement activities. But do these changes reflect senior activity preferences within a natural park setting? The existing research suggests otherwise. Godbey and Blazey (1983) conducted a park study of senior visitors and found that the majority participated in sedentary activities (e.g., sitting, reading and playing cards) during visits to the park. Thus, although studies of retired populations reveal patterns of increased leisure time and additional varieties of activities, the activities most popular among park going senior citizens are of the sedentary variety.

Based on the research reviewed above, it can be expected that younger adults will participate in more mobile park activities, whereas seniors will participate in more sedentary park activities.

Hypothesis 1: As age increases, participants will more likely be observed engaging in, or reporting intentions to engage in, relatively sedentary activities.

Gender

Males and females are often expected to participate in different types of activities. Hutchinson (1994) revealed similar leisure and park recreation patterns for the elderly and women in observational data gathered at 13 public parks in Chicago, Illinois. The results indicated that 56% of all female groups observed were engaged in stationary activities such as watching their children, relaxing and reading. Similarly, 64% of observed elderly groups were engaged in stationary activities as opposed to mobile activities. Conversely, 71% of all male groups were observed participating in mobile or sport activities.

Hypothesis 2: Males will more likely be observed engaging in or reporting intentions to engage in more mobile or sporting activities than females.

Group Size

Another factor that contributes to activity type is group size. The size of a group can be a major determinant of activity, as only larger groups can participate in field games. Hutchinson (1987) made field observations of 13 different Chicago parks during the summer months of 1981 and 1982. The results yielded differences between the particular type of activity and the size of the group. For example, bicycling and jogging were observed more often as an individual activity, but picnicking usually involved larger groups. Field sports were also observed as involving larger groups but will not be included in this study as the natural forested urban park setting is rarely conducive to field sport activities.

Hypothesis 3: As group size increases, participants will less likely be observed engaging in, or reporting intentions to engage in, relatively mobile or sporting activities.

Interaction Effects

Although age, gender, and group size show independent significant relationships with leisure park activities, there are many gaps in the research with respect to the interactive effects of the variables. For example, if there are male/female differences in park leisure activities as well as adult/senior differences in park leisure then it may be expected that gender and age exert joint influences on the choice of activity such that younger males will be more active than older males. Also, if there are group size differences in park leisure activities and there are adult/senior differences in park leisure then it may be expected that group size and age exert joint influences on the choice of activity such that large groups of seniors will be less active than single individuals and small groups of seniors, or large groups of adults will be less active than single individuals or small groups of adults. Further, if there are group size differences in park leisure activities as well as male/female differences in park leisure then it may be expected that group size and gender exert joint influences on the choice of activity such that large groups of females will be less active than single individuals and small groups of females and large groups of males will be less active than single individuals and small groups of males. Thus, the variables in combination should exaggerate the effects of the independent variables as they influence leisure activity choices.

Hypothesis 4: Age and gender are expected to interact such that the effect of age on activity level will be evident primarily for adult males whereas age differences in female activity level will be less pronounced.

Hypothesis 5: Age and group size are expected to interact such that the effect of group size on activity level will be evident primarily for seniors in larger groups whereas group size differences in adult park patrons activity level will be less pronounced.

Hypothesis 6: Group size and gender are expected to interact such that the effect of group size on activity level will be evident primarily for single males whereas group size differences in female activity will be less pronounced.

Previous research regarding age, gender and group size has not considered higher-order interactions of these variables. For example, if there are male/female differences in park leisure activities and there are adult/senior differences in park leisure activities and there are group size differences in park leisure activities, then it may be expected that age, gender and group size exert joint influences on the choice of activity. Specifically, the gender difference in activity for older patrons in large groups will be more pronounced than the gender difference in activity for younger patrons in large groups but this will not be the case for smaller groups.

Hypothesis 7: Age, gender, and group size are expected to interact such that effects of group size on activity will be evident primarily for senior females in larger groups whereas the interactive effects of age and gender will be less pronounced for smaller groups.

The Effects of Demographic Variables On Environment Preferences

Gender, age, and group size are three factors that affect not only park leisure activities, but also environment preference. Three types of natural environments have received attention in previous research: (a) edge environments, (b) vegetation density, and (c) trail type.

Edge Environments

The edge environment, which has received the weight of attention in the literature, is defined as a place where a specific vegetation type (usually a forest) is met by another specific vegetation type (most often a meadow or field). Balling and Falk (1982), Ruddell and Hammitt (1984a), and Appleton (1975) have documented a preference for edge environments. This preference can be explained by a number of theories.

One theory is referred to as the habitat theory (Appleton, 1975), which contends that the relation between the human observer and his or her perceptions of the environment is no different from the relation of an animal to its habitat. The aesthetic beauty perceived in an environment is dependent upon its likelihood of meeting our simple biological needs: shelter, safety, and food.

> “Aesthetic satisfaction, experienced in the contemplation of landscape, stems from the spontaneous perception of landscape features which, in their shapes, colors, spatial arrangements and other visual attributes, act as sign stimuli indicative of environmental conditions favorable to survival, whether they really are favorable or not." (Appleton, 1975)

The Prospect Refuge Theory (which can be viewed as conducive to but more limited than the habitat theory) can be defined by the phrase "to see without being seen" -- an advantage offered by the edge environment. The habitat theory is contingent on the Prospect Refuge Theory because the ability to see without being seen is an intermediate step in the satisfaction of the biological needs put forth by the habitat theory. Thus, the more closely an environment approximates the ability to see without being seen the more likely it will be perceived as aesthetically pleasing.

The potential of a prospect position (the position from which to see) to offer an appropriate view is dependent upon the relation of the observation-point to the land-

The potential of a prospect position (the position from which to see) to offer an appropriate view is dependent upon the relation of the observation-point to the land-surface. In his 1975 book, Appleton demonstrated how different types of landscape afford varying prospects. High mountains provide wider and more distant prospects, but even modest elevations can afford a good view provided there are no blocking objects nearby. Flat land also can offer a good prospect if its surface is free from arboreal vegetation.

Ruddell and Hammitt (1984b) are proponents of the Functionalist approach to visual edge preference that incorporates the theory of the human origin on the savanna. This approach suggests that the perceptual mechanisms, which deal with visual information processing, probably evolved on the savanna. The savanna environments, then, would be the most ingrained in those perceptual mechanisms and would therefore be more resistant to evolutionary change. On the savanna, the edge environments afforded humans the ability to see without being seen. This enabled the humans to observe, stalk and kill prey and to observe and avoid their own predators. Perhaps the use of edge environments for the purpose of seeing without being seen was one of the early mechanisms developed by the savanna-dwelling humans. This would explain the natural preference, in humans, for edge environments.

Hypothesis 8: More park patrons will be observed at or report intentions to visit the edge environments more than any other park environment.

An additional question concerns the most preferred position within the edge environment. The 1987 study by Ruddell and Hammitt examined the Prospect Refuge

Theory as an orientation for interpreting edge preference. The theory was applied to a field situation in which the orientation functions of visitors' perceptions of a set of edge environments were explored. Respondents indicated their visual preference for each of 32 photos. The ratings were then factor analyzed to determine if edge environment themes could be identified. The most preferred scenes were those in which the viewer was located at the edge of a meadow, adjacent to the edge of a forest. The least preferred scenes consisted of a distant view of a forest edge, with the viewer facing the forest edge and in the center of a meadow.

This research indicates that people not only prefer edge environments; they prefer to be closer to the forests' edge within the edge environment.

Hypothesis 9: More park patrons will be observed at the forest's edge than any other area within the edge environment.

There is an overall preference, then, for edge environments and certain vantage points within the edge environments. But are specific groups in the population more likely to prefer one type of environment to another? One study by Nelson and Loewen (1993) analyzed perceptions of the security of outdoor public environments with respect to gender, time of day, and number of people present. The results indicated that gender was a determinant of perception of public places. Women regarded the outdoor environment as more threatening than did men. The number of people present at the sites also played a part in perceptions. There was an overall dislike of being in a public place by oneself, but environments containing one person or no people were less appealing to women in particular. The researchers suggest that this effect relates to the greater physical vulnerability of women given that women's and men's perceptions did not differ when two or more people were present.

Based on these findings, single females are expected to express less preference for non-edge environments than edge environments. It may also be expected that senior citizens express this preference due to their greater physical vulnerability.

Hypothesis 10: Single females will more likely be observed in or report intentions to visit edge park environments than other environment types.

Hypothesis 11: As age increases, park patrons will more likely be observed in and/or report intentions to visit edge environments than other types of environments.

If, indeed, edge environment preferences can be explained by evolutionary theory, as Ruddell and Hammitt (1987) suggest, then the innate preference should be more likely to occur in a younger, less experienced population. In 1982, Balling and Falk conducted a study addressing that possibility. They looked at age differences in edge preference environments and hypothesized that older groups of participants would be more affected by experience and less likely than children to choose the savanna-type edge environments as a preferred area to live or visit. The results showed an expected overall preference for the savanna / edge and open forest areas. The strongest preference for the savanna / edge was found between the two youngest age groups (eight and eleven). The older age groups had statistically indistinguishable preferences for savannas / edge and open deciduous and coniferous forests. So, indeed, preferences for edge environments may be innate.

Hypothesis 12: Children will more likely be observed in edge environments than other types of environments.

Vegetation Density

Another variable identified as affecting environment preference is vegetation density. Although there is relatively little research directed at this factor, Ruddell and Hammitt (1984b) found that vegetation density predicted preferences in a study of natural edge environments. Specifically, preferences were rank-ordered such that managed enclosures (i.e., those that were sharp and well defined) were more preferred than rougher areas with more unmanaged vegetation. The Prospect Refuge theory is reinforced by these findings as rough, thick undergrowth does not afford a clear prospective of the area.

Hypothesis 13: More people will be observed at and/or report intentions to visit park areas with limited, well defined undergrowth vegetation than park areas with unmanaged, poorly defined undergrowth vegetation.

In another study Ruddell and Hammitt (1984a) indicated that motive played a role in the preference of vegetation density. The participants who were identified as having high activity motives (such as hiking) preferred the less defined, rougher environments. The participants who were identified as having low activity, nature-appreciation motives preferred slightly more managed vegetation.

Hypothesis 14: As activity level decreases, participants will be observed at or will report intentions to visit environments with limited, well defined undergrowth vegetation.

Trail Type

The type of trail is also associated with environmental preference (Allton & Leiber, 1983; Fesenmaier, Goodchild, & Leiber, 1980). Leiber and Allton (1983) examined trail attributes as a function of trail evaluation among a group of hikers, joggers and recreational bicyclists. The subjects were asked to evaluate hypothetical destinations that were characterized by differing levels of trail attributes such as trail surface, type of terrain, length of trail and the number of changes or views per unit length. The results for bicyclists showed strong preferences for paved terrain. Bicyclists' satisfaction with a dirt trail is about equal to the satisfaction level one may derive from having to cycle an additional 35 minutes on a paved trail. In contrast, day hikers expressed the least satisfaction with the trail changing from dirt to paved but derived moderate satisfaction from a number of changes in the scenery per 1/4 mile. Joggers, also, indicated that paved surfaces and hills had a negative impact on satisfaction.

Based on the above research it can be expected that activity will affect terrain preference. Overall, however, it is expected that there will be general preferences for flat, widely graveled paths.

Hypothesis 15: As park paths become more widely graveled and clearly defined, population observations will increase or more participants will report intentions to visit.

In order to provide an accurate representation of the patterns of behavior in a natural urban park setting, data were drawn from two different types of investigations. In Study 1 a questionnaire addressed individual intentions for visiting specific environments within an urban natural park setting. Study 2 examined naturally observed patterns of behavior within specific environments in an urban natural park setting. These studies examine the following hypotheses.

Hypothesis 1: As age increases, participants will more likely be observed engaging in, or reporting intentions to engage in, relatively sedentary activities.

Hypothesis 2: Males will more likely be observed engaging in or reporting intentions to engage in more mobile or sporting activities than females.

Hypothesis 3: As group size increases, participants will less likely be observed engaging in, or reporting intentions to engage in, relatively mobile or sporting activities.

Hypothesis 4: Age and gender are expected to interact such that the effect of age and gender on activity level will be evident primarily for younger males whereas age differences in female activity level will be less pronounced.

Hypothesis 5: Age and group size are expected to interact such that the effect of group size and age on activity level will be evident primarily for seniors in larger groups whereas group size differences in younger park patrons activity level will be less pronounced.

Hypothesis 6: Group size and gender are expected to interact such that the effect of group size and gender on activity level will be evident primarily for single males whereas group size differences in female activity will be less pronounced.

Hypothesis 7: Age, gender, and group size are expected to interact such that effects of group size on activity will be evident primarily for senior females in larger groups whereas the interactive effects of age and gender will be less pronounced for smaller groups.

Hypothesis 8: More park patrons will be observed at or report intentions to visit the edge environments more than any other park environment.

Hypothesis 9: More park patrons will be observed at the forest's edge than any other area within the edge environment.

Hypothesis 10: Single females will more likely be observed in or report intentions to visit edge park environments than other environment types.

Hypothesis 11: As age increases, park patrons will more likely be observed in and/or report intentions to visit edge environments than other types of environments.

Hypothesis 12: Children will more likely be observed in edge environments than other types of environments.

Hypothesis 13: More people will be observed at and/or report intentions to visit park areas with limited, well defined undergrowth vegetation than park areas with unmanaged, poorly defined undergrowth vegetation.

Hypothesis 14: As activity level decreases, participants will be observed at or will report intentions to visit environments with limited, well defined undergrowth vegetation.

Hypothesis 15: As park paths become more widely graveled and clearly defined, population observations will increase or more participants will report intentions to visit.

Study 1

The purpose of Study 1 is to examine questionnaire data for the variables that are associated with patterns in a natural urban park setting. The hypotheses define the effects of three demographic factors on activity and environment preference: Age (adult = 1, senior = 2), gender (male = 1, female = 2), group size (one = 1, two = 2, and three or more = 3), activity (sitting/relaxing = 1, sightseeing/exploring = 2, dog walking = 3, walking/exercising = 4), and environment types (15 different park areas/conditions).

Method

The Site

Point Pleasant Park comprises a diversity of environments. The forested areas range in density from very thick to savanna-like and are home to a wide variety of tree species. The paths and roads range in width and level of vegetative undergrowth, such that visibility and depth of field are variable. The waters' edge along the Halifax Harbour and Northwest Arm includes both sandy and rocky beach areas with shorelines of gradual and steep incline. The inland quarry water pond is well maintained and has been habitated by ducks and stocked with fish. Indeed, the many and diverse environments of Point Pleasant Park are to be considered representative of the different types of natural urban recreation opportunities available in North America.

The regulations governing public use at Point Pleasant Park comprise many restrictions. A few of these restrictions directly affect park use as it pertains to the present studies. Park patrons are prohibited from riding bicycles in the park on Saturday and Sunday. Through the week, bicyclists are restricted to the non-graveled areas. Park patrons are also not permitted to take their pets along the eastern shore bordering the Halifax harbor after 10 am daily. No motor vehicles are permitted in the park but there is ample parking at both the western and eastern entrances.

Participants and Procedure

One hundred fifty patrons of Point Pleasant Park in Halifax, Nova Scotia participated in the first study.

The participants were approached at the two main entrances of Point Pleasant Park. The amount of time spent at each entrance was equal so that the variable *entrance* would not have to be included in the analysis. Solicitation of the participants involved an introduction of the researcher and a general overview of the study's purpose. If the subjects agreed to participate in the study, they were asked to read a cover letter explaining, more clearly, the objectives of the research (see Appendix A).

The participants (one from each party) then filled out a questionnaire that included demographic questions (gender, age, group size, and main activity) as well as questions to determine the types of environments the participants were likely to explore (see Appendix B).

The participants answered the question "Will you be proceeding into an area similar to the one pictured in Photo X? Yes or no", while referring to fifteen 8 by 10 color photographs of the park which were posted on a large billboard. The 15 photos, which were chosen from 80 photos taken at regular intervals along two designated routes, were selected by the researcher to reflect the various types of environments at Point Pleasant Park (see Appendix C).

Photos A, B, M, and I reflect the differences in the types of roads in the park. Photo **A** represents the areas of the park that have straight, widely graveled, tree-lined roads with unmanaged, thick roadside undergrowth. Photo **B** represents the areas of the park that have straight, widely graveled, tree-lined roads with limited, well defined roadside undergrowth. Photo **I** represents the areas of the park that have curved, widely graveled, tree-lined roads with moderate roadside undergrowth. Photo **M** represents the areas of the park that have steeply inclined, tree lined, graveled roads with unmanaged, thick roadside undergrowth.

Photos O, N, and C reflect the differences in the types of paths in the park. Photo **O** represents the areas of the park that have poorly defined, tree-lined, narrow paths with moderate path-side undergrowth. Photo **N** represents the areas of the park that have clearly defined, tree-lined, narrow paths with limited path-side undergrowth. Photo **C** represents the areas of the park that have moderately defined, tree-lined, narrow paths with thick path-side underbrush.

Photos L, J, and G reflect the differences in the historical sites and grassy areas. Photo **L** represents the areas of the park that have small historical monuments and large, well-kept, non-flat, grassy terrain. Photo **J** represents the areas of the park that has moderately sized historical monuments and large, poorly kept, flat, grassy terrain. Photo **G** represents the areas of the park that have large historical monuments and large, flat, gravel terrain.

Photos F, D, and E reflect the differences in the water/forest edge environments and crowding densities. Photo **F** represents the areas of the park that are defined by water and forest edge environments with very little crowding. Photo **D** represents the areas of the park that are defined by water and forest edge environments with dense crowding. Photo **E** represents the areas of the park that are defined by water and forest non-edge environments.

Photos H and K reflect two fairly uncommon situations. Photo **H** represents the areas of the park that have tree-lined, graveled roads with dense situational crowding. Photo **K** represents the areas of the park that are only a short distance from the streets of the city.

Preliminary Analysis

To reduce the amount of data and to provide a less complicated view of the different types of destination choices, the 15 photos were factor analyzed. Principal factors extraction with varimax rotation was performed using SPSS Factor on ratings of 15 park photos by the sample of 150 people. Principal components extraction was used to estimate the number of factors and factorability of the correlation matrices.

Five factors were extracted. The variables were well defined by this factor solution. Communality variables, as seen in Table 1, tended to be high. With a criterion of .45 for inclusion of a variable, all of the variables loaded on a factor.

The loadings of variables on factors, communalities, and percents of variance are shown in Table 1. The variables are grouped by size of loading to facilitate interpretation. The five factors will provide the variables for many of the subsequent tests of effects on environmental preference.

Table 1

Factor Loadings, Communalities (h^2), and Percents of Variance for Principal Factors Extraction and Varimax Rotation on Park Photos

Photo	Paths	Edges	H. Sites	Roads	M. Sites	h^2
O	.906					.831
N	.811					.712
C	.752					.643
F		.884				.799
D		.800				.732
K		.524				.449
J			.796			.739
G			.767			.671
L			.712			.585
B				.854		.780
A				.800		.744
M				.468		.471
E					.714	.631
I					.699	.579
H					.593	.464
% of var	24.05	15.77	10.19	8.47	7.05	

Note. H. Sites = Historical Sites; M. Sites = Miscellaneous Sites.

Data Analysis

To test the effects of gender, age, and group size (predictor variables) on intended activity (criterion variable), a three-stage hierarchical standard multiple regression was conducted. Activity was coded such that the lower numbers represent the more sedentary activities (sitting/relaxing = 1, sightseeing/exploring = 2, dog walking = 3, walking/exercising = 4)

To test the effects of gender, age, and group size on reported intentions to visit environments, a 2 × 2 × 3 between-subjects multivariate analysis of variance was performed on five dependent variables: edges, paths, roads, miscellaneous sites and historical sites. Each of the five environment types were coded such that the lower numbers represent non-presence in the environment (not present = 1, present = 2). To investigate the impact of each effect on the individual dependent variables, tests of between-subjects effects were performed. Reported intentions among different activity groups for visiting areas of varying undergrowth vegetation density were examined using the Kruskal-Wallis 1-way ANOVA, non-parametric test.

General reported intentions for visiting the five factor-analyzed environments were analyzed using repeated measures ANOVA. General reported intentions for visiting areas of varying undergrowth vegetation density and different trail types were analyzed using the Wilcoxon signed ranks, non-parametric test.

Results

Results are presented in the following order: (a) frequency tables of demographic variables and activity (b) regression analyses of effects of demographic variables on activity level; (c) multivariate analyses of demographic variables on the 5 environment types derived from the factor analysis, and analysis of activity level on visitation intentions for areas of varying undergrowth vegetation density; and (d) analysis of general visitation intentions of the five factor analyzed environment types, undergrowth vegetation density, and trail type.

Frequency Tables of Demographic Variables and Activity

Table 2 displays the frequency counts of park patron gender, table 3 displays the frequency counts of park patron group size, table 4 displays the frequency counts of park patron activity, and table 5 displays the frequency counts of park patron age.

Table 2

Frequencies of Groups by Gender Composition

Gender Composition	Frequency
Male	75
Female	75

Table 3

Frequencies of Groups by Group Size Composition

Group Size Composition	Frequency
One	34
Two	64
Three or more	52

Table 4

Frequencies of Groups by Activity Composition

Activity Composition	Frequency
Sitting/relaxing	17
Exploring/sightseeing	14
Dog walking	36
Walking/exercising	83

Table 5

Frequencies of Groups by Age Composition

Age Composition	Frequency
Adults	123
Seniors	27

Effects of Demographic Variables on Activity Level

Table 6 displays the unstandardized regression coefficients (*B*), the standardized regression coefficients (β), and R^2. The main effects, entered in step 1, did not account for a significant amount of the variance in activity, F (3, 146) = 1.03, ns. Contrary to Hypothesis 1, park patrons did not indicate intentions to engage in less mobile or sporting activities as age increased. Contrary to Hypothesis 2, male park patrons did not indicate intentions to engage in more mobile or sporting activities than female park patrons. Contrary to Hypothesis 3, park patrons did not indicate intentions to engage in more mobile or sporting activities as group sizes decreased. In step 2 (F (6, 143) = .588, ns), the 2-way interactions involving gender, age, and group size did not account for a significant increment in explained variance, $\Delta R^2 = .002$, ns. Contrary to Hypothesis 4, the interaction between age and gender did not approach significance. Age differences in activity levels for females were not less pronounced than age differences in activity levels for males as adult males were not more likely to engage in more mobile or sporting activities than senior males. Contrary to Hypothesis 5, the interaction between age and gender did not approach significance. Group size differences in activity level for adults were not less pronounced than group size differences for seniors as single seniors were not more likely to engage in more mobile or sporting activities than seniors in larger groups. Contrary to Hypothesis 6, the interaction between group size and gender was not significant. Group size differences in activity level for females were not less pronounced than group size differences for males as single males were not more likely to engage in more mobile or sporting activities than males in larger groups. In step 3 ($F(7, 142) = .521$, ns), the 3-way interactions involving gender, age, and group size did not account for a significant increment in explained variance, $\Delta R^2 = .001$, ns. Contrary to Hypothesis 7, the interaction between age, gender, and group size was not significant. Gender differences in activity level for older park patrons in large groups were not more pronounced than gender differences in activity level for younger park patrons in large groups.

Table 6

Results of Multiple Regression Predicting Activity Level

Predictor variables	*B*	β	t	R^2
Group Size	-7.985E-04	-.001	-.010	
Gender	.130	.267	1.850	
Age	.074	.197	.900	
				.02
Group Size	-.008	-.012	-.103	
Gender	.133	.272	1.591	
Age	.082	.219	.976	
Age * Gender	.045	.239	.514	
Age * Group Size	-.015	-.061	-.175	
Gender * Group	-.038	-.105	-.458	
				.02
Group Size	-.007	-.009	-.077	
Gender	.134	.273	1.592	
Age	.074	.196	.840	
Age * Gender	.045	.242	.519	
Age * Group Size	-.010	-.042	-.119	
Gender * Group	-.032	-.088	-.378	
Age * Group * Gen	.033	.266	.375	
				.02

None of the independent variables contributed to the prediction of the choice of activity. Altogether, 1.5% (0 % adjusted) of the variability in intended activity was predicted by knowing the scores on these three independent variables. Thus there is insufficient evidence to support Hypotheses 1 to 7 as far as they relate to park patrons reported intentions of activity.

Effects of Demographic Variables on Environment Preference

With the use of Roy's Largest Root, the combined factor analyzed groups of photos (dependent variables) were not affected by any of the demographic variables: Gender (F (4,135) = 1.14, ns), Group Size (F (4,136) = 2.41, ns), Age (F (4,135) = .848, ns), Gender by Group Size (F (4,136) = 1.52, ns), Gender by Age (F (4,135) = 1.07, ns), Group Size by Age (F (4,136) = 1.76, ns), Gender by Group Size by Age (F (4,136) = .915, ns). Contrary to Hypothesis 10, single females did not indicate intentions to visit edge environments compared to other types of environments. Contrary to Hypothesis 11, seniors did not indicate intentions to visit the edge environments compared to other types of environments. Thus, there is no evidence to support Hypotheses 10 and 11 as far as they relate to single female and senior citizens reported intentions to visit edge environments as opposed to other types of environments.

There were differences in preferences for vegetation density among different activity groups ($\chi^2 = 8.85$ (3, N = 150), $p < .05$). The Kruskal-Wallis 1-way ANOVA showed that Photo A, representing road environments with thick, unmanaged undergrowth vegetation ($M = 1.83$) was more preferred by walkers/exercisers (MR = 78.56) and dog walkers (MR = 84.33) than by sitters/relaxers (MR = 48.79), and explorers/sightseers (MR = 67.07). Photo B, representing road environments with limited, well-defined undergrowth vegetation, (M =1.76) did not show any significant preferences among activity groups. Therefore, congruent with Hypothesis 14, the less active park patrons intended to avoid environments with thick, unmanaged undergrowth vegetation.

General Environment Preferences

There were differences in overall preferences for the factor analyzed group of photos (roads, paths, historical sites, edges, and miscellaneous sites, (F (4,146) = 36.79, $p < .001$). Post hoc comparisons showed that park patrons were more likely to report intentions to visit Edges (M = 4.39) than Paths (M = 4.05), $p < .025$; and Historical Sites (M = 4.12), $p < .049$, but were more likely to avoid Edges (M = 4.39) than Roads (M = 5.07) and Miscellaneous Sites. (M = 4.81). Contrary to Hypothesis 8, park patrons were not more likely to report intentions to visit the edge environments than any other park environments. Thus, there is no evidence to support Hypothesis 8 as far as it relates to park patrons reported intentions to visit edge environments.

There were differences in reported intentions for visiting sites with varying amounts of undergrowth vegetation density (T = -2.13, $p < .05$). Wilcoxon Signed Ranks Test showed that park patrons intended to visit Photo A (representing roads with thick, unmanaged undergrowth), with ranks totaling 16 (M = 1.83), more than Photo B (representing roads with limited, well defined undergrowth), with ranks totaling 6 (M = 1.76). Contrary to Hypothesis 13, park patrons did not intend to visit park areas that had limited roadside undergrowth vegetation. Thus, there is no evidence to support Hypothesis 13 as far as it relates to people's reported intentions to visit park areas with limited undergrowth.

There were differences in reported intentions to visit trail types ($T = -4.02$, $p < .001$) and ($T = -5.00$, $p < .001$). Wilcoxon Signed Ranks Test showed that park patrons intended to visit Photo C (representing moderately defined, tree-lined paths), with ranks totaling 26 ($M = 1.39$), more than Photo O (representing poorly defined, tree-lined, narrow paths), with ranks totaling 4 ($M = 1.25$). Also, the Wilcoxon Signed Ranks Test showed that park patrons intended to visit Photo N, (representing clearly defined, tree-lined, broad paths), with ranks totaling 25 ($M = 1.41$) more than Photo O, with ranks totaling 0 ($M = 1.25$). Congruent with Hypothesis 15, park patrons intended to visit park areas that had widely graveled, clearly defined paths. Thus, there is evidence to support Hypothesis 15 as far as it relates to people's reported intentions to visit clearly defined park paths.

Discussion

Contrary to expectations, the results of Study 1 did not support the effects of any demographic variables on intended activity level and did not support the effects of the demographic variables on intentions to visit park areas. There was, however, support for the hypothesized effects of the activity level on reported intentions to visit park areas. More active participants intended to visit road environments with thick, unmanaged undergrowth vegetation.

There was limited support for the general environment preferences. There were general preferences for widely graveled clearly defined park paths over the narrow poorly defined park paths.

In summary, the overall pattern for Study 1 presents limited support for the hypotheses. This is possibly attributable to at least four reasons. First, many of the hypotheses were based on research that was conducted in urban park settings not *natural* urban park settings where the majority of the land space is forest. It is reasonable to expect that the differences in activity would be dependent upon the land features of the individual parks. Secondly, the relatively small sample size means that tests of several hypotheses, particularly those involving interaction effects, had limited power. The third shortcoming is that participants were asked to report their intended destinations and this may not be a true reflection of their actual behavior in the park setting. Fourth, photos of environments may not provide adequate information to make accurate choices.

The second study was conducted to address these issues. Data were gathered using naturalistic observation of people in various park locations.

Study 2

The purpose of Study 2 is to examine *observational* data for the variables that reflect the usage patterns in a natural urban park setting. Much the same as Study 1, the hypotheses define the effects of the three demographic variables on activity and environment preference but with additional categories along the dimensions (See Tables 10, 11, 12, 13).

Method

Participants and Procedures

Over 5000 adult, children and senior patrons of Point Pleasant Park, Halifax, Nova Scotia were observed in Study 2.

The activity of the patrons of Point Pleasant Park were observed and recorded. The researcher walked two designated park routes at various times of the day and week (see Appendices D & E). A third route comprised observations recorded during random, undirected walks. The direction of the two designated routes was alternated regularly. Only the stationary subjects and the subjects proceeding toward the researcher were recorded. Characteristics of each observed subject (their age group, group size, gender, and activity) were recorded on the data sheet according to their location in the park. For example, if the first observation of the day were a single adult female walking her dog through a poorly defined, thickly vegetated path, in section 2(b), the number 1 was recorded on the map, in the vicinity of the observation within section 2(b). On the reverse side of the map, the observation number (one, in this case) was recorded along with the age group, the gender, and the activity of the subject or subjects in the group (see Appendix F, and reverse). The specific type of environment, in which the subject was observed, was recorded later as it corresponded to one of the 15 environment types matched to the photos in Study 1 (see Appendix C & G).

Preliminary Analysis

To reduce the amount of data and to provide a less complicated view of the different types of environments, some of the data were interpreted according to the factor-analyzed groups of photos in the first study. That is, although the environment types along the routes were recorded as they corresponded to the 15 photos in Study 1, the data of the 15 different environment types of Study 2 were collapsed into the 5 factor analyzed variables of Study 1: Edges, Roads, Paths, Historical Sites, and Miscellaneous Sites.

Data Analysis

To test the effects of gender, age, and group size (predictor variables) on observed activity (criterion variable), a three-stage hierarchical standard multiple regression was conducted. Activity was coded such that the lower numbers represent the more sedentary activities (sitting/relaxing = 1, picnicking = 2, exploring/sightseeing = 3, dog walking = 4, walking = 5, bicycling = 6, jogging = 7).

To test the effects of gender and group size on each of the five environment types a multinomial logit analysis was used. The levels of the demographic variables were condensed to ensure adequate expected cell sizes. Gender was recoded such that the number 1 represents the all male and majority male levels of the variable, and the number 2 represents the all female and majority female levels. Groups that consisted of equal numbers of males and females were disregarded. Group size was recoded such that the number 3 additionally represented group sizes of four and five or more. The environment types were coded such that the lower numbers represent non-presence in the environment (not present = 0, present = 1). The frequencies of gender groups by location was determined by crosstab counts of gender and group size for each map section (see Appendix F). To test a quadratic relationship for age as a predictor of population distribution in edge environments a curve estimation regression was used. The effects of activity on the population distribution in areas of varying vegetation density were analyzed using an independent samples t-test.

Overall frequency observations in the 5 factor analyzed environments were analyzed using a chi-square test for independence. The nature of the population distribution was determined using a modified Bonferroni procedure. Overall frequency observations of areas within edge environments, areas of varying vegetation density, and different trail types were analyzed using chi-square tests.

Results

Results are presented in the following order: (a) frequency tables of weather, day of the week, and time of day; (b) frequency tables of demographic variables and activity; (c) analyses of effects of demographic variables on activity level; (d) multivariate analysis of demographic variables on the 5 environment types derived from the factor analysis, and analysis of activity level on vegetation density; and (e) analysis of general preferences of the five factor analyzed environment types, vegetation density, and trail type.

Frequency Tables of Weather, Day of the Week, and Time of Day

Table 7 displays the frequency counts of park patron presence in different types of weather systems, table 8 displays the frequency counts of park patron presence during each day of the week, table 9 displays the frequency counts of park patron presence during different hours of the day.

Table 7

Frequencies of Groups by Weather System

Weather System	Frequency
Sunny / Calm	1691
Cloudy	406
Rainy	49
Sunny / Windy	556

Table 8

Frequencies of Groups by Day of the Week

Day of Week	Frequency
Monday	247
Tuesday	431
Wednesday	286
Thursday	365
Friday	407
Saturday	519
Sunday	447

Table 9

Frequencies of Groups by Time of Day

Time of Day	Frequency
9:00 am	42
10:00 am	241
11:00 am	341
12:00 pm	361
1:00 pm	540
2:00 pm	230
3:00 pm	317
4:00 pm	280
5:00 pm	350

Frequency Tables of Demographic Variables and Activity

Table 10 displays the frequency counts of park patron gender, table 11 displays the frequency counts of park patron group size, table 12 displays the frequency counts of park patron activity, and table 13 displays the frequency counts of park patron age.

Table 10

Frequencies of Groups by Gender Composition

Gender Composition	Frequency
1 = All male	921
2 = Majority male	38
3 = Half and half	727
4 = Majority Female	61
5 = All female	955

Table 11

Frequencies of Groups by Group Size Composition

Group Size Composition	Frequency
1 = One	1214
2 = Two	1004
3 = Three	230
4 = Four	153
5 = Five or more	101

Table 12

Frequencies of Groups by Activity Composition

Activity Composition	Frequency
1 = Sitting/relaxing	402
2 = Picnicking	77
3 = Exploring/sightseeing	313
4 = Dog walking	362
5 = Walking	1113
6 = Bicycling	101
7 = Jogging	334

Table 13

Frequencies of Groups by Age Composition

Age Composition	Frequency
1 = All children/teens	108
2 = More kids/less adults	136
3 = More kids/less seniors	1
4 = Half kids/half adults	197
5 = More adults/less kids	114
6 = All adults	1779
7 = More adults/less seniors	2
8 = Half seniors/half adults	42
9 = Half seniors/half kids	9
10 = More seniors/less kids	8
11 = More seniors/less adults	10
12 = All seniors	294

Effects of Demographic Variables on Activity Level

Table 14 displays the unstandardized regression coefficients (*B*), the standardized regression coefficients (β), and R^2, The main effects, entered in step 1, accounted for a significant amount of the variance in activity, F (3, 2698) = 49.25, $p < .001$. Congruent with Hypothesis 1, as the age of park patrons increased, the activity level decreased. Congruent with Hypothesis 2, male park patrons were more likely to engage in more mobile or sporting activities than female park patrons. Congruent with Hypothesis 3, park patrons in larger groups, were less likely to engage in more mobile or sporting activities. In step 2 ($F(6, 2695) = 25.54$, $p < .001$), the 2-way interactions involving gender, age, and group size did not account for a significant increment in explained variance, $\Delta R^2 = .002$, ns. The interaction between age and gender, however, approached significance (see Table 14), which was consistent with Hypothesis 4. As shown in Figure 1, younger males tended to engage in more mobile or sporting activities than older males, whereas age differences in female activity level were less pronounced. No other significances were reported. Contrary to Hypothesis 5, the interaction between age and gender did not approach significance. Group size differences in activity level for adults were not less pronounced than group size differences for seniors as single seniors were not more likely to engage in more mobile or sporting activities than seniors in larger groups. Contrary to Hypothesis 6, the interaction between group size and gender was not significant. Group size differences in activity level for females were not less pronounced than group size differences for males as single males were not more likely to engage in more mobile or sporting activities than males in larger groups. In step 3 ($F(7, 2694) = 21.92$, $p < .001$) the

3-way interactions involving gender, age, and group size did not account for a significant increment in explained variance, $\Delta R^2 = .000$, ns. Contrary to Hypothesis 7, the interaction between age, gender, and group size was not significant. Group size differences in activity level for adult females and senior males were not less pronounced than group size differences in activity level for senior females as senior females in larger groups were not more likely to engage in more sedentary activities than senior females in smaller groups.

Table 14

Results of Multiple Regression Predicting Activity Level

Predictor variables	*B*	β	t	R^2
Age	-5.879E-02	-.083	-4.133***	
Group Size	-.394	-.229	-11.377***	
Gender	-5.304E-02	-.050	-2.615**	
				.052
Age	-5.777E-02	-.081	-3.932***	
Group Size	-.379	-.220	-9.421***	
Gender	-4.475E-02	-.042	-2.122*	
Gender * Group	2.940E-02	.026	1.206	
Age * Gender	1.768E-02	.041	1.934*	
Age * Group	1.153E-02	.020	.839	
				.054
Age	-5.871E-02	-.082	-3.966***	
Group Size	-.379	-.221	-9.426***	
Gender	-3.876E-02	-.036	-1.617	
Gender * Group	3.914E-02	.034	1.27	
Age * Gender	1.848E-02*	.042	1.993	
Age * Group	1.007E-02	.018	.717	
Age * Gen * Grp	5.042E-03	.014	.526	
				.054

*** $p < .001$

** $p < .01$

*$p < .053$

Four of the independent variables contributed to the prediction of the choice of activity: Gender ($p < .01$), Age ($p < .000$), Group Size ($p < .000$), and Age by Gender ($p < .053$). Altogether, 5.4% (5.2 % adjusted) of the variability in the choice of activity was predicted by knowing the scores on these four independent variables. Thus there is sufficient evidence to support Hypotheses 1 to 4 as far as they relate to observed activities of park patrons. There is insufficient evidence to support Hypotheses 5 to 7 as far as they relate to observed activities of park patrons.

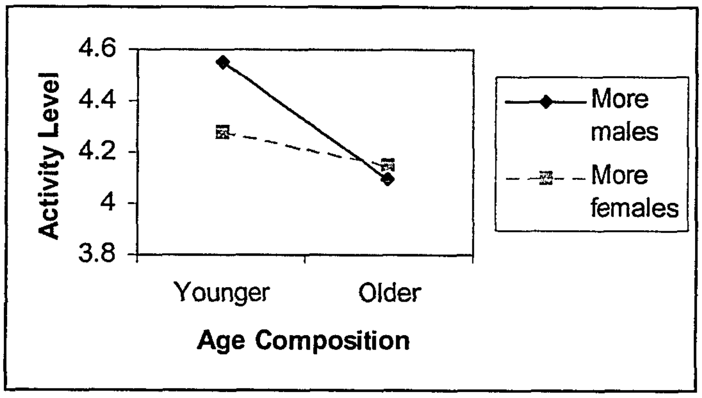

Figure 1: The effects of age and gender on activity level.

Effects of Demographic Variables on Environment Preference

The model had a likelihood ratio $\chi^2(8) = 11.09$, $p = .196$, indicating a good fit between observed frequencies and expected frequencies generated by the model. Table 15 displays a summary of the table information with observed percentages.

Table 15

Summary of Table Information of Environment Preference

Variables	Values	Observed %	Values	Observed%
Gender	Males		Females	
Group size	One		One	
Environment	Paths	1.43	Paths	1.17
	Edges	41.43	Edges	34.96
	H.Sites	3.43	H.Sites	2.73
	Roads	37.43	Roads	45.12
	M.Sites	16.29	M.Sites	16.02
Gender	Males		Females	
Group size	Two		Two	
Environment	Paths	1.23	Paths	.00
	Edges	57.67	Edges	48.59
	H.Sites	5.52	H.Sites	2.11
	Roads	25.77	Roads	33.80
	M.Sites	9.82	M.Sites	15.49
Gender	Males		Females	
Group size	Three or more		Three or more	
Environment	Paths	2.08	Paths	2.73
	Edges	41.67	Edges	46.36
	H.Sites	10.42	H.Sites	7.27
	Roads	33.33	Roads	30.00
	M.Sites	12.50	M.Sites	13.67

Contrary to Hypothesis 10, single females were not more likely to be observed in edge environments than other environments (see Table 15). Slightly more of the single females were observed in the road environments (45.12%) as opposed to the edge environments (34.96%). Figures 2, 3, 4, and 5 display the histograms of gender groups in edges, roads, historical sites, and paths, as they were recorded in each section of the map. Thus there is insufficient evidence to support Hypothesis 10 as far as it relates to observations of single females in edge environments.

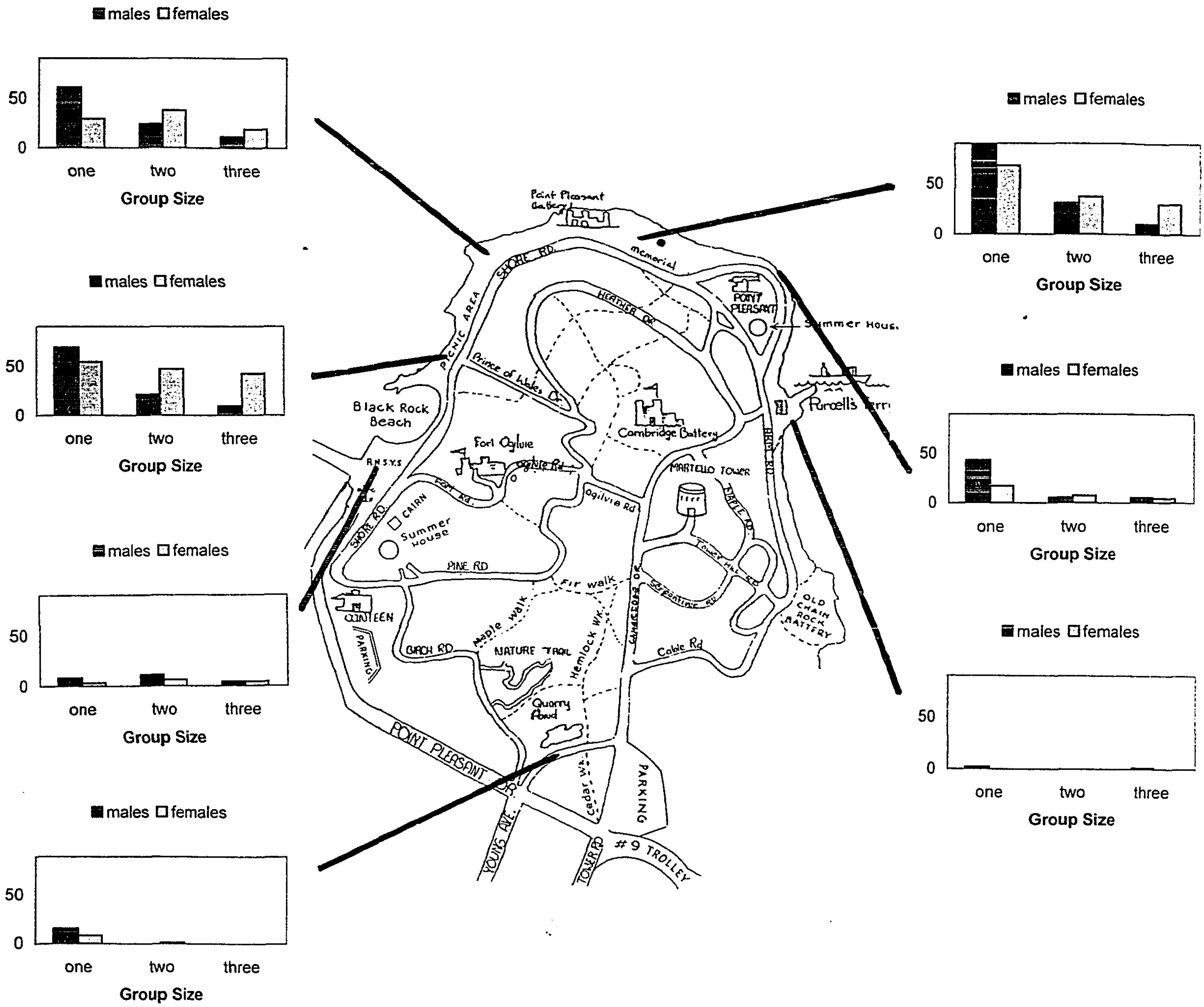

Figure 2: Histograms of gender groups by location in edge environments

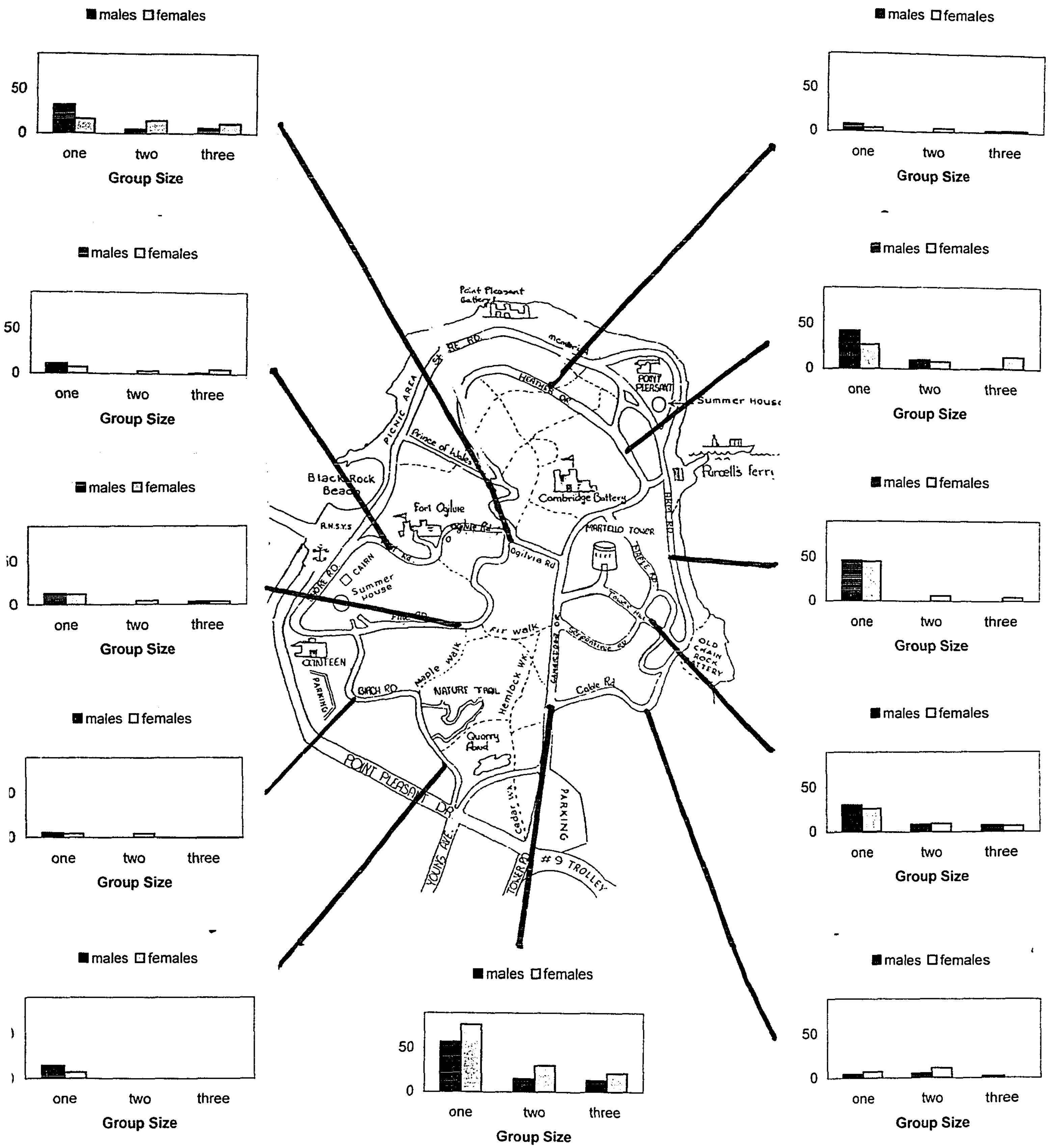

Figure 3: Histograms of gender groups by location in road environments

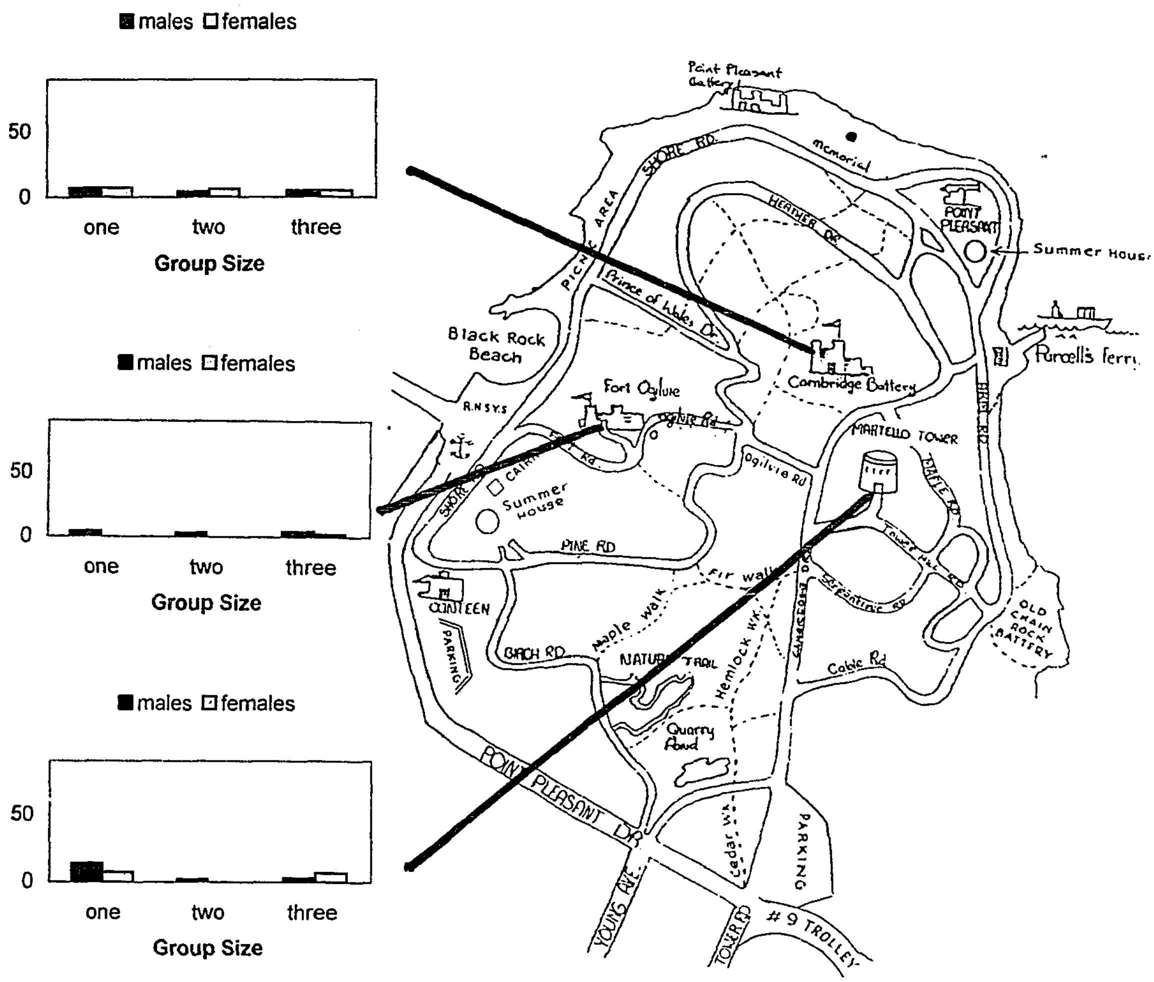

Figure 4: Histograms of gender groups by location in historical site environments

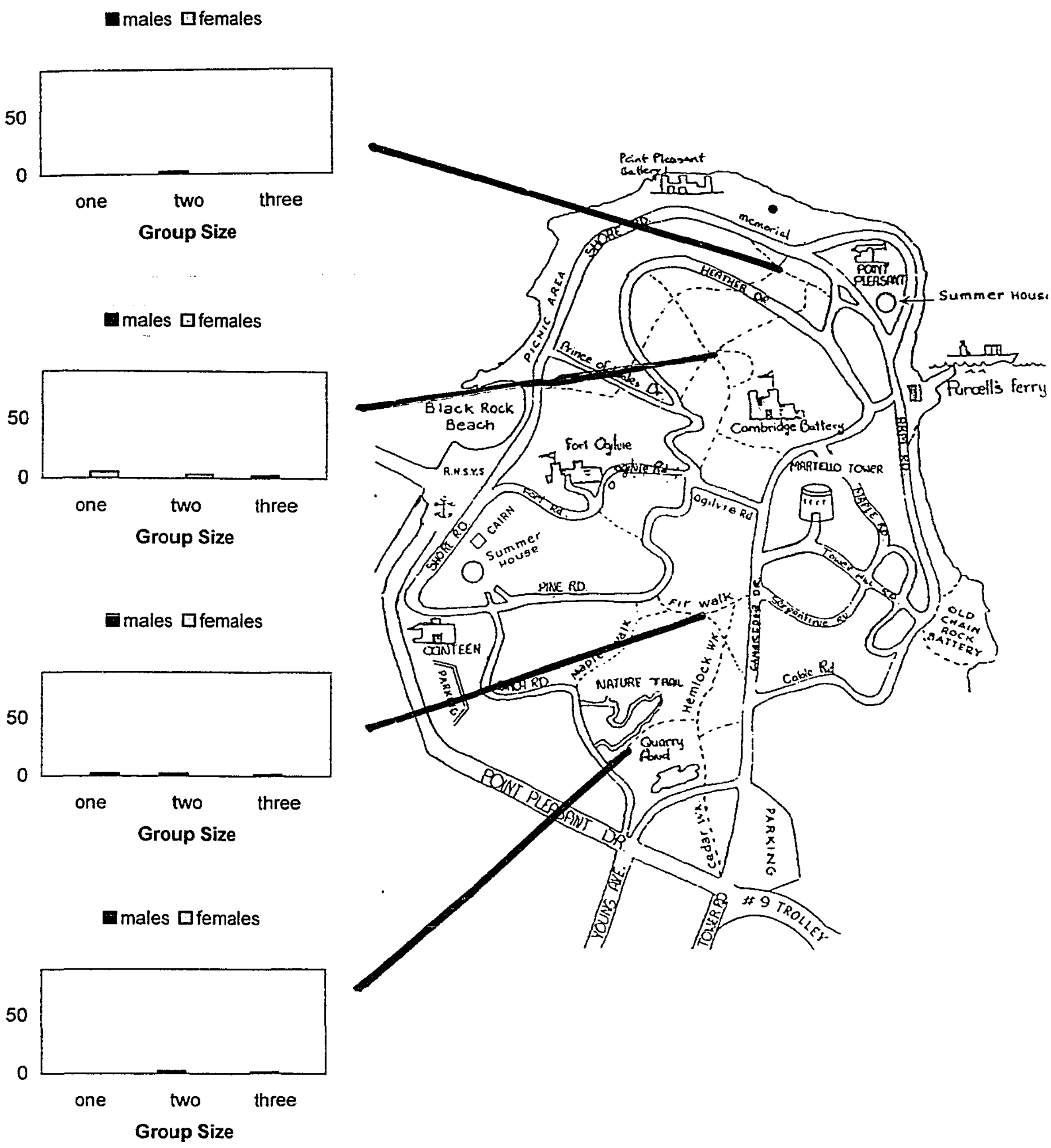

Figure 5: Histograms of gender groups by location in path environment

Although there was a significant linear relationship for age as a preference predictor of edge environments, the significant quadratic effect accounted for more variance F (3, 2699) = 17.87, $p < .001$. Table 16 displays the R^2, F value, and b values for the linear and quadratic methods of the curve estimation regression for the 5 environment types. It was expected that the effects proposed in Hypotheses 11 and 12 would be manifest in a quadratic relationship. As shown in Figure 6, seniors and children were observed in edge environments more than adults as compared to roads, paths, and miscellaneous sites. Seniors and children were also observed in historical site environments (F (3, 2699) = 8.95, $p < .001$, R^2 change = .11) more than adults as compared to roads, paths and miscellaneous sites, but this finding is recognized as further support for these hypotheses as the historical sites embody the many of the same edge environment characteristics (See Figure 7). Thus there is sufficient evidence to support hypotheses 11 and 12 as far as they relate to seniors and children's preference for edge environment.

Table 16

Results of Age Curve Estimation Predicting Environment Preference

Environment	Method	R^2	F	b0	b1	b2	Sig.
Edges	Linear	.002	6.47	.357	.010		.011
Edges	Quad	.013	17.87	.571	-.060	.005	.000
Misc. Sites	Linear	.001	3.03	.171	-.005		.082
Misc. Sites	Quad	.002	2.81	.126	.010	-.001	.061
Paths	Linear	.001	2.20	.023	-.001		.138
Paths	Quad	.001	1.11	.022	-.001	-2.E-05	.331
Roads	Linear	.000	.41	.367	.002		.521
Roads	Quad	.010	13.34	.167	.068	-.005	.000
Hist. Sites	Linear	.005	14.09	.082	-.006		.000
Hist. Sites	Quad	.007	8.95	.114	-.017	.001	.000

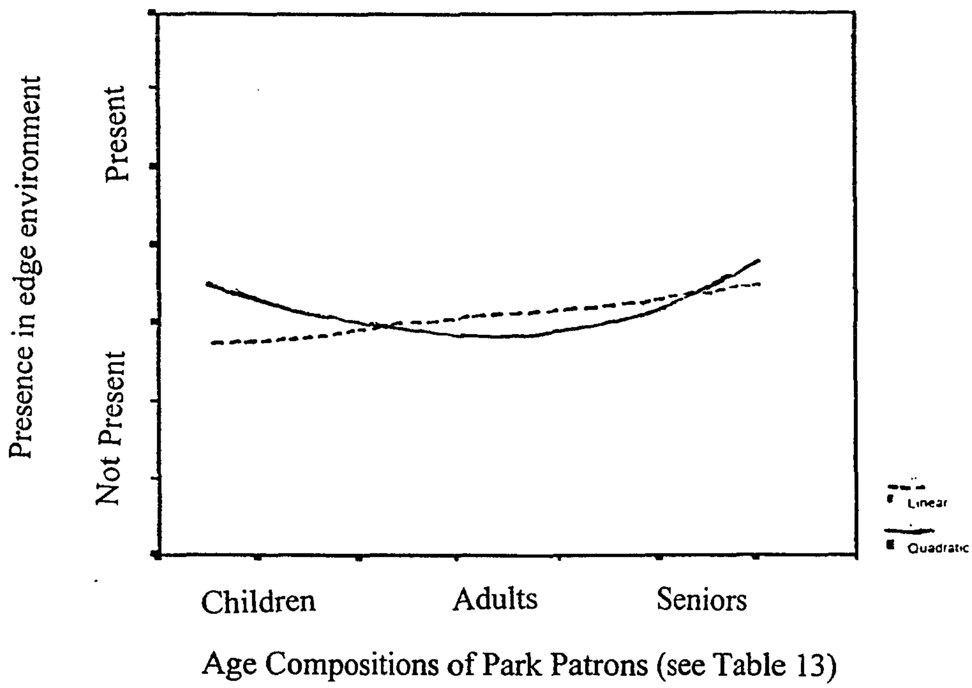

Figure 6: Age as a predictor of edge environment preference

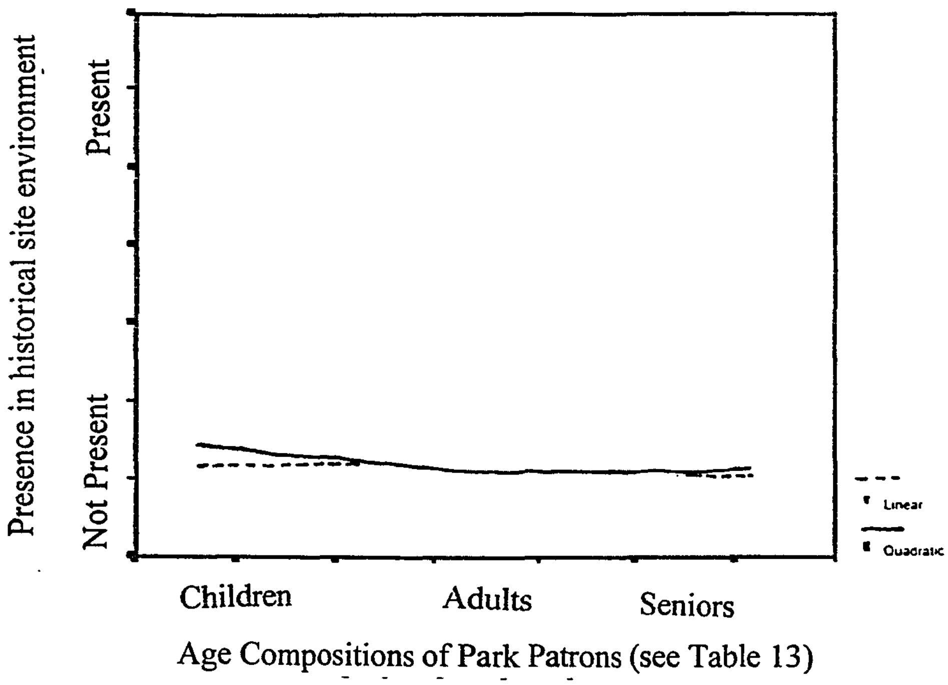

Figure 7: Age as a predictor of historical site environment preference

There were significant differences in activity levels for those observed in the road environment areas containing limited, well defined undergrowth vegetation ($\underline{M} = 4.91$) and thick, unmanaged undergrowth vegetation ($\underline{M} = 4.70$), $T = -2.09$, $\underline{p} < .037$. However, this relationship is the reverse of Hypothesis 14 as regarding activity in the road environments with thick, unmanaged undergrowth vegetation.

General Environment Preferences

Observation frequencies in edge environments were significantly higher than in all other environments using a family wise error rate of .05. (χ^2 (4) =1910.37, $\underline{p} < .001$): Paths, $z = 30.85$, $\underline{p} < .001$; Historical Sites, $z = 28.51$, $\underline{p} < .001$; Miscellaneous Sites, $z = 19.57$, $\underline{p} < .001$; and Roads, $z = 2.27$, $\underline{p} < .02$. Congruent with Hypothesis 8, more park patrons were observed at edge environments than any other type of environment. The evidence supports Hypothesis 8 as far as it relates to park patrons observed frequencies at edge environments (see Figure 2).

There were no significant differences in population distribution within the edge environments χ^2 (1)= 1.09, ns. Contrary to Hypothesis 9, more park patrons were not observed at the forest edge within the edge environment. The evidence did not support Hypothesis 9 as far as it relates to park patrons observed location within the edge environment.

There were significant differences in population distribution for road environment areas with varying amounts of undergrowth vegetation, χ^2 (1) = 273.327, $\underline{p} < .001$. Congruent with Hypothesis 13, more park patrons were observed in road environments with limited, well-defined undergrowth vegetation. The evidence supported Hypothesis 13 regarding observed frequencies in road environments with limited, well-defined undergrowth vegetation.

There were significant differences in population distribution for paths with varying degrees of definition, χ^2 (1) = 14.40, $p < .001$. Congruent with Hypothesis 15, more park patrons were observed on widely graveled, clearly defined paths than on narrow, poorly defined paths. The evidence supported Hypothesis 15 for observed frequencies on wide, well defined park paths.

Discussion

The results of study 2 showed mixed support for the effects of demographic variables on activity level. The hypothesized main effects were all supported. Older park patrons tended to be observed engaging in sedentary activities; male park patrons were more likely to engage in mobile or sporting activities than females; and as group sizes increased park patrons were less likely to engage in mobile or sporting activities. The hypothesized interaction between age and gender approached significance: younger males engaged in mobile or sporting activities to a greater extent than older males whereas age differences in female activity level were less pronounced.

There was mixed support for the effects of the demographic variables on environment preference. There was a curvilinear relationship between age and presence in edge environments, such that both children and seniors tended to be observed in edges. The same curvilinear relationship was reliable between age and presence in historical sites. This effect was not predicted but it is recognized as further support for hypotheses 11 and 12 as the forest/lawn edges within the historical site environments must also be considered edge environments.

There was mixed support for the hypothesized general environment preferences. As expected park patrons were observed in the edge environments to a greater extent than in the other environments types. Also, people were more likely to be in road environments with limited, well-defined undergrowth vegetation than in road environments with thick, unmanaged undergrowth vegetation. There were also general preferences for trail type such that there were more park patrons in path environments with more widely graveled, clearly defined paths than in path environments with narrow, poorly defined paths.

In summary, there was an overall pattern of support for the hypotheses in Study 2. Four of the seven hypothesized effects of demographic variables on activity were supported by the observational data. The results expand on previous research by demonstrating a joint effect of two demographic variables: age and gender. Five of the eight hypothesized effects on environment received support. These findings extend prior work by including seniors in analyses involving the relationship between age and environmental preference.

General Discussion

The limited natural land space in urban environments makes it important that we understand the extent to which urban natural parks are used and by whom. These issues were addressed in the context of Halifax's Point Pleasant Park by two studies. The questionnaire design of Study 1 and the observational approach of Study 2 were chosen to compliment one another, as each design yields data with strengths and limitations that mirror the other.

Study 1 and Study 2, Compared

The results of study 1 contrast with those of the observational study in a number of respects. There were no main effects of the demographic variables on activity in Study 1 whereas the observational data of Study 2 supported the expected main effects of the demographic variables. This could be partially attributable to less variability in the activity variable in Study 1 as a consequence of both smaller sample size and the use of fewer activity categories. Only one interaction effect for activity was supported in Study 2. The lack of support for this effect in the first study can also be explained by the limited power afforded by the small sample size. The three other hypothesized interaction effects were not supported by either study.

There was mixed support, between the two studies, for the hypothesized effects of the demographic variables and activity on environment preference. Neither study supported the predicted interactive effects of group size and gender on environment preference. In contrast to Study 1, the observational study supported the hypothesized effect of seniors' preferences for edge environments. The lack of this effect in Study 1 can be explained by the particularly small sample of seniors. Finally, in contrast to Study 2, the questionnaire study supported the hypothesized effects activity on preferences for varying levels of roadside vegetation. The reason for this inconsistency is unclear.

The majority of support for the hypothesized effects of general preferences for environments was provided by the observational study. The absence of evidence for edge environment preference in Study 1 could partly be explained by the phrasing of the question. The participants indicated whether or not they would be proceeding into areas similar to those presented in the photos as opposed to indicating their preferred environment. Participants entering the park from the west entrance would have indicated their intentions to proceed through other environments even if their final destination were an edge environment simply because the edge environments are located on the other side of the park. The lack of support, in Study 1, for the hypothesized preference for undergrowth vegetation preference could be partly explained by the similarity of the road environment photos. The participants may not have discerned the subtle differences of undergrowth vegetation between the photos. The phrasing of the question may have also contributed to the low variability such that the participants were asked whether or not they would be proceeding into areas *similar* to those presented in the photos. Both Study 1 and Study 2 supported the hypothesized effect of general preference for widely graveled, clearly defined park paths.

The discrepancies between the findings of the first and second studies also raise the question of whether peoples' reports of their intentions to visit various environments are accurate predictors of their actual behavior in the park. Considering this, it seems that the observational data reflect more directly the behavior of interest, and thus allow stronger tests of the hypotheses than the questionnaire data in the first study.

Main Findings

Consistent with previous research (e.g., Godbey & Blazey, 1983; Hutchinson, 1994; Hutchinson, 1987), Study 2 supported the main effects of the demographic variables on activity. Whereas previous research has been limited to examining the main effects of demographic variables on activity, the present studies were directed toward testing the more complex effects. Only one such effect was found, however. The interactive effect of age and gender suggests that in terms of predicted activity, gender matters for younger park patrons but not for older patrons -who tend to be relatively inactive regardless of their gender.

Whereas previous investigations of gender, age, and group size on environment preference have been limited to photo comparisons (e.g., Nelson & Loewen, 1993; Balling & Falk, 1982), Study 2 examined observed behaviors in the natural environment. Of particular interest was the finding that children and seniors tended to be observed in edge environments. This finding provides support for Ruddell and Hammitt's (1987) theory that edge environment preference can be explained by evolutionary theory, but challenges Balling and Falk's (1982) theory that the innate preference for edges can be modified, over time, through positive experiences in other environments. Balling and Falk's (1982) theory was partially supported by the data as children were observed in the edge environments more than adults but not more than seniors. This suggests that changes in our increased tolerance for environments other than edges as we become adults is less a function of positive experiences in these environments and more a function of decreased vulnerability. In other words, the protective prospect / refuge qualities of the edge environment may be more attractive to those in vulnerable age groups, and those who accompany them.

Whereas previous investigations of general preferences for edge environments, roadside areas with limited, well managed undergrowth vegetation, and park paths which are clearly defined and widely graveled have been limited to photo comparisons, Study 2 examined these issues in terms of observed behavior in the natural environment. The findings were consistent with previous investigations and supported preferences for the types of areas mentioned above. However, the study did not provide evidence for Ruddell and Hammitt's (1987) orientation theory of interpreting edge preference. In contrast to Ruddell and Hammitt's (1987) photo preference investigation, park patrons were not more likely to be observed at the forest's edge within the edge environments. This finding raises the challenge of whether behavior in the natural setting can be accurately predicted by people's reported preferences or whether photo questionnaires are useful for this type of investigation.

Recommendations

A central question addressed by these studies is the extent to which the park is used and by whom. The demographic data of Study 2 identify a diverse composition of park patrons. Males and females, young and old, in large and small groups engaged in a variety of activities that were well facilitated by the different environments of Point Pleasant Park. So there is a broad indication, then, that all of the park spaces are utilized to some extent by various groups of people.

There are, however, a number of recommendations that arise from the findings. First, some spaces were used more than others. Study 2 indicated, as predicted, that people gravitated toward the edge environments. Providing more defensible spaces such as park benches and picnic tables may maximize the utilization of these areas. Further, it may be advantageous to extend the harbor edge environment to include the Northwest Arm. Clearing some of the trees away and leveling the hill to provide a flat and open vista over the Northwest Arm would make that area more attractive to park patrons.

Study 2 also indicated, as predicted, that people would be observed more often in clearly defined, widely graveled types of path trails than other types of paths. In the interest of maximizing the utilization of all park space, it may be prudent to landscape path trails such that they incorporate more of these preferred qualities.

Further, Study 2 indicated, as predicted, that people would be observed more often on roads lined with limited, well-managed undergrowth vegetation than on other types of roads. This is particularly relevant in the context of the recent problem regarding the presence of the Brown Spruce Longhorn Beetle in Point Pleasant Park and the efforts to eradicate it. In light of the findings of Study 2, the roadside areas cleared of spruce trees and undergrowth as a result of the eradication process may, in fact, be more preferred by patrons than roads with greater vegetation. Unfortunately, the removal of large clusters of spruce trees has left much of the roadside areas looking barren and sparse. Thus, whereas the thinned underbrush might represent a positive side effect of the cutting, the primary effect may still be negative.

Limitations and Future Directions

The findings of the two studies should be interpreted with a number of limitations in mind. Small sample size and lack of variability may have contributed to the lack of findings in Study 1. Photo images do not encompass the range and quality of information gathered by the human eye. Another possibility is that the chosen sample of park photos inadequately represented the park areas. It is possible that there is another environment type overlooked by the research or that may have emerged in the factor analysis if more photos had been included in the questionnaire. The reliability of findings in Study 2 should be interpreted with consideration of the limitations in the first study given that the environmental categories were taken from study 1. Future research, then, might try to replicate the environmental categories used or include others.

One shortcoming of the second study is the unequal land space of the environment categories. The amount of land space consisting of road environments is much greater than that of path environments and historical site environments. The amount of land space accounted for by each of the environment types may be positively correlated with the number of people observed in those environments. It is important to note, however, that the overall preference for edge environments was found despite the fact that the edge environments accounted for a relatively small proportion of the park.

Another consideration pertaining to the results in Study 2 is that there were limited observations of the land space areas identified as paths. It is possible that the data did not accurately represent the frequency patterns in those areas. Although this issue was partly addressed by Study 1, future observational research might consider this more directly.

As a follow up to Study 2, it may be worth investigating the effects of the deforestation of Point Pleasant Park on people's behavior patterns. One change might be that people will venture into path environments in search of the areas untouched by the Brown Spruce Longhorn Beetle and the eradication efforts. Another related issue outside of the scope of the current study is that people may be less likely to go to the park in the first place.

Future research in the field of park behavior patterns might benefit from virtual reality technology. This would allow more controlled and efficient means of investigating people's environmental preferences. Also, an investigation of park patrons' perceptions of safety within the park may provide a clearer picture of the effects of perceived safety on behavior patterns in the park. A combination of research strategies might serve to further illuminate the relationship between people and the places they prefer to spend their time.

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Appendix A

Cover Letter

Saint Mary's University

Park Behavior Study

Dr. James Darley and Shannon Nickerson

Consent to participate in research:

You are invited to participate in an experimental study examining park destination choices. If you agree to participate, you will be asked to complete a questionnaire that will involve referring to the pictures posted on the billboard. Completion of the survey will take only about 5 minutes. If you have any questions regarding the questionnaire, you may ask the researcher. Otherwise, we ask that you do not confer with anyone when answering the questions.

We ask that you do not provide you name or any other identifying information. All envelopes containing completed questionnaires will be inserted into the designated cardboard box and will be thoroughly mixed together so no envelope can be associated with any individual participant.

Your help with this study is very much appreciated. However, if at any time you feel uncomfortable for any reason, you are free to discontinue your participation at any time without prejudice.

Thank you for your participation. If you have any questions or concerns regarding this study please contact Shannon Nickerson at 425-2721 or Dr. James Darley at 823-2936. You may also contact Dr. Laura Methot, Chair of the Department of Psychology Ethics Committee at 420-5846 or Dr. Victor Catano, Chair of the Department of Psychology.

Appendix B

Study 1 Questionnaire

Saint Mary's University

Park Behavior Study

Dr. James Darley and Shannon Nickerson

Please check ___ the option applicable to you.

What is your age category? ___ 18 to 57 ___ 58 and over

What is your gender? ___ male ___female

Number in your party: ___one ___two ___ more than two
(including pets)

What is your main purpose for visiting the park today? (Please choose only one)
___ walking dog ___ walking/exercising
___ sitting/relaxing ___ sightseeing/exploring

When answering the following questions it is important to remember that your responses must be made according to where you will go today. Your responses to the questions must also be made bearing in mind the size of your group and your main purpose for visiting the park today.

1) Will you be proceeding into the area in Picture **A** or into an area very similar to this today? ___yes ___no

2) Will you be proceeding into the area in Picture **B** or into an area very similar to this today? ___yes ___no

3) Will you be proceeding into the area in Picture **C** or into an area very similar to this today? ___yes ___no

4) Will you be proceeding into the area in Picture **D** or into an area very similar to this today? ___yes ___no

5) Will you be proceeding into the area in Picture **E** or into an area very similar to this today? ___yes ___no

6) Will you be proceeding into the area in Picture **F** or into an area very similar to this today? ___yes ___no

7) Will you be proceeding into the area in Picture **G** or into an area very similar to this today? ___yes ___no

8) Will you be proceeding into the area in Picture **H** or into an area very similar to this today? ___yes ___no

9) Will you be proceeding into the area in Picture **I** or into an area very similar to this today? ___yes ___no

10) Will you be proceeding into the area in Picture **J** or into an area very similar to this today? ___yes ___no

11) Will you be proceeding into the area in Picture **K** or into an area very similar to this today? ___yes ___no

12) Will you be proceeding into the area in Picture **L** or into an area very similar to this today? ___yes ___no

13) Will you be proceeding into the area in Picture **M** or into an area very similar to this today? ___yes ___no

14) Will you be proceeding into the area in Picture **N** or into an area very similar to this today? ___yes ___no

15) Will you be proceeding into the area in Picture **O** or into an area very similar to this today? ___yes ___no

Appendix C

Photo A – Roads

Photo M - Roads

Photo B – Roads

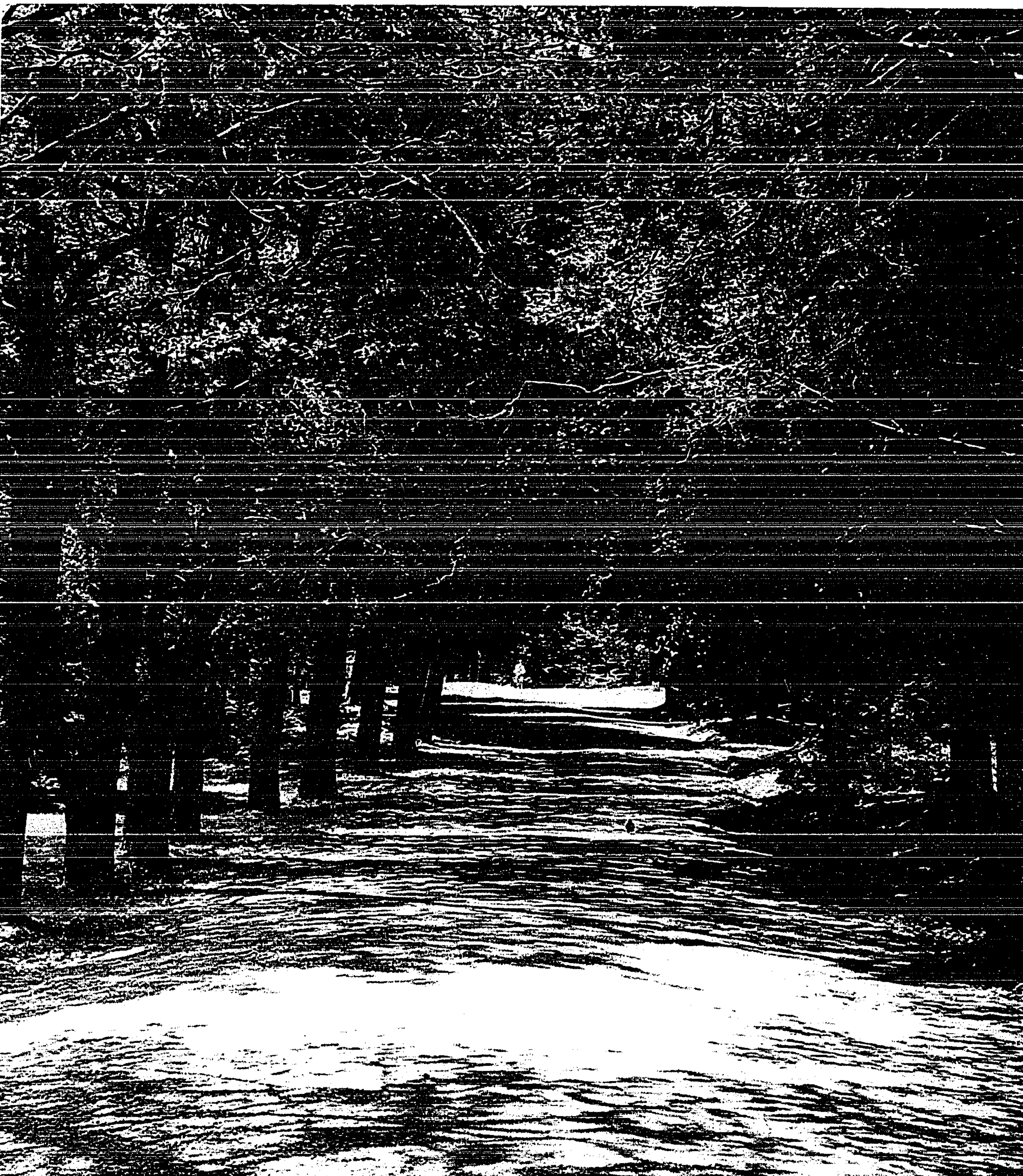


Photo N – Paths

Photo O – Paths

Photo O – Paths

Photo C – Paths

Photo D – Edges

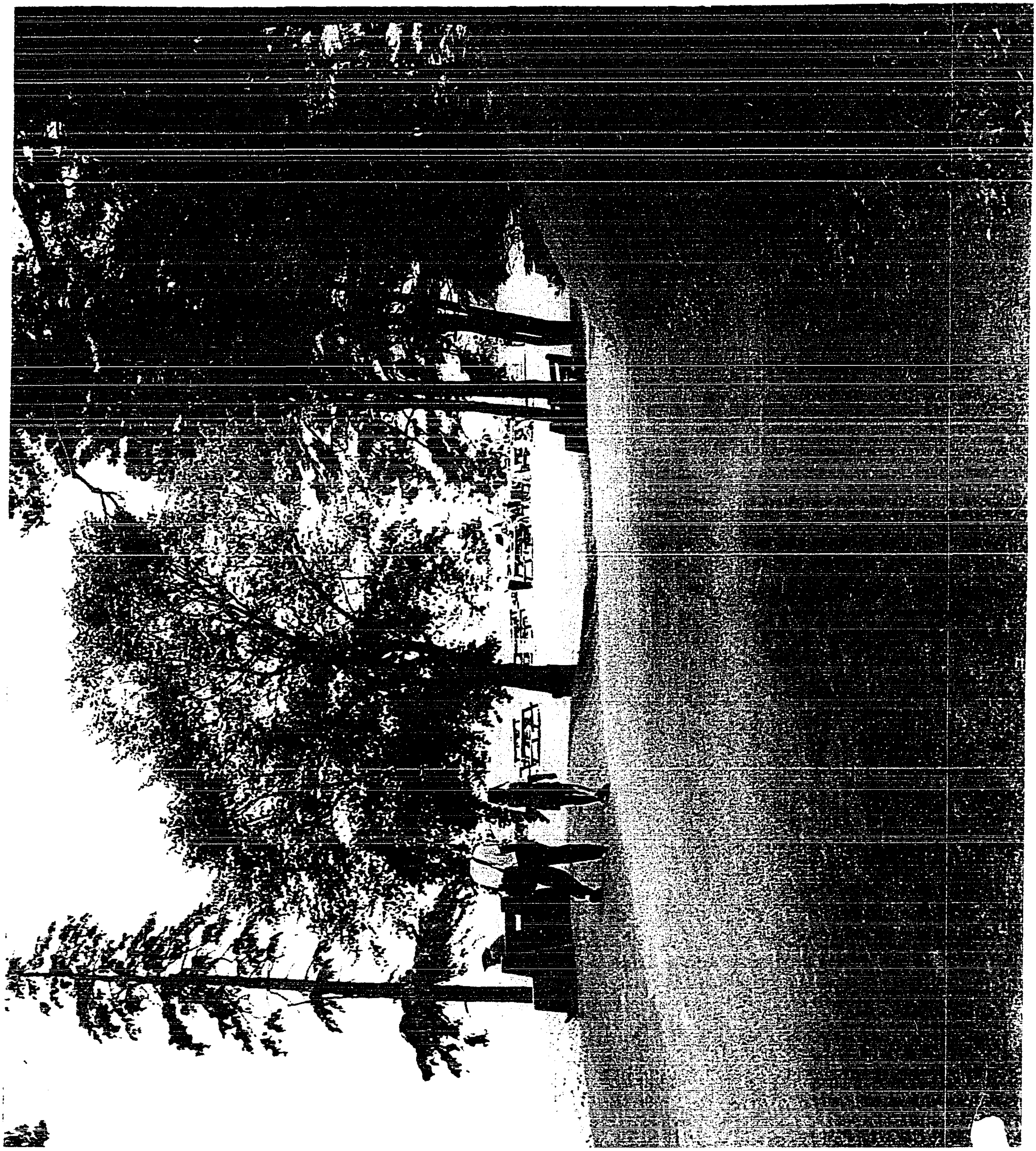


Photo F – Edges

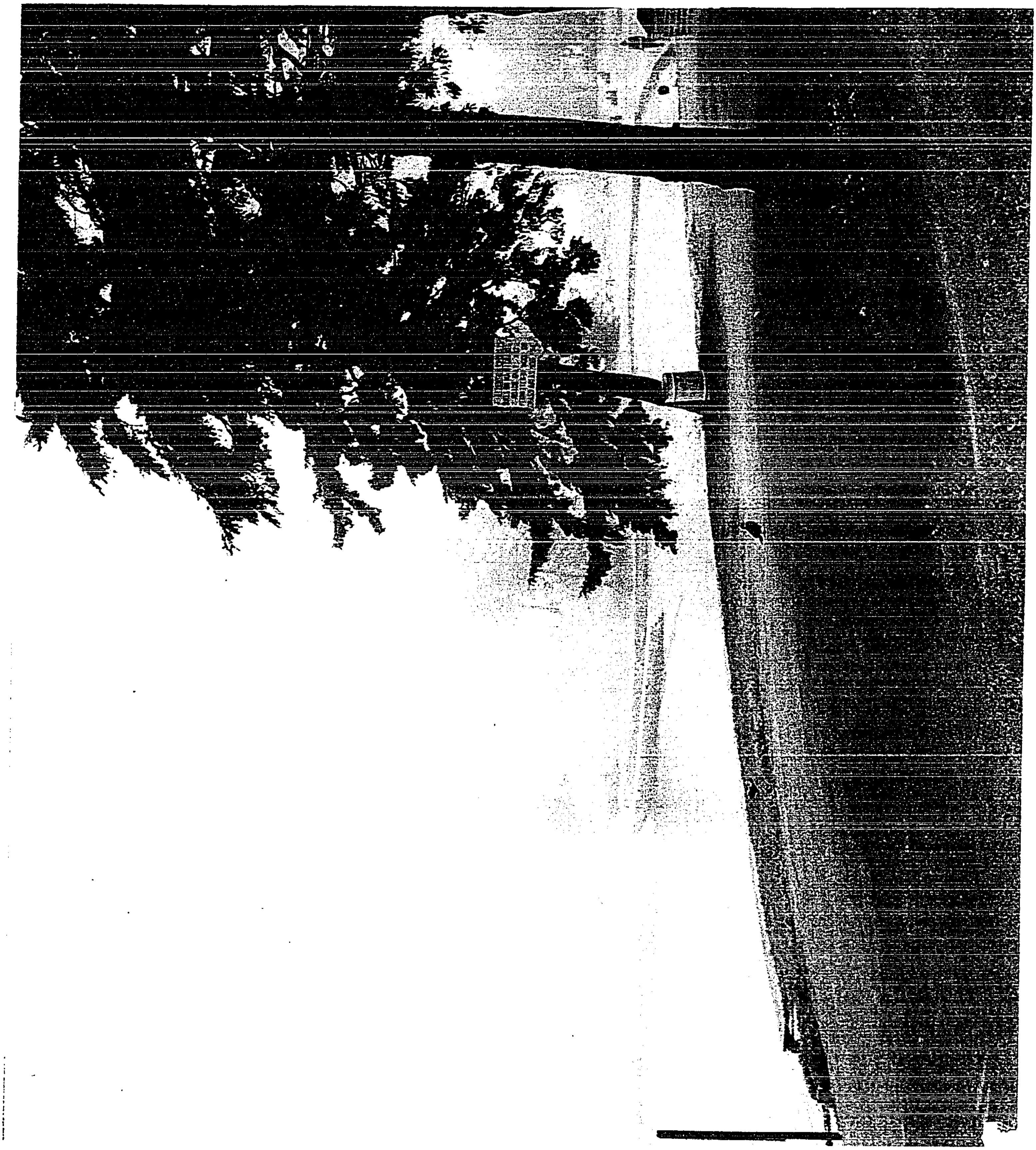


Photo K – Edges

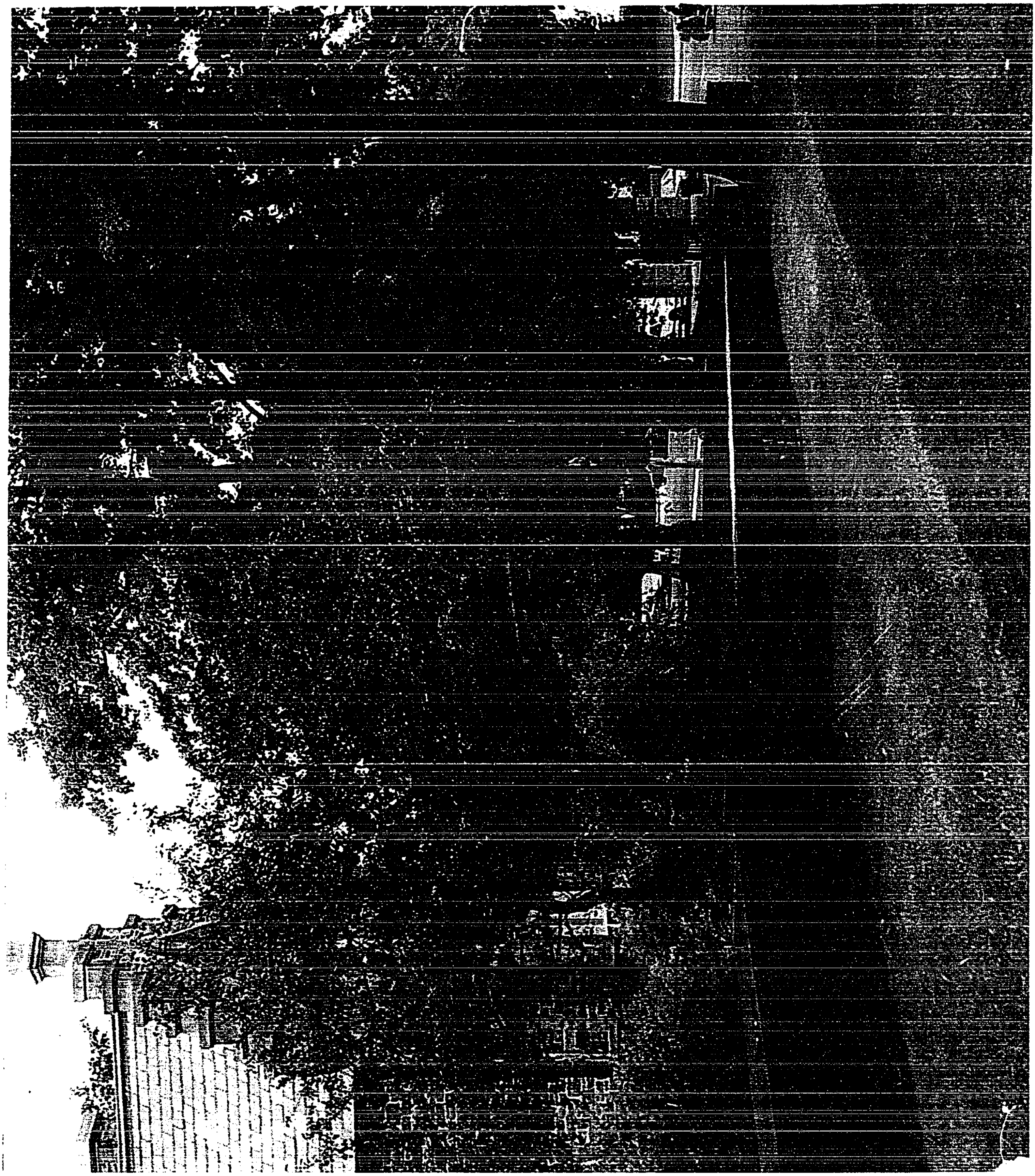


Photo L – Historical Sites

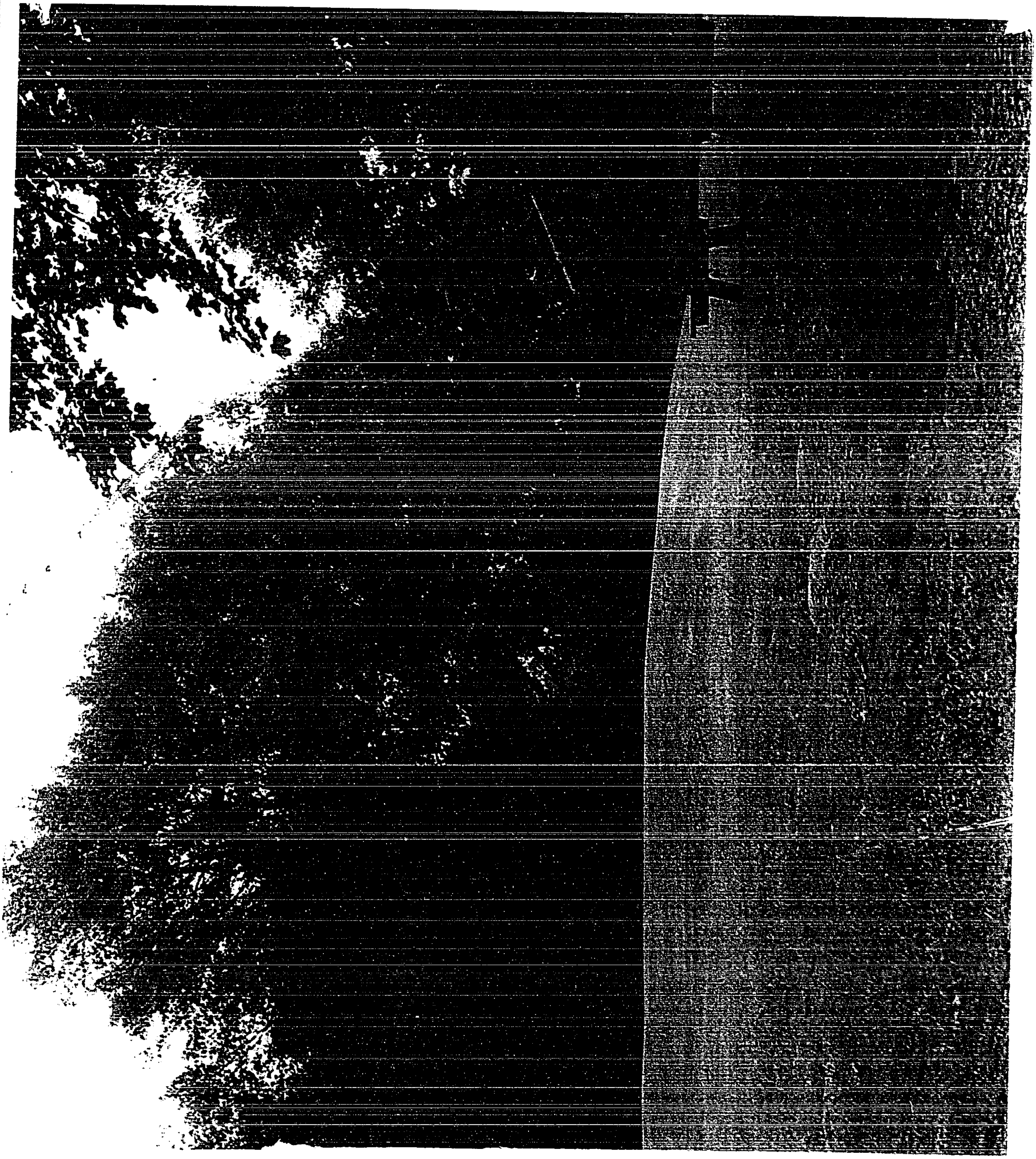


Photo G – Historical Sites

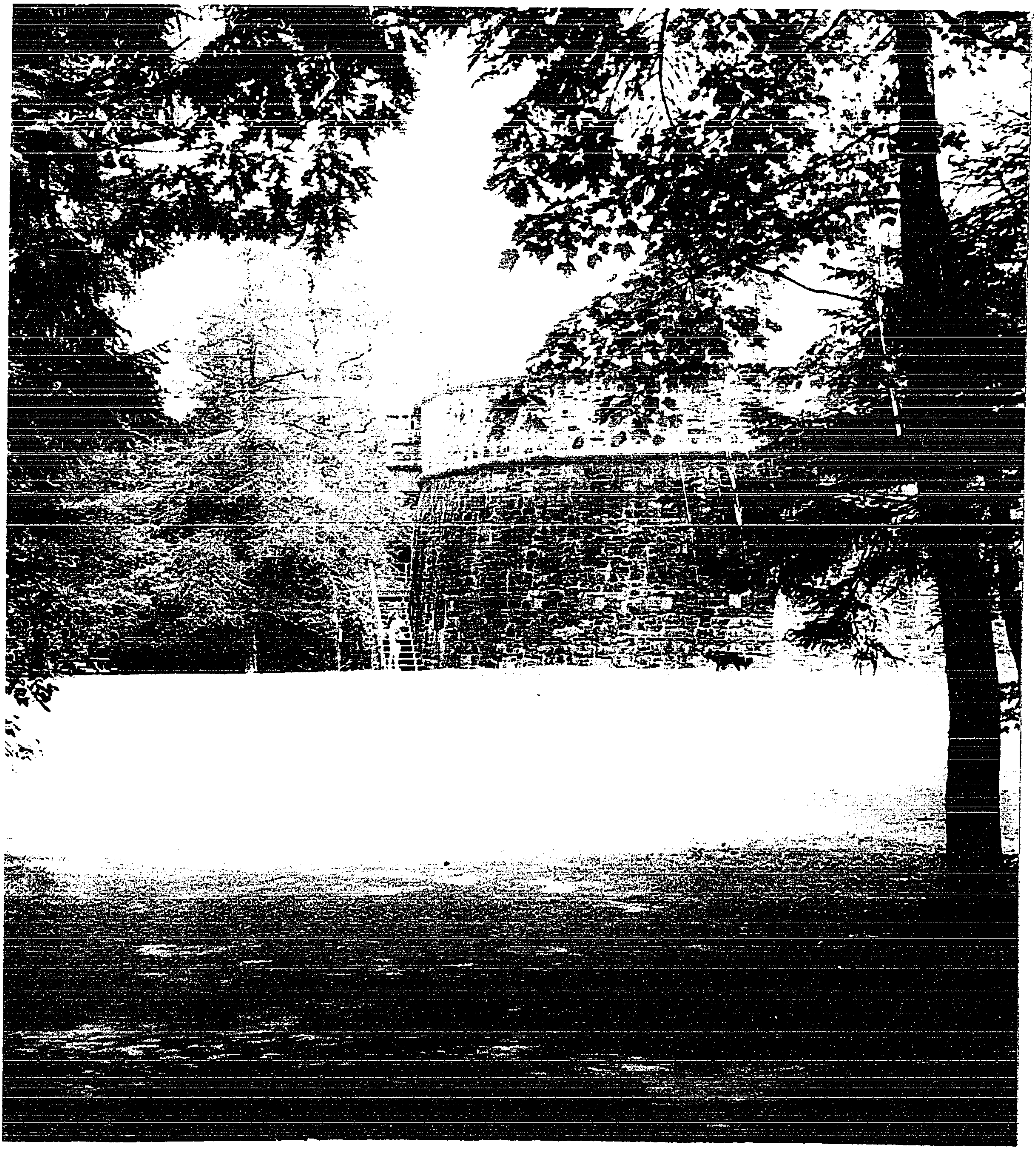


Photo J – Historical Sites

Photo I – Miscellaneous Sites

Photo E – Miscellaneous Sites

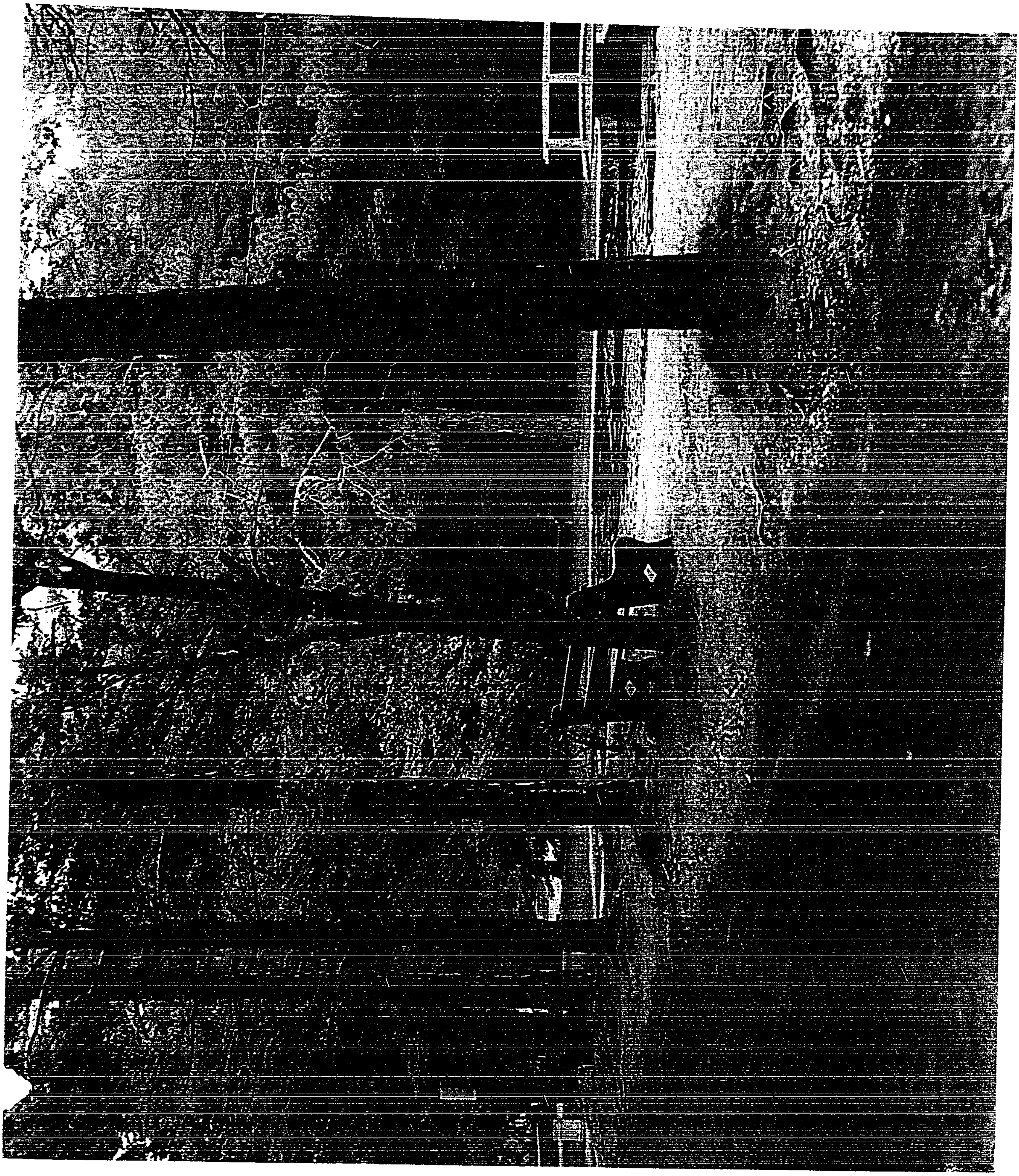
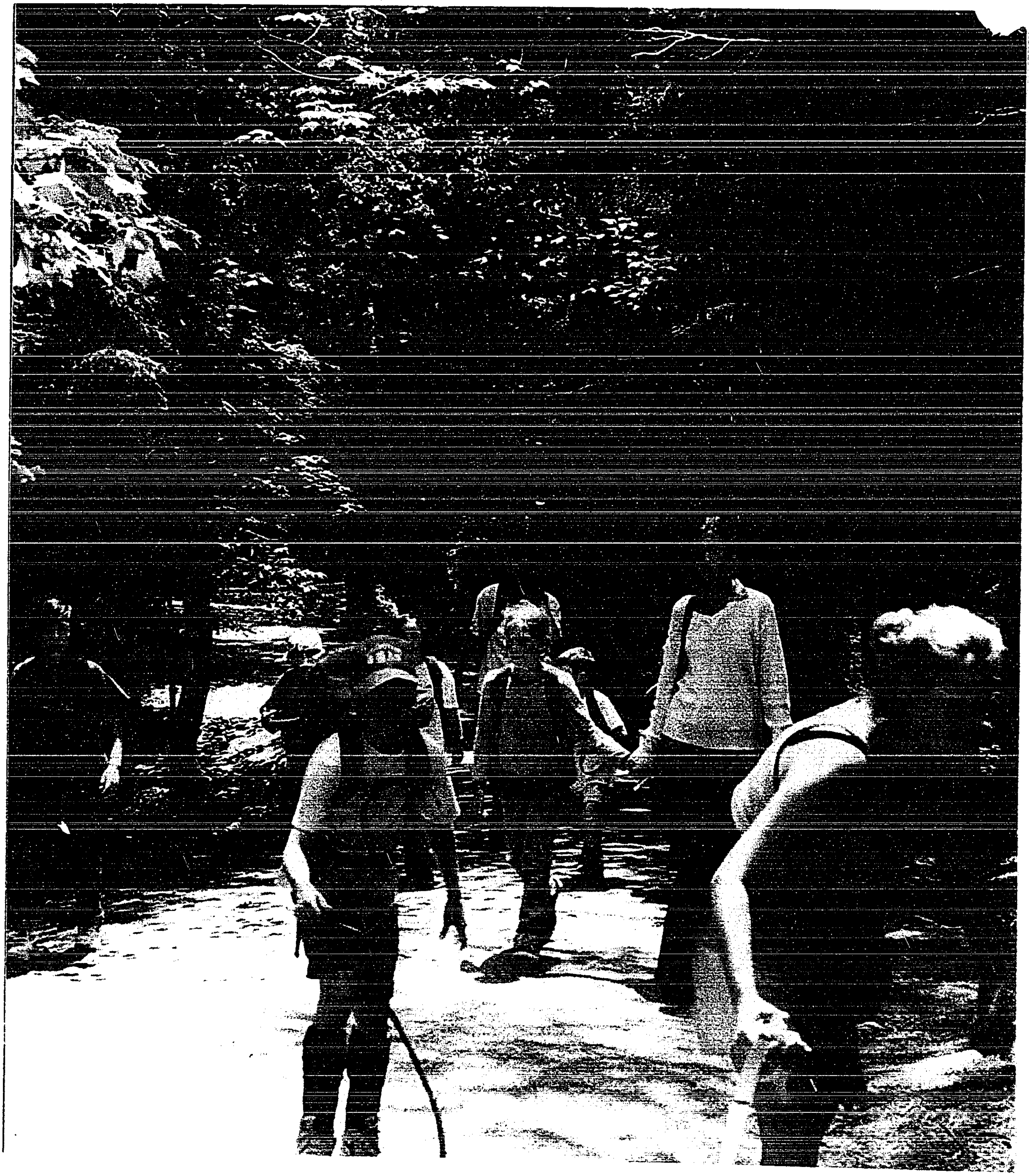
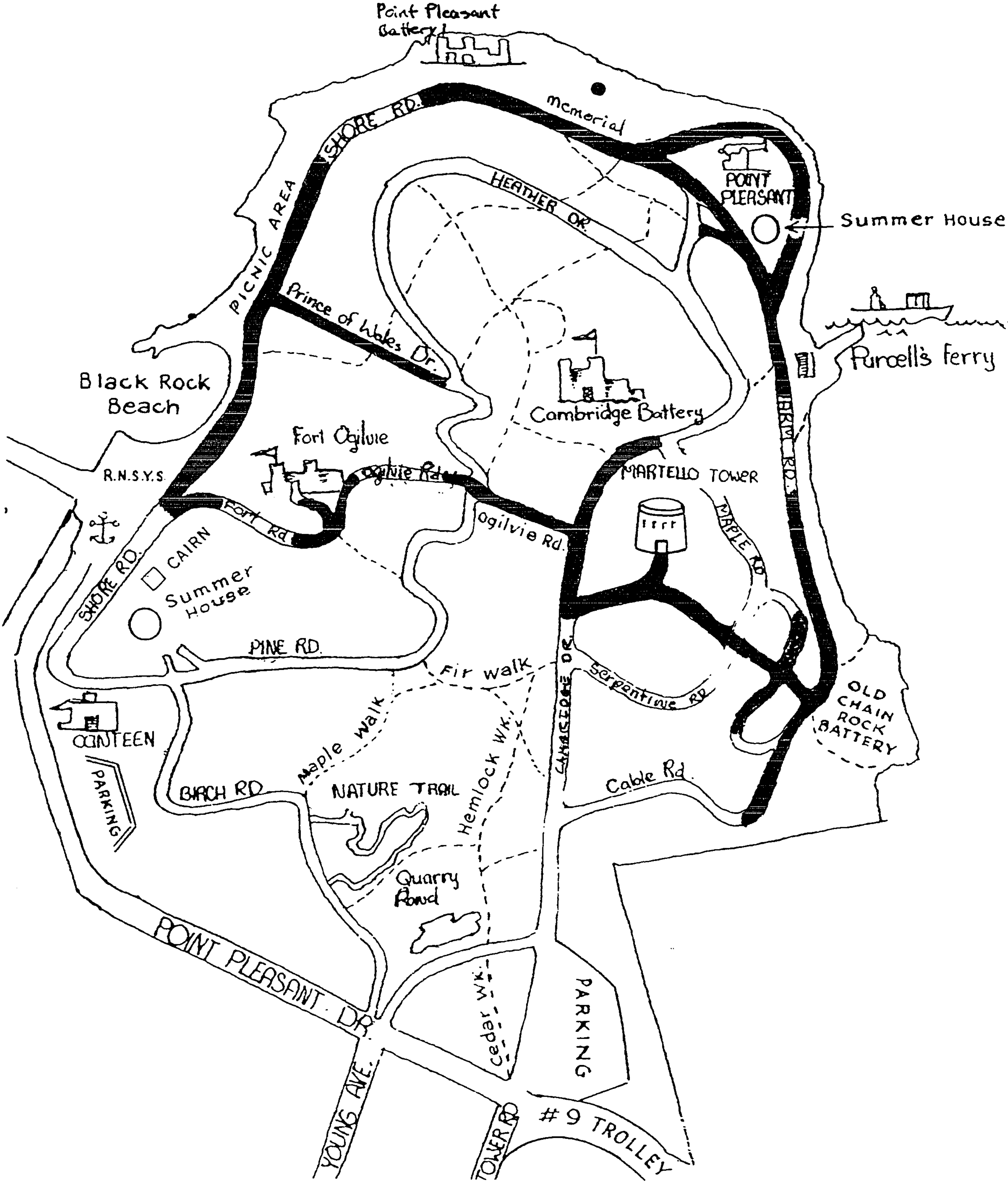


Photo H – Miscellaneous Sites



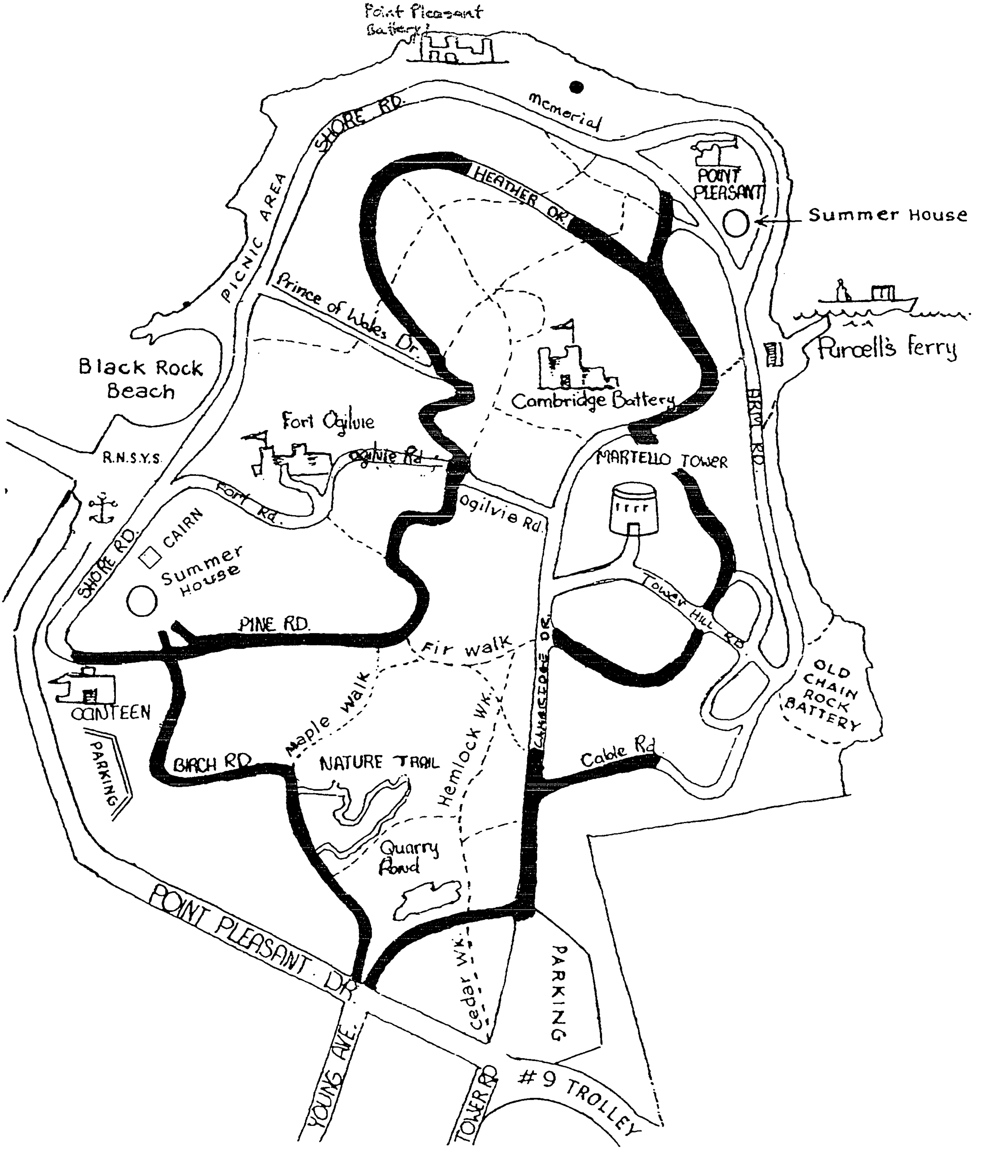
Appendix D

Route #1



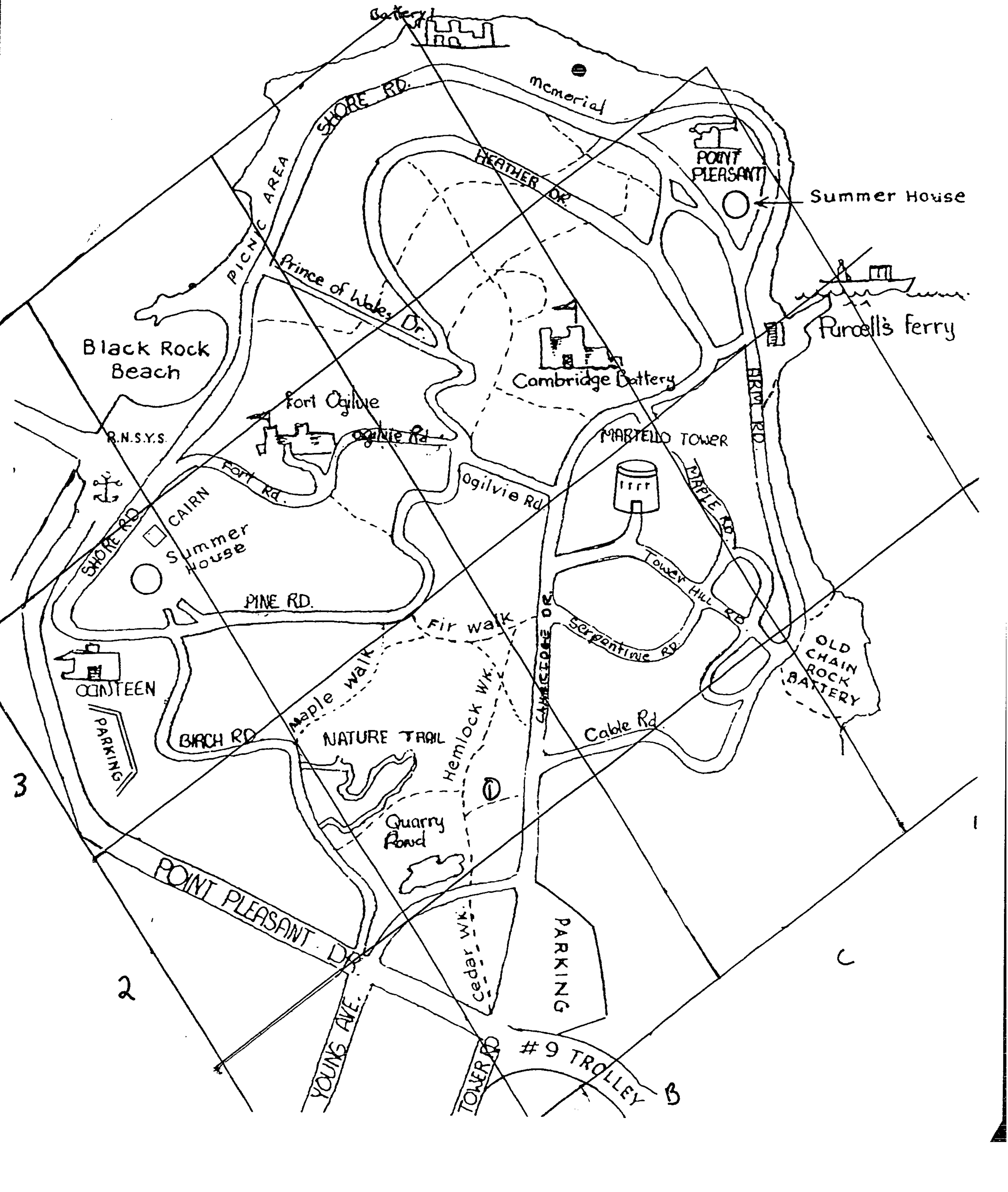
Appendix E

Route #2



Appendix F

Grid Map



Appendix G

Park Areas Corresponded to Photos