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UMI
CULTURAL PERSPECTIVES OF THE URBAN FOREST

By

Evan David Gaviller Fraser

A thesis submitted in conformity with the requirements for the degree of Master of Science
Graduate Department of Forestry
University of Toronto

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Abstract

Cultural Perceptions of the Urban Forest
M.Sc. Forestry
Faculty of Forestry
University of Toronto
1997
By -- Evan David Gaviller Fraser

Due to urbanization, Canadian cities impact the environment negatively. A well maintained urban forest (UF) ameliorates these impacts. Given most trees grow on private property, it is difficult to manage the UF as all residents influence UF management. Conflicts in the UF seem to occur between cultural groups. This study tested the hypothesis that culture influences the way a community perceives the UF using four methodologies. A vegetation inventory in Toronto shows significant differences in both the number and species of tree cover in different cultural communities. Interviews with residents of different backgrounds shows marked differences in landscape tastes. Interviews with urban forest professionals shows varying levels of understanding of cultural differences, and research done on the landscape history of different cultures shows vastly different urban planning traditions. The study recommends that planners be educated to these differences, and that residents need be educated about benefits of the UF.
Acknowledgments

As with any sort of major project, the efforts of many people went into the completion of this thesis. First my sincere thanks goes to my supervisor Dr. Andy Kenney, who did the seemingly impossible, and designed a project in forestry that a student with an anthropology background could complete. My thanks also goes out to my other committee members who have been outstanding and nothing but helpful: Dr. Shashi Kant, Dr. Patricia Petersen, and Dr. Rodney White.

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Also without the help of Ed Pajor my statistical analysis would have taken ten times as long.

Finally, but not lastly, I want to thank my father, Dr. David Fraser, for constant editing, suggestions, and advice.
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**Executive Summary**  
With three-quarters of Canada’s population living in urban settings, the impact of cities on the environment is disproportionately large compared with their geographic area. As a result, the urban environment effects the whole world, as environmental, social, and economic effects of the city spill into rural areas. From a number of perspectives, a well-maintained urban forest ameliorates a number of the negative effects of the city. These benefits include increased property value, a reduction in heating and cooling energy, and recreational opportunities afforded by urban green space. However, these are only realized by the city when the urban forest is managed as a whole. As 90% of trees in the city are on private property, managing the urban forest becomes very difficult. To manage trees on private property, property owner’s perceptions of the environment must be understood and respected. By the same token, property owners must also be aware of the benefits of the urban forest. As everyone has his or her own experience with the environment, everyone has a different opinion of it. Subsequently, this study tests the hypothesis that there are broad cultural differences in the expectations of the urban forest that must be taken into account by urban planners in order for them to effectively promote the urban forestry. This study, therefore, examines different cultures’ perceptions of the urban forest in order to help planners understand their constituents needs, and help inform property owners about the true value of the urban forest.
CHAPTER 1 --- INTRODUCTION; THE CITY

The city's influence extends far beyond its physical boundaries. For example, pollution caused in cities travels down stream or down wind to pollute rural areas; urban areas obstruct wildlife migration patterns and alter habitat; landfill generated inside cities must be shipped to more remote areas for disposal. It is important however, to recognize the fact that the city and the country are not two discrete and separable units, but ends of a continuum that are connected with such intimacy that when one is influenced the other experiences the consequences. To generate power for a city, for example, huge areas of wilderness may be flooded. Alternatively, when a rural area suffers a drought, and crops cannot be grown, the price of food in the cities will rise. The important point is that we cannot expect to manage the problems of one environment at the expense of the other. In order to create a significant benefit in a city, an action must not damage the country. In a society dominated by cities, this balance is especially precarious. The cities of today have such concentrations of population that the consequences of urban conditions extend far beyond the city's geographic boundaries to influence entire eco-regions (Gov. of Canada, 1991). Ultimately, the negative effects which a city passes on to the country invariably come back to haunt city dwellers; for example, water that is polluted by untreated sewage must then be treated even more carefully before it is used again by city dwellers. In light of the fact that 30% of all Canadian homes are without sewage treatment and such urban areas as the Greater Toronto Area have inadequate sewage treatment, this is a very serious problem (Gov. of Canada, 1991). When the influences of the city dominates a country it is called urban primacy.
Urban Primacy
Canada is an example of a country with urban primacy (Gov. of Canada, 1991). Although our population is small relative to our landmass, three quarters of all Canadians live in cities. Even more extreme is the fact that 50% of urban Canadians live between Quebec City and Windsor (Gov. of Canada, 1991). This concentration of population is exacerbated by a number of factors, which make Canadians' influence on the environment all the greater. Given our cold climate, the fact that we live in a society that is dominated by cars (77% of families own at least one car), and that the distances between our cities are so great, Canadians are the world's leading energy users, and amongst the world's worst waste producers (Gov. of Canada, 1991). Most Canadian urban areas have already run out of space to bury their municipal waste, and this problem is expected to worsen as Canadian cities continue to expand. Furthermore, our lifestyles, oriented around the single family dwelling (50% of all homes built in 1990 were single family: Gov. of Canada 1991), boosts our personal heating and cooling energy consumption.

Canada has also undergone a distressing amount of urban sprawl in recent decades; since 1966 our cities have spread chiefly onto agricultural land, and swallowed up 301,440 ha of arable land (Gov. of Canada 1991). Parts of the Welland Marsh, for example, amongst the best agricultural land in the world, have disappeared beneath the Greater Toronto Area and now lies buried under the City of Brampton north-west of Metro Toronto. According to the Government of Canada's Green Plan Initiative (published in The State of Canada's Environment, 1991), a city in harmony with nature must involve holistic planning where the people responsible for directing development understand regional ecosystems and monitor physical changes in the
Ameliorating the City: Benefits of the Urban Forests

While no single solution will solve all of the city's problems a well-maintained urban forest takes certain steps to reduce some of the problems outlined above. These will be discussed under the headings social, environmental, and economic benefits.

Social Benefits

It has been shown in a number of recent studies that urban dwellers hold very close ties with the trees which surround them, and value their experiences with nature in the city (Gold, 1977; Schroeder, 1982; Sommer, 1994; Talbot and Kaplan, 1984). It has also been shown that peoples' enjoyment of the urban forest is heightened when they are aware of the biology and ecology that creates the urban ecosystem (Dwyer, et al., 1991). Urban forestry programs that aim to improve the quality of life, therefore, will be most effective if urbanites are given the opportunity to learn basic biology. By the same token, managers and planners must also learn about the many psychological, social, and cultural needs that trees and forests fulfill for urban dwellers (Dwyer, et al., 1991). For example, in 1989 after Hurricane Hugo caused millions of dollars of damage in South Carolina, respondents indicated that after their own dwellings, it was the trees which they missed the most (Hull, 1992). Another study, from Sacramento California, shows a direct correlation between satisfaction with a neighbourhood and the extent of the trees in that neighbourhood (Gold, 1977). Concerning recreation, it has been shown that people almost unanimously prefer facilities that integrate trees and waterways into built features (Schroeder, 1982). These studies have concluded that trees are valued elements of a city's ecosystem.
People's enjoyment of both the urban forest, and their own personal neighborhoods is also magnified when they are directly involved in the planting and maintenance of the urban forest. Sommer (1994), showed that residents who planted a tree as a part of a community project were more satisfied with the outcome than residents who had not participated. When the tree had been planted by a developer, satisfaction was the lowest (Sommer, 1994). Interestingly, not only were people happy to have additional trees that improved the aesthetics of their properties and neighborhoods, but they were also pleased by the fact that the tree planting had provided an opportunity to become acquainted with their neighbours. Sommer concluded that communities bonded by being able to provide mutual assistance during tree planting projects. It is important to realize, however, that this sort of study uses a biased sample that is made up of people who, by the very act of participating in an event, are already in favour of the exercise; while the conclusions are interesting they should be interpreted cautiously.

The urban forest also provides wildlife habitat. This influence is perceived as both negative and positive depending on the species of wildlife in question and also the person. For some residents raccoons, rats, mice, gulls, and pigeons are considered to be negative additions to the urban ecosystem. Other species, that are restricted to reserve areas and green belts, however, are considered beneficial from a recreational and educational perspective.

It should be apparent from these studies that the social benefits of the urban forest are varied, and span the spectrum of urban experience. On one hand, we have people who hold close personal ties with the trees in the city; on the other, people found
planting programs good opportunities for communities to come together. In at least one social way, however, the urban forest is seen as negative; a study of low-income black residents in downtown Detroit showed that these economically disadvantaged people feared highly naturalized areas. It was perceived that green spaces that were overgrown with vegetation provided hiding spots for attackers, and created a climate that was hospitable to crime. While the respondents to this survey enjoyed green recreation areas, they felt that security was compromised by too much vegetation, and preferred highly managed facilities with good visibility and built features (Talbot and Kaplan, 1984).

**Environmental Benefits**

There are many environmental benefits of an urban forest. Primarily, trees in the city reduce or ameliorate some of the negative environmental influences caused by urban development. For example, two features of the built environment that make urban life oppressive are atmospheric pollution, and the heat island. The urban forest can play a role in reducing the impact of both.

**Pollution Sequestering**

Ninety percent of photochemical smog is ground level ozone, which is caused by a reaction between combustion exhaust and sunlight. Not only is this pollutant urban in origin but it is also created primarily on hot summer days (Gov. of Canada, 1992). The urban forest reduces ground level ozone by creating cool and shaded areas that
prevent the sunlight from reacting with pollutants, thus reducing the quantity of ozone produced in the summer. Given also that trees can sequester Ozone, a well-developed urban forest works in a number of ways to reduce ground level pollution.

Another major source of atmospheric pollution that originates in cities is the carbon emissions from industry and vehicles. Carbon pollution contributes to the greenhouse effect, and to the acid precipitation which degrades remote lakes, and forests as well as urban architecture. As the woody mass of a tree is 50% carbon, the urban forest acts to absorb quantities of carbon as it grows. While this influence should not be ignored, it is not as significant as once thought, for two reasons. First, the amount of carbon sequestered, relative to the amount produced, is small. Nowak (1994), estimates that in one year the entire urban forest in Detroit will only absorb one week's worth of the city's carbon emissions from the transportation sector. Second, the carbon stored in the trees is only kept out of the atmosphere for the duration of the tree's life. Once that tree has died and begins to decompose, it releases the carbon into the atmosphere. To keep this benefit, the urban forest must be maintained at its current volume or the carbon stored in the wood will again become a problem. Urban trees, however, do exert a significant influence by reducing the amount of carbon emitted in a city by ameliorating the temperature. This in turn reduces heating and cooling energy demands. This will be addressed in the next section.

**The Urban Heat Island**

It has been shown that cities are between 1°C and 5°C hotter than surrounding rural areas (Vukovich, et al., 1979). This is partly due to the many hard, dark surfaces in cities that absorb the sun's radiation, only to re-radiate it at night, keeping
temperatures considerably higher than otherwise would occur. Trees reduce this effect in a number of ways. First, trees block and absorb the sun's radiation. It is estimated that a mature shade tree in full leaf will block 95% of the incoming radiation (Huang, et al., 1992). Trees also transpire water in a way similar to an air conditioner. A 21m tall shade tree, for example, transpires about 400 litres of water each day in the summer, or the same as approximately five room air conditioners units (Federer, 1989). Of course, because trees are grown outside this cooling is not as concentrated as an indoor air conditioner, though when considering all of the trees in a city this can be quite significant. For summer cooling loads, therefore, the addition of strategically planted shade trees can substantially reduce energy demands (Akbari, et al. 1992). Not only does this reduction in temperature make the city more tolerable in the summer, but it also means that carbon emissions caused by generating electricity using fossil fuels, are reduced as people do not need to turn on their air conditioners as often.

The immediate question that this raises is, to what extent do these summer energy reductions help Canada with its northerly climate? First, the quality of life in Canadian cities is improved in the summer months. Second, Southern Ontario's energy consumption is similar in the summer to the winter, now that so many houses are equipped with air conditioner units. Guelph, Ontario, for example, used more power in the summer of 1994 than it did in the winter. For Southern Ontario, therefore, Ontario Hydro, now operates year round on what used to be the winter peak energy load (Kenney et al., 1996). Furthermore, if trees are planted strategically around a house, they will act as windbreaks and reduce winter heating needs by 8-12%, (Heisler, 1986). It has been estimated that 75% of the air in an unprotected house can be exchanged in
an hour, representing a 33% heat loss in winter (Heisler, 1986). Trees planted as windbreaks have been shown to reduce heat loss due to air exchange, and reduce heating energy consumption by 42%. Trees, however, that cast shade in the winter can increase energy consumption. For strategically planted trees, the urban forest can have a substantial climatological effect, and creates a less extreme climate in both summer and in the winter.

**Storm Water Attenuation**

Canadian cities have almost invariably changed the water tables that existed prior to development (Gov. of Canada, 1991). Toronto, for example, has altered the river basins of major watercourses, and subsequently, has serious problems with flooding (Gov. of Canada, 1991). Furthermore, the quantity and intensity of runoff is increased by the hard surfaces of the city. Given that trees intercept and transpire large quantities of water, a well maintained urban forest would reduce demand on storm sewers.

**Economic Benefits**

The urban forest also contributes to a number of economic benefits for urban dwellers. It has been estimated by the real estate industry, for example, that trees can add 25% to the value of a lot (Kenney et al., 1996). Furthermore, the reduced sewage needs, energy savings, and the use of wetlands as a natural sewage filtration, all add up to a substantial economic benefit. The Urban Forests Centre, University of Toronto, has estimated that the total value of the urban forest for the town of Elora, Ontario, population 3,000, was 14 million dollars in 1995 (Kenney et al., 1996). This value is based on the Council of Tree and Landscape Appraisers methods and essentially
represents the adjusted cost of replacing a tree based on its species, size, condition and location. It does not address any other environmental, social, or economic benefits. It is worth noting that this figure also does not take into account the potential revenue from managing a community forest for timber harvest, which could generate a regular income for the community.

**The Ecosystem Approach**

The benefits cited above profit everyone in a community, and can be attributed directly to the extent and condition of the urban forest canopy (including shrubs). The effectiveness of the urban forest in achieving these goals will be governed by the structure and quality of the canopy. This efficiency will be determined by such things as species and age-class structure (diversity in both of these is important), as well as the health and condition of the trees and shrubs. The health of the canopy in turn will be a function of the entire urban forest ecosystem, from the soil microorganisms to the trees, the dominant human component, and the environment in which they interact. Expanding the urban forest canopy within the limits imposed by certain physical, economic, and social factors will maximize the benefits to the community.

The physical constraints placed on the urban forest must be addressed by improving the dialogue between the planners of the built landscape and those charged with the responsibility of planning for, and maintaining the urban forest. The forest industry worldwide has been criticized for de-emphasizing aspects of forest renewal (both in terms of quantity and quality), while focusing on the short-term gains derived from logging. Urbanization, however, places even less emphasis on environmental "sustainability." For the most part, trees and green-spaces are relegated to "what's left
over" after the built infrastructure is in place.

The economic constraints placed on the urban forest partly stem from this outlook; trees and green-spaces are of secondary importance relative to the rest of the urban infrastructure. This is exacerbated by a poor understanding of the actual costs and benefits of the urban forest.

Many of the social barriers to the development and maintenance of an effective urban forest canopy are related to the attitudes mentioned above. However, one extremely important component of the social constraints relates to a "homogenization" of public attitudes towards urban green-space in the minds of planners and managers. In the culturally diverse society of Canada (and the Greater Toronto Bioregion in particular), the planning and management of urban green-space is often limited to a middle-class European outlook. If we exclude so-called natural areas, as much as 90% of the urban forest is privately owned (Kenney, 1996). A public informed of the benefits of the urban forest canopy, therefore, is necessary to maximize these benefits. The next section of this report will evaluate the jurisdiction and management of the urban forest.

**Identifying the Management of the Urban Forest**

As already discussed, the urban forest is 90% on private property. This creates management problems as every urban property owner has a right to manage their own parcel of land. Given this, even ascertaining the quantity and quality of the urban forest is a challenge. While many municipalities have tree inventories, these invariably deal only with the 10% of the urban forest that is on public land.

There have been some strategies to preserve private property trees in the face of
urban development, and some municipalities, such as Toronto and Vancouver, have passed tree cutting by-laws which prevent the removal of trees on private property without a permit. Although critics of this in Toronto see the legislation as draconian and worry that the by-law may precipitate a back-lash, its proponents believe that such measures show a municipality commitment to a vibrant urban ecosystem: "the whole purpose of the bylaw is to recognize that trees have a significant contribution to make to the health of the city." (Toronto councilor David Hutcheon in, "New Curbs Imposed on Cutting Older Trees. The Toronto Star, Wed. May 17, 1995). Similarly, the Vancouver By-law (#7347), and its accompanying list of guidelines discourages people from indiscriminately cutting trees. As any proposed development is recommended to follow the guidelines for replacement, this bylaw has had the spin-off effect of increasing the awareness of trees in the city. Any developer with a treed site is encouraged to retain the trees, provided an adequate root mass can be saved, and the tree is a suitable distance from the proposed building. Failing this, the guidelines recommend moving the tree if possible. As a last resort, guidelines are given for tree replacement. Although the intentions of the by-law are good, it still cannot prevent the destruction of the urban forest, and its recommended replacement trees do not ensure that an adequate replacement is made if a tree is removed.

Barriers to Management: A brief introduction to why the city means different things to different people

One cause of the conflicts that arise in managing the urban forest comes from the fact that not everyone in the city sees their environment in the same way. At its extreme, opinions may be voiced from environmentalists who believe that the goal of urban management should be to accommodate "wild" ecosystems in the city through
reserve areas and green belts. Alternatively, a developer may see a valuable real-
estate opportunity lost when large areas in the city are devoted to naturalized sites that
cannot even be used for active recreation such as sports or picnics. From this
perspective, valuable land is being under-used. Both of these opinions, however, may
be seen as ideological; the developer could be accused of being overly concerned with
financial aspects, and unconcerned for the environment, while the environmentalist
could be seen as dogmatically opposed to anything that involves human development.
Culture and personal experience, however, may shape a person's perception of the
environment at a more fundamental level than their chosen ideology or profession.

The study of human geography has shown that it is possible to view a landscape
in many different ways. Because the city reflects the needs and desires of the people
who built it, it is possible to understand these motivations by 'reading' the city as a non-
linguistic text. Therefore, it is possible to see the developer's biases, or the
environmentalist's concerns, in how neighborhoods and properties are organized in
different communities. Lewis (1989), wrote in an introductory essay on landscape
geography:

Our human geography is our unwitting autobiography...and all of our cultural
warts and blemishes, our ordinary day to day qualities are there for anybody
who knows how to look for them...

Similar to politics, literature, food, or the arts, therefore, everyone has different
opinions or perceptions of the environment. Perhaps because the environment
surrounds us and is very difficult to modify (relative to choosing a television program or
item on a menu), there is a fundamental lack of understanding of what different
preferences of the environment are. It is only when people come into conflict over this,
that environmental perceptions are recognized. The *Globe and Mail*, on November 17th 1995, for example, ran an article discussing the differences in communities' perceptions of trees in the city. This article quoted Mr. James Floyd, president of the Ontario Association of Landscape Architects, saying that cultural differences play a large part in how people perceive the environment. In Egypt, for example, people escape the heat and brightness of the outdoors by retreating inside. As a result, homes of Egyptians in Canada tend to be decorated in dark tones. There are a number of forces shaping the way a person will view and modify the environment that have been discussed at length in the field of human geography. First is the idea that a built landscape represents a huge investment of energy, and, therefore, will not change unless there is significant motivation to do so. Second, people will alter their environments to suit their needs, though this will be a slow process due to the effort required to modify a landscape. Third, when people move, they take their experiences with them. This means that if a person’s only experience with trees is as dwarf fruit varieties, then they will carry this experience with them where-ever they may travel. Fourth, over time people assimilate to a new area, with the result that if two places start to look similar to each other they are probably becoming more culturally homogenous (Lewis, 1980). A cultural group’s experience with a landscape, therefore, is defined by two opposing tensions. First is the pull of differentiation, where, over time, a group shapes an area to reflect their needs and desires. Second, and pulling in the opposite direction, is the force of assimilation that makes two groups more similar over time. Between these two opposing forces is the way in which a population experiences a landscape.
Meinig (1989) discussed how every landscape can be viewed in ten rough categories: nature, habitat, artifact, (eco)system, problem, wealth, ideology, history, place, and aesthetic. These categories can be further consolidated under the three general categories: social, economic, and environmental. Using the tree that does not have a background or any context in Figure 1 as an example, these categories can be analyzed in the following ways:

**Economic --- problem, wealth.** This tree could be standing in the way of someone's business opportunity, and, as a result, may be a serious financial liability. By the same token, however, the property it is on may be more valuable as a result of its presence due to an increase in property value, or energy conservation.

**Social --- artifact, history, aesthetic, place.** If this tree is old it may have become an historical landmark that is part of the heritage of the region. Similarly, local inhabitants may feel a strong sense of attachment to the location, remembering their family’s or region’s past.

**Environmental --- nature, habitat, ecosystem.** Trees provide habitat for a great variety of species, and are an element of local ecosystems. By creating a diverse number of niches, an increase in the urban forest can have the effect of increasing bio-diversity in the city.
Every person, therefore, has a different experience of the environment that will vary depending on their needs, their experience, and their motivation to use the landscape. Hence, everyone has a different perception of it. It follows that, given enough time and energy, everyone will shape their environment to reflect their own particular perception.

**Summary to Part I  Hypothesis and Research objectives**

Given the negative effects of the city on the environment it can be argued that a well-maintained urban forest creates certain benefits. Management of the urban forest however, is a difficult task as the majority of trees in the city grow on private property, making all homeowners responsible for the trees on their property. Interventions such as private tree cutting by-laws that require home owners to get a permit before removing a tree on their property, have been used as legislative tools to conserve the urban forest, but have been met with mixed success. Inevitably, conflicts arise as different groups have different perceptions and needs of the urban forest. Given that many of these conflicts seem to appear along cultural lines, this study proposes to quantitatively test the way in which different cultural groups in Metropolitan Toronto perceive and use the urban landscape. Therefore, this study will test the hypothesis that a person’s perceptions and expectations of urban trees will vary according to their cultural background.

Chapter two outlines the sampling hypotheses, techniques, methods and statistical analysis used to evaluate the question of cultural perceptions of the urban forest. Chapter three deals with the results of the survey. Chapter four discusses the role of landscape history and tries to explain the results of Chapter 3 in terms of
different cultures' gardening and urban planning histories. Chapter five deals with the management implications of this study and the conclusions that should be reached from it.
CHAPTER II --- METHODS

No single methodology is an adequate way of testing something as intangible as perception. As a result, four major approaches were used independently in this study. First, a land use inventory was used to code how the various populations used their front and back yards in the city. Second, the owners of the houses inventoried were also interviewed for their opinions on the urban environment. Third, professionals working with the urban forest were interviewed regarding their experiences with community involvement in tree related issues. Finally, landscape architectural and urban planning traditions were researched for each population to understand the historical context in which people built and designed their landscapes. This was used to explain the results that were obtained by the other three methods and is included in Chapter 4 --- Discussion. Table one shows the organization of these approaches and the hypotheses they were designed to test.

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<td>IV Cultural Perceptions of the urban environment are reflected in those cultures' landscape histories.</td>
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Table 1 An Outline of methods used to test hypotheses

Populations
Given the cultural diversity of Toronto it was necessary to use the 1991 census that asked respondents their country of origin and language. This was used to stratify the city into a series of cultural communities. This census information was compiled by the government of Metropolitan Toronto into an atlas that showed the size of the various cultural communities and where these groups occur in the city. Figure 2 shows the cultural make-up of Toronto according to the 1991 census. Not all of these communities, however, are in concentrated areas within the city. East Indian and Black communities, for example, are distributed relatively evenly over the entire city, and are not found in significantly large communities like the Chinese or Italian neighborhoods. As a result, it is not meaningful to compare all of these cultural groups together. An area that is very heterogeneous will have many cultural influences while areas that are culturally homogenous will only have one dominant expression.

Figure 2. The distribution of cultural groups in Toronto based on the 1991 census. (Government of Canada, 1991)

Given anticipated difficulties in differentiating among the influence that multiple cultures might have, it was decided only to examine groups that could be found in relatively dense proportions. As a result, a cultural group was
considered not sufficiently concentrated for this study if there was less that 35% of that group in two adjacent census tracts.

It was also necessary to control for other variables that may have confounded the cultural effect. As a result, only census tracts that had average "combined annual household incomes" between $40,000 - 55,000.00 were included in this study. This income bracket was selected because it allowed for the largest number of populations to be compared. While incomes differed among the study populations it was impossible to test this statistically, as only the average income per census tract was available, with no details of variation within the tracts.

The final variable that was controlled in the sample was the form of architecture prevalent in the community. As living in an apartment block affords residents very different opportunities to shape their landscape than living in a detached home, only tracts that have the majority of the houses built before 1946 were included. Although a few small apartments were built before W.W.II, this immediately removed any areas that had a large proportion of high-rises or new developments, it also eliminated any suburban areas where the larger lot size could influence people's land use opportunities. This also meant that all the communities were from the "inner" city, and eliminated any bias that could occur due to comparing sub-urban and downtown residents.

In summary, the sample populations were selected according to three considerations. First the cultural group present in two adjacent census tracts had to be at least 35% of the population, second the average combined annual household incomes in these areas had to be between $40,000 and $55,000.00, and third the
architecture in these communities had be mostly pre-1946. When this criteria was applied to the city only four populations remained. In alphabetical order these populations are:

British -- The British population is located north of the Beaches on the border between Toronto and Scarborough (census tracts # 079 and 338). This was the wealthiest of the neighborhoods chosen for study, and had average incomes between $53,000 and $55,000. In 1991 there were 5,375 people living in tract 079 and 5,877 in tract 338. These two census tracts were approximately 50% British single origin in 1991, and over half of the homes were built before World War II. Figure 3 shows the locations of these communities.

Chinese -- Two Chinese communities met the criteria for being included in this study: 1) Spadina Avenue south of College Street, and 2), between Gerard Street and Queen Street, east of the Don Valley Parkway. However, the Queen Street community is more homogenous with respect to cultural diversity. Consequently, the East Queen Street community was chosen. This community, made up of census tracts #27, #28, and #29, was between 40 and 50% Chinese at the time of the 1991 census, and had average household incomes between $45,000 and $50,000. The total population was 4,747 (Tract #27) 4,868 (#28) and 6,806 (#329) for a total of approximately 15,000 people. Between 60 and 80% of the homes in these census tracts were build before 1946. Despite this, the community has experience some more recent development, and an old-aged home and a housing project had to be removed from the list.

Italian -- The Italian population surrounding Dufferin Street and St. Clair Avenue had incomes between $43,000 and $50,000. Approximately 67% of the homes were
built before 1946 and between 36% and 45% of the residents are Italian. This community was made of up three tracts, #110, #111, and #112, which had total populations of 4217, 2920, and 5887 respectively.

Portuguese -- The Portuguese community used in this study occupies the area west of Ossington Avenue, and south of College Street. It was made up of census tracts #42, #43, and #44, which have average household incomes between $42,000 and $46,000. In 1991 it was between 35 and 45% Portuguese and had a total population of 15,000 people living in these three tracts.

![Map of Toronto showing Study Sites.](image)

The final issue that had to be confronted was how to take a random sample of people of the desired cultural group from these specific communities. Despite
narrowing the possible communities by the above criteria, there still were 13,000 people living in the "Italian" area, of whom only 5,000 were Italian. It was necessary, therefore, to eliminate as many non-Italians from the Italian community's list as possible, and then randomly select the people for the study. This was accomplished by searching on a CD ROM phone directory of Toronto. The CD ROM was searched for all the addresses within each census tract (either by using the first three digits in the postal code or the street name), and only British, Chinese, Italian, and Portuguese, names were selected. This generated a list that was then double-checked by research assistants from the specific cultural groups, and a random sample of 100 names was taken from that to establish the population to be studied. In the Chinese and Italian communities only one of the homes on the list turned out not to be someone of the desired descent, and the list was entirely accurate in the British community. The Portuguese community was more variable, and eight residents on our list turned out not to be Portuguese.

Research assistants that were fluent in Cantonese, English, Italian, and Portuguese were hired to translate and conduct the interviews. Finally, a letter explaining the purpose of the survey was delivered to each residence on the population list a few days prior to conducting the survey (Appendix A).

When in the field people always worked in pairs. While the interviewer was conducting the interview, the partner could collect the inventory data. This team approach, however, was also considered essential for safety reasons.

Finally, fieldwork was timed to occur at all points throughout the day when we would expect people to be at home and on all days during the week. It was especially important to make contact with working people, in order to minimize the number of non-
responses. As a result, while much of our fieldwork took place at dinnertime on weekdays and in the late morning on Saturdays it also occurred at other times during the week.

Inventory
The land use inventory recorded how the various communities used their yards, and what trees were growing in each lot. It was hypothesized that people, based on their experience, will change their land to suit their needs. As a result it was expected that each neighbourhood would have different observable landscape trends. Everyone that was on the population list, and that we were able to interview, also had his or her yard inventoried. In this way, while the two methodologies were conducted independently, they used the same sample. We also inventoried the yards of the neighbours of the people we interviewed. However, given a large number of fences, and overgrown yards that prevented us being able to see all neighbours’ yards, we were unable to gather this data in a systematic or consistent fashion. As a result, this data was not included in the analysis.

To test the inventory hypothesis, five categories were established that describe urban yards: lawn, patio, drive/walk way, flower/shrub gardens, and vegetable gardens. Keeping the front and the back yards separate (and side yards in the few cases that had side yards), researchers estimated the size of each category for each property, and the percentage of the area occupied by each category. Each tree was then categorized as being either a shade tree, a small ornamental tree, or a fruit tree. The purpose here was to distinguish between sizes of trees and to understand the intention that went behind that tree being planted: was the tree planted to cast shade, provide visible
amenity or to bear fruit? Smaller trees that provided flowers in spring or were ornamental landscaping stock are considered ornamental, larger trees are shade trees, and trees that bear a fruit often eaten by people are fruit trees. For example, maples (Acer spp.), and spruce (Picea spp.), were considered to be shade trees, crab-apples (Malus coronaria), and saucer magnolias (Magnolia soulangiana), ornamental and peach (Prunus spp.) and pear (Pyrus spp.) trees fruit. Trees were divided into these categories because many of the benefits of the urban forest are a function of total leaf area, and it was important to distinguish between smaller trees, such as a crab apple or magnolia, and larger shade trees.

Finally, each yard was given a subjective maintenance score from zero to two. A score of zero indicated that there was no evidence that anyone had maintained the yard that year, while a score of two indicated that the yard showed regular and constant maintenance.

Five independent hypotheses were then tested. First, that front yard land use (i.e. vegetable or flower gardens, patios, parking spots and lawn) would differ among cultural groups. Second, that back yard land use would differ among cultural groups. Third that front yard tree cover (i.e. types and number of trees) would differ between cultural groups. Fourth that back yard tree cover would differ between cultural groups. Fifth, that the level of maintenance would be different between cultural groups.

**Interview**
The second major approach that was used to understand people's perceptions of urban green space was interviewing (to see the interview form please see Appendix B). Using the population lists that were generated by the process already described, 210
interviews were conducted in the summer of 1996. There were 50 usable interviews for each population. The first purpose of these interviews was to gather both quantitative and qualitative data on how people had changed their landscape, or would change their landscape if they were able to. The second purpose of the interview was to understand what types of landscapes people would prefer and what types of landscape they would use. People were also asked to evaluate different park types and commercial sites with and without vegetation.

Five initial hypotheses were determined to test cultural differences in perception. The first hypothesis was that different cultural groups had or would change their properties in different ways. This was tested by asking, “Have you, or would you add to/remove the i) driveway, ii) patio, iii) flower garden, iv) vegetable garden, v) lawn vi) fence, vii) shrubs, viii) fruit trees, ix) ornamental trees, x) shade trees, xi) other (e.g. grape trellises).

The second hypothesis was that different cultural groups would chose to plant different types of trees based on their cultural background. Residents, therefore, were asked, “if you were going to plant a tree on your property, what kind would it be (fruit, ornamental or shade), if there was a particular species, and why. This question was specifically designed to get people to choose a tree, and was meant to test the hypothesis that people’s experience with nature will shape their expectations of nature.

The third hypothesis was that different groups would react more or less favourably to different types of yards. Computer generated photographs were used in order to minimize any translation bias in the interview, and because they represent a constant image that all groups could evaluate in a consistent fashion (the photographs
which were used in this study are included in Appendix C). There were three series of photographs that people were asked about, one series dealing with domestic landscapes, another dealing with recreational facilities, and the last dealing with commercial sites.

Domestic landscapes were illustrated by five computer-generated photographs, each showing the same house with a different front yard “type.” The yards, all dominated by only one landscape expression, included: i) lawn, ii) interlocking brick, iii) shrub garden, iv) vegetable garden, and v) shade trees. Upon being shown these photographs (in a different order for each interview), interviewees were asked “if you were living in this house, which would be your first choice for a front yard, which would be your second choice, your third choice...”. Respondents were then asked why they chose their first and last choices. In order to test whether there was an interaction between the landscape and the architecture of the house, two different series of photographs were generated. The first series featured a brick two-story house and the five front lawn types, while the second featured a white stucco bungalow with exactly the same front yards. The sample was then divided into two, and one half saw the brick house series, while the other half saw the stucco house.

The fourth hypothesis was that the different groups would react to different park types in a distinctive way. In order to test people’s impressions of park and recreational facilities, respondents were shown a series of photographs representing different types of city parks. Parks were divided into four categories: playgrounds, flower gardens, sports fields, and naturalized areas. These types tend to vary in size, usage, and frequency, though these categories are not mutually exclusive and only serve in general
terms for the purpose of this study. Playgrounds and flower gardens tend to be small
green spaces surrounded by residential areas. Sports fields tend to be larger, and less
frequent, and dominated by soccer fields, baseball diamonds, skating rinks, picnic
shelters and swimming pools. Naturalized areas -- wood lots, river valleys, and ravines
-- are used mostly for hiking, mountain biking, and cross-country skiing. These tend to
be the largest and most infrequent in a city. Respondents were showed representative
photographs of each type of park and asked a series of four closed ended questions on
each photograph (see appendix B for the full questionnaire).

Finally, to test if groups reacted differently to treed or untreed commercial sites
photographs of commercial sites were shown to respondents. Again using the
computer, trees were added to each photograph and respondents were asked if they
would prefer to shop in the treed, or untreed area. This was repeated for the mall.

Respondents were also asked some identification information including where
their families had come from, where specifically in the country of origin they had lived,
how many years or generations they or their families had been in Canada, how many
years they had lived in the current house, and if they rented the house they were living
in.

The questionnaire was translated into Chinese, Italian, and Portuguese. Not
wanting only one person to translate the material for fear of biases, representatives of
each target community were used to help with translating the interview. Since at least
two or three people helped to translate the questionnaire, any biases that could have
entered the survey at this point were minimized.

The survey team was trained to conduct interviews at a workshop. At this
workshop, various ways to contact perspective interviewees were discussed, as well as how to deal with angry or uncooperative people, and how to deliver the interview. Special focus was placed on the importance of getting people to cooperate, and answer the interview. It was decided that each question should be read directly from the interview sheet (in the language of the respondent’s choice). If further elaboration was required to explain a concept or question the research assistants were able to explain as the situation merited. The need for consistency was especially stressed.

The last step that had to be completed was to field test the questionnaire. Initial field-testing, done in the Chinese and Italian neighborhoods, brought to light a number of difficulties and problems with the survey. First, the interview as it was initially established, was too long, and took almost 45 minutes to complete. As a result, a number of interviews were terminated by the interviewee before they were finished. To correct this, the number of photographs of the parks were reduced from six to four, and other questions were streamlined. This reduced the interview length to between 15 minutes and half an hour depending on the interviewee. Interestingly, many people, especially the older respondents, found the park questions (where they were asked to rank such things as beauty on a scale of 1 to 5), very confusing, perhaps because they had never seen this sort of question before. We developed a visual aid to overcome this problem. This aid showed a scale with all the possible responses clearly labeled. The respondents could point to and indicate their choice directly from the chart (Appendix D).

During the field-testing we also found that, in many cases, no one was available to answer the questionnaire. Since this can contribute to a non-response bias, it was
decided that we would attempt to contact any non-responses on at least three days and at different hours. If, after this, we still could not get an answer, we would remove that name from the list.

**Expert Opinion**

The third methodology was conducted in the spring of 1997, and involved a series of interviews with professionals working in the urban environment. In many cases, the expert working within the urban environment acts as a conduit between municipal politicians that pass legislation having an impact on urban land use, and private residents. This expert opinion survey was designed to test if a) professionals working in the urban environment are aware of cultural differences in landscape perception, and b) what their experience with different cultures has been. Trying to get a range of opinions, systematic interviews were conducted with five urban planners, five landscape architects, five urban foresters, and five community environmental group coordinators. It is felt that these groups represent the range of professions working in urban forestry. A stratified random sampling technique using the Urban Forests Centre’s database of urban professionals was used to determine the expert opinion list where possible. This list, however, does not include many community group organizers or urban planners, as a result personal contacts were relied on to identify planners and community groups. This interview was field tested on students at the Faculty of Forestry that had been involved in urban forestry programs.

The expert opinion survey was comprised of telephone interviews that asked respondents first about their own background, the area in which they worked, and their contact with the public. They were then asked if they solicited public involvement, and if
so, whether they interacted specifically with different language, economic, or cultural groups. Finally they were asked whether or not they felt that different groups were over or under represented in their programs. These initial questions did not specifically mention culture. If the subject failed to mention culture, they were asked directly why they had not mentioned it, and were asked to comment on the role that culture played. After these two series of questions, the subjects were told the purpose of the study to stimulate informal conversation on the role of culture. Organizing the questionnaire in this way, it is possible to test whether different groups of urban professionals had different levels of awareness about culture by showing which respondents mentioned culture of their own accord, and which ones were prompted into it.

**Landscape History**

In order to understand if the differences in cultural perceptions were reflected by the landscape histories of these groups, each population's gardening, urban planning, and landscape architecture traditions were researched using both primary and secondary sources.

**Statistical Analysis**

The null hypotheses for the inventory component of the study are as follows:

i) There is no statistical difference in the area of lawn, flower and vegetable garden, patio, driveway, and weeds in the front and back yards, among the different cultural groups.

ii) There is no statistical difference in the numbers of shade trees, ornamental trees, fruit trees and other vegetation growing on the front and back lawns of the different cultural groups.

iii) There is no statistical difference in the level of maintenance of the different cultural groups' yards.

These Hypotheses were tested using an analysis of variance (ANOVA) that compares
the variance around the means of two or more populations in order to determine if the populations are different, and what components went into determining that population (Johnson, 1980).

The use of space in the front and back yards was measured in square meters, and then the percentage of land use was estimated, an example of this data is included in Table 2. This was then analyzed using the General Linear Model Procedure (PROC GLM) in the statistical software SAS (SAS Institute Inc., 1989), using the following basic linear models:

\[ Y_{(ij)k} = \mu + \sigma^2_c + \sigma^2_s + \sigma^2_{cxs} + \sigma^2_i \]

Where:

- \( Y_{(ij)k} \) represents the area of front lawn occupied by a particular land use type for each property \( j \) (\( j = 1 \) to \( 50 \)) in cultural group \( i \) (\( i = 1 \) to \( 4 \)).
- \( \mu \) represents the population mean
- \( \sigma^2_c \) represents the variance due to the cultural group
- \( \sigma^2_s \) represents the variance due to the size
- \( \sigma^2_{cxs} \) represents the variance due to the interaction between the cultural group and the size stratum
- \( \sigma^2_i \) represents the residual or unexplained variance

Table 2. Sample of the data collected during the inventory of land use practices by four cultural groups in Toronto.
Trees growing on front and back yards were placed into four categories, a) shade, b) fruit, c) ornamental, d) other. The number of shade, ornamental, fruit and other trees per square meter, and the maintenance score was analyzed by PROC GLM using the following basic linear model:

\[ Y_{ij} = \mu + \sigma_c^2 + \sigma^2 \]

Where:

- \( Y_{ij} \) represents the number of shade, ornamental or fruit trees per square meter, or the maintenance score for each property; for respondent \( j \) (\( j=1 \) to 50) in cultural group \( i \) (\( i=1 \) to 4).
- \( \mu \) represents the population mean.
- \( \sigma_c^2 \) represents the variance due to the cultural group.
- \( \sigma^2 \) represents the residual or unexplained variance.

When the ANOVA indicated a significant variance, a Duncan pair-wise comparison test was used to determine among which factors the differences existed. Because an Fmax test for heteroscedasticity showed that some of the data were non-normal, all of these results were confirmed using the non-parametric Kruskal-Wallace one way analysis of variance (\( P<0.05 \)).

The interview data were broken into five sections: 1) additions and removal of trees, 2) choice of tree species, 3) ranking of residential photos, 4) ranking of recreational photos, and 5) ranking of commercial photos.
1) Additions and Removals ---

The null hypotheses tested are as follows:

i) The choice of landscaping additions is independent of cultural group.
ii) The choice of landscaping removals is independent of cultural group.
To test these hypotheses, a contingency table and Chi Squared test for independent samples was used to ascertain the significance at the 5% level of significance. Only the interviews from people who owned their homes were used in this analysis as it is not reasonable to expect that renters would have developed plans or even have preferences for the development of the property.

2) Choice of Tree Species

The null hypothesis tested is:

i) There is no statistical difference between the types of tree that the cultural groups would plant on their property.
To test the hypotheses, a contingency table and Chi Squared test for independent samples was used to ascertain the significance at the 5% level of significance.

3) Residential Photos

The null hypotheses tested are:

(i) There no statistical difference between how the cultural groups ranked the two series of recreational photographs.
(ii) There is no statistical difference between the order in which the cultural groups rank the photographs of the houses.
(iii) There is no statistical difference in how each cultural group responded to a) the grass photograph, b) the vegetable photograph, c) the brick photograph, d) the treed photograph, e) the shrub photograph.
These hypotheses were tested using an analysis of variance.

Hypothesis (i) tested the differences with the two series of photographs with the
following linear model using SAS' PROC GLM:

\[ Y_{i(j)k} = \mu + \sigma^2_c + \sigma^2_s + \sigma^2_{cs} + \sigma^2_e \]

Where:

- \( Y_{i(j)k} \) represents rank for each photograph; for respondent \( j \) (\( j = 1 \) to 50) in cultural group \( i \) (\( i = 1 \) to 4).
- \( \mu \) represents the population mean.
- \( \sigma^2_c \) represents the variance due to the cultural group.
- \( \sigma^2_s \) represents the variance due to the series of photograph.
- \( \sigma^2_{cs} \) represents the variance due to the interaction between the cultural group and series of photograph.
- \( \sigma^2_e \) represents the residual or unexplained variance.

An ANOVA tested the interaction between cultural groups and the series of photographs of the residences (brick two-story vs. stucco bungalow). Again, given that an F-max test indicated some non-normality in the data, a Kruskal Wallace test was used to confirm the results at the 5% level of significance. As there was no significant interaction effect between the series of photograph and the cultural group, the two populations were combined to test hypotheses (ii) and (iii). Hypothesis (ii) tested how the cultural groups ranked the photographs and used the following linear model:

\[ Y_{i(j)k} = \mu + \sigma^2_c + \sigma^2_s + \sigma^2_{cs} + \sigma^2_e \]

Where:

- \( Y_{i(j)k} \) = the rank for each photograph; for respondent \( j \) (\( j = 1 \) to 50) in cultural group \( i \) (\( i = 1 \) to 4).
- \( \mu \) represents the population mean.
- \( \sigma^2_c \) represents the variance due to the cultural group.
- \( \sigma^2_s \) represents the variance due to the photograph.
- \( \sigma^2_{cs} \) represents the variance due to the interaction between the cultural group and the photograph.
\( \sigma^2_c \) represents the residual or unexplained variance.

Hypothesis (iii) tested the cultural effect for each individual photograph's rank, using the following linear model:

\[
Y_{(ij)k} = \mu + \sigma^2_c + \sigma^2_s + \sigma^2_{cxs} + \sigma^2_i
\]

Where:

- \( Y_{(ij)k} \) = the rank for each photograph; for respondent \( j \) (\( j = 1 \) to 50) in cultural group \( i \) (\( i = 1 \) to 4).
- \( \mu \) represents the population mean.
- \( \sigma^2_c \) represents the variance due to the cultural group.
- \( \sigma^2_s \) represents the variance due to age.
- \( \sigma^2_{cxs} \) represents the variance due to the interaction between the cultural group and the age of the respondent.
- \( \sigma^2_i \) represents the residual or unexplained variance.

Given that approximately 90% of the British population were born in Canada, while less that 5% of the Chinese, Italian, and Portuguese populations were, it was impossible to assess accurately the effect of the number of years a respondent resided in Canada. A Duncan pair-wise test was also completed when the ANOVA F-tests indicated significant differences. Because of non-normality in the distribution of the data, all effects being reported were also tested with the Kruskal-Wallace one-way analysis of variance by ranks to confirm that at least 5% of statistical significance was reached.

4) Recreational Photographs

The null hypotheses tested are:

(i) There is no statistical difference in the way the different groups ranked photographs of different park types.

(ii) There is no statistical difference in how each cultural group responded to a) the athletic facility, b) the hiking path, c) the flower garden, d) the playground.
The hypothesis was tested using an ANOVA.

Hypothesis i tested how the cultural groups scored park photos using the following linear model on SAS' PROC GLM:

\[ Y_{(ij)k} = \mu + \sigma^2_c + \sigma^2_s + \sigma^2_{cs} + \sigma^2_i. \]

Where:
- \( Y_{(ij)k} \) = the score for each photograph of a park; for respondent \( j \) (\( j = 1 \) to 50) in cultural group \( i \) (\( i = 1 \) to 4).
- \( \mu \) represents the population mean.
- \( \sigma^2_c \) represents the variance due to the cultural group.
- \( \sigma^2_s \) represents the variance due to the photograph.
- \( \sigma^2_{cs} \) represents the variance due to the interaction between the cultural group and the photograph.
- \( \sigma^2_i \) represents the residual or unexplained variance.

Hypothesis (ii) tested the cultural effect for each individual park type, using the following linear model:

\[ Y_{(ij)k} = \mu + \sigma^2_c + \sigma^2_s + \sigma^2_{cs} + \sigma^2_i. \]

Where:
- \( Y_{(ij)k} \) = the score for each photograph of a park; \( j \) the number of respondents (\( j = 1 \) to 50) in cultural group \( i \) (\( i = 1 \) to 4).
- \( \mu \) represents the population mean.
- \( \sigma^2_c \) represents the variance due to the cultural group.
- \( \sigma^2_s \) represents the variance due to the photograph.
- \( \sigma^2_{cs} \) represents the variance due to the interaction between the cultural group and the photograph.
- \( \sigma^2_i \) represents the residual or unexplained variance.

A Duncan pair-wise test was also completed when the ANOVA indicated significance.

Commercial Photographs

Given that the photographs of the commercial areas were not clear, no statistical
analysis was completed on these data.
CHAPTER III --- RESULTS

Inventory

Front yard land use

The Analysis of Variance and Kruskal-Wallace did not detect any significant differences in relative area for each land use in the front yards, except for the average amount of weeds. The only null hypothesis that was rejected was that there was no difference in the area of weeds between cultural groups. The Chinese community had, on average, 1.1 m² (S.E. = 0.31) of weeds in their front lawn while none of the other communities had any. Details of the results of the statistical analysis are provided in Appendix E. As an F-Max test (Sokal and Rohlf, 1981) showed non-normality in the data, the Kruskal-Wallace test (SAS Institute, 1989, and Sokal, R and F. Rohlf, 1981), was used to confirm significance at the 5% level of significance.

Front yard trees

The Analysis of Variance did not detect any significant differences in front yard trees among the cultural groups. The null hypothesis, that there is no difference in the number and type of front yard trees among the cultural groups, could not be rejected.

Back yard land use

While everyone had similar amounts of patio, flower gardens, and driveway the average amount of back yard devoted to growing vegetables, and that left untended, differed among cultural groups (P=0.001 and P=0.0025 respectively). Therefore, for weeds, and vegetable gardens, the null hypothesis was rejected. The Mediterranean
communities put a much larger emphasis on vegetable gardens. (Appendix E). Duncan pair wise analyses showed that (P±0.05), with an average of only 2.5 m² (S.E.=0.73) vegetable garden the British had significantly less than the other communities. There was an average of 10 m² (S.E.= 1.2) and 13 m² (S.E.=1.1) devoted to vegetable gardens in the Chinese and Portuguese communities respectively, though these two groups did not statistically differ (P±0.05). The Italians, with an average of 24 m² (S.E.=2.1) devoted to growing vegetable clearly put the greatest emphasis on this type of land use. Finally, the Chinese community had significantly more area, on average, untended or left to weeds. On average, 6.6 m² (S.E.=2.1) were weedy in the back yards of the Chinese community, while none of the other communities exhibited this type of land use. Figure 4 shows the average area of backyard vegetable gardens by cultural group.

Back yard trees
Cultural differences were most marked in back yard trees, and both the ANOVA and the Kruskal-Wallace comparison of ranks rejected the null hypothesis. Overall, there was a probability of P<0.0001 of rejecting a true hypothesis for the models analyzing the number of shade, fruit, and ornamental trees. Similarly, the probability of rejecting a true hypothesis was P=0.0067 for the model analyzing "other" vegetation. The British community had the most shade trees (0.02/ m² S.E.= 0.003), followed by the Chinese at 0.009/m² (S.E.= 0.002), and the two Mediterranean communities (that did not differ significantly), with between 0 and 0.001 shade trees per m² (S.E.=0006). The British had significantly more ornamental trees per m² than the other three communities (0.024/m² (S.E.=0.003), compared with less than 0.009/m²), while the Italians had by
Figure 4 — Area of Backyard Occupied by Vegetable Gardens in Each Cultural Group with Standard Error
Figure 5 — Back Yard Tree Cover by Cultural Group with Standard Error

Number of Shade Trees per Square Meter

Number of Ornamental Trees per Square Meter

Fruit Trees per Square Meter

Other Vegetation per Square Meter
far the most fruit trees (0.08 fruit trees/m² S.E.=0.007), followed by the Portuguese and Chinese (approximately 0.045/m² S.E.=0.008) and the British with less than 0.005 fruit trees/m² (S.E.=0.001). Figure 5 shows the number of trees by type for each cultural group. Details of the ANOVAs are provided in Appendix E.

*Level of Maintenance*

The last category that was tested in the inventory was a maintenance score. Researchers gave each yard an overall score from 0 (meaning there was no sign of tending or care in the yard) to 2 (indicating a great deal of care and maintenance). ANOVA of the maintenance level showed a highly significant cultural effect (P<0.0001), with the Italians scoring highest (maintenance level = 1.5. S.E.=0.06), followed by the British and Portuguese (maintenance level = 1.2-1.3 -- British S.E.= 0.09 and Portuguese S.E. = 0.07), with the Chinese community scoring lowest (0.6) (S.E.=0.09). Figure 6 illustrates the maintenance levels for the various communities.

*Neighbours ---*

The Inventory was also completed for neighbours of the people who had been inventoried. These data, however, were not included in the analysis, as it was not possible to collect the information in a consistent fashion. In the Italian community, for example, every neighbor was inventoried, while in the Chinese community only it was only possible inventory 10% of neighbours' yards. It was decided that this inconsistency de-valued these data and, as a result, they were discarded.

*Summary of the Inventory*

Front yards across the communities are very homogenous in every way except for size.
Figure 6 — Maintenance Level by Cultural Group with Standard Error
and there is little that can be said about the attitudes of the owners just by looking at the front yards. The hypothesis that front yards differ between cultural groups, therefore, has to be rejected based on the available data. Backyards, however, are quite indicative, and although patios and flower gardens are remarkably constant among all communities, the degree of tending, the use of driveways, and especially the role of vegetable gardens differ significantly among cultural groups. Most telling, however, is the types of trees which homeowners have chosen to plant. These, more than anything else examined in this study, are a direct reflection of the resident’s culture. Generally, the Italian and Portuguese communities both place a strong importance on urban agriculture, with a large amount of their land used for fruit trees and vegetable gardens. The Italian community, however, demonstrates this trend more strongly than the Portuguese. The British community generally prefers shade trees, and has almost no vegetable gardens, despite having significantly larger yards than the other three groups. The British, for example, had a mean yard size of 150 m² while the other three communities had mean yard sizes between 10 and 15 m². The Chinese are most notable for an apparent lack of investment in their property, had the lowest maintenance score, and a large proportion of their yards were untended. None of the other communities had untended areas.

Interviews

In total, 50 usable interviews were conducted in each population. Sixty-three percent of the people we approached were willing to complete our interview. We were unable to contact 15% of the population after three attempts, and 22% of the people we contacted were unwilling to answer our questions.
**Additions to property**

The number of people who had or would make certain additions to their property was recorded and analyzed using a Chi-Squared test for independent samples. Results are significant to the 0.05 confidence level. The null hypotheses of no difference among cultural groups were rejected for the addition of fruit trees, shade trees, and ornamental trees. British people had or would plant many more shade and ornamental trees than the other groups, while many more Italians, followed by the Portuguese would or have planted fruit trees. In all four categories the Chinese said they had or would plant the least number of trees. Figure 7 illustrates the number of people who would plant the various types of tree, by cultural group.

**Removal from property**

Removals from a property were handled in the same way as additions. In this case however, it is felt that there was a response bias, and people tended to focus their thoughts on what they would add to their property and not what the change would replace. As a result, few people mentioned removals when asked about the changes they had done or intended to do to their property. These data, therefore, were not analyzed statistically.

**Residential photographs**

The first analysis of variance that was completed on these data evaluated the cultural effect on all the photographs and showed that there is a strong interaction between the photograph and the culture (P<0.0001) (See Appendix E for complete statistical analysis). The second ANOVA tested the influence of cultural and age on each of the five residential photographs independently and showed a significant cultural
Figure 7 Respondents who have or would add Shade Trees, Ornamental Trees, Fruit Trees, and Shrubs by Cultural Group with Standard Error
effect for four of the five photographs (all except the vegetable garden). As these data were found to be non-normal using an F-max test, these results were confirmed with a Kruskal-Wallace test at the 5% level of significance. There is also an age and age X culture interaction effect for the photograph of the trees and the interlocking brick. Therefore, the hypothesis that there would be no statistically significant difference between the cultural groups with respect to how they react to the photographs and the hypothesis that there is no difference among the groups with respect to how they would rank individual landscapes, are both rejected. The probability of rejecting a true hypothesis for the treed lot, the interlocking brick paving, and for the shrub landscaping were 0.03, <0.0001 and 0.0006, respectively (Appendix E).

The British and Portuguese communities rated the shrub garden photograph higher than the Chinese and Italians did, although there was no statistical difference between the Portuguese and the Chinese in this regard. The British and Portuguese were most favourably disposed towards the treed photo, though there was no statistically significant difference between the Portuguese, Italian, and Chinese. The British ranked the grass photo lower than the other three communities did, and the Chinese reacted more favourably to the interlocking brick than the other communities. Italian and Portuguese respondents did not display significant difference in their ranking of the brick, while the British ranked the brick much less favourably.

It is also interesting to note why people made the choices that they did. In discussing the photographs with the interviewees, many Italian and Portuguese respondents mentioned that they did not like the treed photograph because you could not see the front of the house. Conversely, some British people preferred the fact that
Figure 8 — Average Rank for Five Residential Photographs

Average Rank for Five Residential Photographs with Error Bars

Average Rank for Five Residential Photographs

Residential Photograph
the treed house was more private when compared to the other, more open forms of landscape architecture.

Given that the inventory showed that front yards were homogenous, these trends might have been stronger if the photographs had depicted back yards. This may account for why the photograph showing the vegetable garden was the only one not to be statistically significant, as many Italian and Portuguese respondents mentioned that they did not feel that vegetable gardens in the front of a house were appropriate.

**Recreational photographs**

For the photographs of different types of recreational facilities, respondents were asked to rate, on a scale of 1 to 5, how much they thought the city would be improved if there were more areas like the one in the photograph. A score of 5 meant that the city would be "much more pleasing" with that type of park, while a score of 4 meant "more pleasing", 3 meant "no change", 2 "less pleasing", and 1 was "much less pleasing". Before analysis, taking the mean score from all four photographs and subtracting it from the score for each photograph standardized data. After this standardization, a score of zero for a photograph meant that the population was neutral towards that park type. A score of 2 meant that the population reacted more favourably to that park type than the others, while a score of -2 meant that a population was more negative towards the park type. For example:

<table>
<thead>
<tr>
<th>Community X</th>
<th>raw score</th>
</tr>
</thead>
<tbody>
<tr>
<td>photo 1</td>
<td>3</td>
</tr>
<tr>
<td>photo 2</td>
<td>4</td>
</tr>
<tr>
<td>photo 3</td>
<td>2</td>
</tr>
<tr>
<td>photo 4</td>
<td>3</td>
</tr>
</tbody>
</table>
Figure 9 — Scores for Recreational Photographs by Cultural Group

Average improvement Score for Different Park Photograph

Improvement Score (+1=improved, -1=hasennd)

-1.00
-0.80
-0.60
-0.40
-0.20
0.00
0.20
0.40
0.60

Park Photograph

flower gdn

hiking trail

play gmd
average score 3

Standardized (raw score - average score = new score)

<table>
<thead>
<tr>
<th>Photo</th>
<th>Score</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-3</td>
<td>0 (neutral)</td>
</tr>
<tr>
<td>2</td>
<td>4-3</td>
<td>1 (positive)</td>
</tr>
<tr>
<td>3</td>
<td>2-3</td>
<td>-1 (negative)</td>
</tr>
<tr>
<td>4</td>
<td>3-3</td>
<td>0 (neutral)</td>
</tr>
</tbody>
</table>

Overall, culture was a significant in determining people's choice of parks (P<0.0001). Therefore, the null hypothesis must be rejected. Significant differences were found to exist among cultural groups for all photographs except for photo #1, the athletic field (P = 0.068). It should be noted that this value is only marginally greater than the conventional level of 0.05 used to indicate statistical significance. For photograph 2 (the hiking trail), and photograph 3 (the flower garden), cultural differences were highly significant (P < 0.0001), and for the playground (photo 4), the probability of rejecting a true hypothesis was 0.0073. Therefore, all null hypotheses were rejected except the one for the athletic field. Complete results of the statistical analyses are presented in Appendix E. Figure 9 displays the mean standardized score for each photograph classified by cultural group. As in other parts of this study, the Italian and Portuguese communities reacted in a similar way to all photographs. They preferred the flower garden (scores of 0.47 and 0.56, S.E.= 0.09 and 0.08), while reacting most negatively to the hiking trail (scores of -0.5 and -0.7 S.E.=0.18 and 0.12). The British community was the only one to react favourably to the hiking trail with a score of 0.44 (S.E.= 0.1) and it reacted significantly more favourably to the playground than the Chinese or Portuguese. The Chinese were least in favour of the hiking path (-0.96, S.E.=0.13), though this was not significantly different for the Portuguese.
community (-0.71. S.E.=0.13). Again the Italian and Portuguese were not significantly different.

**Type of tree planted**
A significant differences among cultural groups also appeared when respondents were asked what kind of trees they would like to plant on their property. Interestingly, although the question was designed as a closed ended question, where respondents were presented with three types of trees to chose from, many of the Chinese respondents answered that they would not plant a tree on their property. Out of fifty Chinese respondents, 44% indicated that they would not plant a tree of any type. None of the other populations showed this tendency. 16% of the Portuguese said they would not plant a tree, while only 4% of the Italians, and 2% of the British said this. Approximately 50% of the British community indicated that they would plant a shade tree, while almost 60% of the Italian population wanted a fruit tree. The Portuguese community's first choice was split between fruit trees (36%) and ornamental trees (38%). (Table #9 in appendix E). Figure 10 shows the types of trees the various communities would like to plant.

**Commercial photographs**
An analysis was not completed on questions regarding commercial photographs. It was felt that the photographs showing the mall with and without trees were not clear enough to elicit open responses.

**Summary to interview results**
The interview process confirms the trend that emerged from studying the back
Figure 10 — Responses to question, "If you were adding one tree to your property what kind of tree would it be?"

- **British**: 
  - Shade: 62% 
  - Fruit: 24% 
  - Ornamental: 11% 
  - None: 3%

- **Chinese**: 
  - Shade: 8% 
  - Fruit: 26% 
  - Ornamental: 22% 
  - None: 44% 

- **Italian**: 
  - Shade: 17% 
  - Fruit: 64% 
  - Ornamental: 15% 
  - None: 4% 

- **Portuguese**: 
  - Shade: 10% 
  - Fruit: 36% 
  - Ornamental: 16% 
  - None: 38%
yards for each of the cultural groups. First, is the Mediterranean attachment to urban agriculture. Although there are differences between the Mediterranean communities, both the Portuguese and the Italians place a great deal of importance on vegetable gardens and fruit trees. This is reflected by their reaction to the residential photographs. The most common changes preferred by these communities were the addition of fruit trees and vegetable gardens. Also interesting within the Mediterranean communities was the apparent lack of concern for privacy. The Italian and Portuguese communities preferred homes that are visible from the street, and with little to obstruct the view from the front.

The British community, on the other hand, did not emphasize urban agriculture and preferred shade trees and naturalized areas. This was the only population that reacted favourably to the naturalized park, and they generally want shade trees planted on their properties. They also seemed more concerned with maintaining a sense of privacy.

Entirely different from both the Mediterranean or British groups, is the Chinese community. In general, they exhibited a somewhat negative attitude towards urban vegetation. Their yards were less intensively maintained, they made the least number of changes to their yard, reacted most favourably (relative to the other communities), to the residential photo of interlocking brick, and they did not generally want to plant any trees on their property.

**Expert Opinion**

In the spring of 1997, 20 interviews were conducted with professionals working in the urban environment. These interviews were designed to determine to what extent
landscape architects, urban foresters, community environmentalists, and urban planners were aware of the cultural differences, and to what extent they took these differences into account. Five people were selected from each of the above categories, and a series of open-ended questions was delivered. The questions initially asked what the person's background was, what programs they are involved with, what groups, if any, they felt were over or under represented, and to what extent they targeted specific economic, cultural, language or geographic groups. If by this point the expert had not mentioned culture as a determining factor in how a person is involved in the urban environment, they were asked directly what role they felt culture played in a person's perception of the environment. Lastly they were told the purpose of the study, in an attempt to generate some informal discussion on the subject of culture and the urban environment. In nine of the interviews the respondents mentioned that they felt culture was a significant feature in determining how involved people were, and what they felt about, the urban environment.

**Urban Foresters**

The urban foresters generally came into contact with developers, and community groups, and did not actively solicit public involvement. Two of the five said that they felt that different cultural groups reacted differently to the urban forest, or said that they felt that a person's cultural background was the major determining factor of how people perceive the environment. The three remaining respondents had to be specifically asked what role they felt culture played, and when prompted in this way two believed that culture was significant, while one did not. A number of interesting points came out of these conversations. The Italian affinity for vegetable gardens was stressed by two
of the urban foresters one of whom had been to an Italian community whose back yards opened onto a public ravine. In some cases, Mediterranean residents had begun to terrace the slope for urban agriculture. One forester even said that for people who came from the south of Italy it was a "mortal sin to let fertile land go uncultivated". The Chinese aversion to yard trees came up, and two foresters referred to the Chinese tradition of Feng Shui. According to some interpretations of Feng Shui, trees standing in the path of a doorway are inauspicious. This forester was aware of an $850,000 house sale that did not close because the Asian couple that was going to purchase the home wanted a tree across the road removed because it was in the way of their door. Feng Shui is discussed in more detail in the next section.

_Landscape Architects_

The landscape architects generally worked both out of their homes for private clients and had permanent jobs, either with municipalities or with large landscape architecture firms. As a result, they came into contact with a wide range of people both as civil servants and as private consultants and designers. Four of the five spontaneously referred to culture as a significant feature in how a person perceives the urban environment. They talked about different garden traditions, and how different cultures organize their personal space. Again, the Mediterranean agriculture came up, as did the more abstract nature of formal Chinese gardens. The only landscape architect that did not mention culture stated that it was outside her/his area of expertise when prompted.

_Community organizers_

This category of urban environment professionals is involved with naturalization
projects, watershed rehabilitation and community gardening. This group actively solicited public involvement to attend events, plant trees, and contribute to the organizations. This group also actively targeted specific language groups, and ran advertisements in cultural newspapers. In one case, a liaison officer is employed to maintain contact with the Chinese community. Although this group all referred to culture as significant, they were cautious about stereotyping, and in general made it very clear that, although they felt culture played a role in a person's impression, they did not want to categorize people unnecessarily. Despite this caution, a number of interesting points came out. In one case, a community organizer had established a naturalized savanna with a public school. The Italian janitor, however, had insisted that if he was going to tend it for the summer, they would have to plant fruit trees. By the following year, however, he had removed the wild flowers, planted vegetables, and changed the project. This group of professionals also indicated that the part of the general population which contributes to their projects the most were "typical white middle class professionals."

**Urban Planners**

The urban planners that I spoke with generally came into contact with the public during planning proposal meetings or Ontario Municipal Board hearings. Although they made some attempt to advertise these meetings in different language newspapers, they generally did not feel that different cultures viewed the environment differently. When prompted they indicated that they did not feel that culture played a role in how a person perceived the environment.
Summary to expert opinion

While the sample size is too small to draw any firm conclusions, the fact that the planning community showed a lack of awareness about cultural perceptions is worth noting. In addition to this, many professionals are too cautious to acknowledge this issue for fear of "stereotyping." This may prevent some urban professionals from tackling this issue head on.
Summary of Results --- Table 3 Interview

<table>
<thead>
<tr>
<th>Group</th>
<th>Additions</th>
<th>Type of tree added</th>
<th>House Photo</th>
<th>Recreation Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>British</td>
<td>shade</td>
<td>reacted most positively of all groups to shade tree and shrubs</td>
<td>Only group to react positively to hiking trail</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>none</td>
<td>reacted most positively of all groups to brick</td>
<td>Reacted most positively to Flower garden</td>
<td></td>
</tr>
<tr>
<td>Italian</td>
<td>added more vegetable gardens</td>
<td>fruit</td>
<td>Reacted most positively to Flower garden</td>
<td></td>
</tr>
<tr>
<td>Port.</td>
<td>Added more vegetable gardens</td>
<td>fruit or ornamental</td>
<td>Reacted most positively to Flower garden</td>
<td></td>
</tr>
</tbody>
</table>

Table 3b Inventory Results

<table>
<thead>
<tr>
<th>Group</th>
<th>Front Yard Use</th>
<th>Back Yard Use</th>
<th>Back Yard Trees (per m²)</th>
<th>Maintenance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>British</td>
<td>more driveways</td>
<td>more shade trees</td>
<td>High Maintenance</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>more weeds</td>
<td>more “weeds”</td>
<td>Lowest Maintenance</td>
<td></td>
</tr>
<tr>
<td>Italian</td>
<td>more driveways</td>
<td>most vegetable</td>
<td>Highest maintenance</td>
<td></td>
</tr>
<tr>
<td>Portuguese</td>
<td>large vegetable garden</td>
<td>many fruit trees</td>
<td>Well Maintained</td>
<td></td>
</tr>
</tbody>
</table>
Chapter IV --- Discussion

Based on the three methodologies, a fairly consistent picture emerges of the four communities. The British community reacted the most positively to photographs of homes with large trees, and mentioned privacy as an important feature of their homes. They also indicate a willingness to plant shade trees. This is confirmed by the fact that they have the most shade trees per square meter on their properties, and despite having much larger yards than the other communities, they have virtually no vegetable gardens. This was the only group that thought that the addition of naturalized parks (hiking paths) would be beneficial to the city. While their attitudes were not specifically referred to by the experts, it did come out that this group was the most represented during community tree planting events.

The Chinese community exhibited a markedly different pattern. Their yards are much smaller than the British, but the same size as the Italian and Portuguese, with generally less tending, on average, relative to the other communities. They indicated that they did not want to add trees to their yard, partly because of the work involved, and partly because they felt there was not enough space. The Portuguese and Italians, however, had the same size of lawn and they were very eager to plant fruit or ornamental trees. The Chinese responded most favourably to photographs that were free of trees. While members of the Chinese community themselves did not refer to the tradition of Feng Shui, this came up with the experts who considered that this tradition predisposed Chinese to a negative impression of urban trees.

Finally, the Italian and Portuguese communities exhibited many of the same characteristics. Although the Italians displayed a greater affinity for gardens, both
communities placed an emphasis on fruit trees and vegetable gardens, and were negative to shade trees when they were in conflict with their gardens. These communities used grape trellises for shade in their yards and did not care for the addition of shade trees to their homes. This trend came across very clearly in the experiences of the experts who generally felt that there was a conflict between shade trees and vegetable gardens in the minds of many of the Mediterranean residents. Due to the similarities in these two populations, they will be considered together in the next sections.

The following three sections are the results of the fourth methodology of this study, an analysis of landscape history. It is hypothesized that the trends uncovered can be explained by examining the cultural landscape histories of the British, Chinese, and Mediterranean cultures.

**British**

*Introduction* --- Consider the following three images:

i) office towers lining a city avenue, ii) a quaint Mediterranean village surrounded by olive groves, and iii) a dark forest interrupted only by massive trunks of oak and beech. Of these three distinctive landscapes, the first two are clear expressions of human culture, while the third might be taken for undisturbed nature. Yet, the fact that the forest landscape is as much a reflection of cultural values and economic forces as any urban or agricultural landscape, is the key to understanding the opinions about the urban forest that were expressed by the British community. The affinity for shade trees, comments about desiring privacy for their homes, and a lack of the urban agriculture that is so prominent in Italian and Portuguese neighborhoods, find their roots in the English person's relationship with the traditional forms of forest management in the British Isles.
This relationship can be explained largely by understanding how the history of forestry and urban planning in England have been shaped by social and economic forces to create a “British” perception of the landscape. In this chapter, therefore, it will be argued that forests in England are actually part of a “traditional” British landscape, that has been shaped by centuries of forest management, and reflect economic, social, and ecological influences in much the same way as a city-scape or Mediterranean village are reflections of these cultures’ needs. This tradition has created the idea of a British landscape that this study quantified.

Pre-Industrial Revolution --- Throughout the middle ages forests in England were managed primarily for three uses: timber for the navy, firewood for the common people, and game production for the gentry (Hunter, 1985). The emphasis on game created an early and significant association between the elite of the society and natural areas, as close advisors to the King would be made lords of valuable land, and be expected to ensure that there was a plentiful supply of animals to hunt during royal visits. The lord, however, also had a responsibility to manage the forests so that there was enough firewood for the commoners in the area. From a woodlot management perspective, this social relationship was realized in the coppice and pollard silvicultural systems (Hunter, 1985). Coppicing, the “silvicultural system in which crops regenerate vegetatively by stump sprouts” (Young and Giese, 1990), produces a large amount of small diameter wood, makes excellent habitat for birds, and was common in forests where the main game species were partridge or pheasant. Pollarding is a similar technique that also encourages the rapid growth of epicormic shoots, though in this case the tree is pruned at two or three meters in height, rather than at ground level and made excellent wood for
ship building (Dunster and Dunster, 1996). Royal forests --- usually pollarded English Oaks (*Quercus robur*) --- were also specifically managed to produce a regular supply of firewood and to leave enough low hanging branches to provide abundant deer browse. All of this was formalized in the medieval tradition whereby the King had rights to the lower branches for deer browse. The Lord of the Manor had rights to the bole of the tree primarily for timber extraction, and the commoners had rights to the upper branches enabling them to collect fruit and nuts, hunt some birds and gather firewood (Hunter, 1985). This form of forest management, that was born out of the social structure and economy of the time, created a relationship where the upper class was associated with mature deciduous forests. The forests in England that involved large shade trees, therefore, became intertwined with an upper-class British identity. This identity then has been passed through the generations to shape modern British communities.

As the wardens of the royal forests were inevitably members of the aristocracy, and lived in expansive and luxurious manors near or in the forests that they managed, it is easy to see how the shade tree became synonymous with a British identity. Sparing no expense for the visual amenity of these natural spaces, the aristocrats’ forested manor house became a symbol of the wealth, power, and prestige of upper class English society. Often the best and most sheltered land was used for the manor house, thus also creating an attitude of reserved and genteel privacy that is reflected by the British living in Toronto today (Miles, 1967). From early times, it is possible to document the fact the English aristocracy prized privacy and sought out secluded naturalized retreats. Alexander Pope (1688-1744), wrote many descriptions of the English landscape which survive to this day. One in particular, written in the 1720's, describes an area in Dorset
that included a traditional hunting park, a secluded manor surrounded by trees, and a formal garden.

The British Navy that had a voracious appetite for English Oak reinforced this system. The English empire was built on the power of its sea routes, and this demanded not only boats to ply these routes, but also that the trade routes themselves be safe from piracy. Unlike in Italy and Portugal, where at this time all arable land was used for food production, the British made wood production their first priority. For an aristocrat, planting an oak forest for the navy became the supreme act of allegiance to the British crown (Hunter, 1985).

The history of Britain's forests in the pre-industrial revolution era established the foundation of the British forested landscape. The pollard and coppice systems were designed according to economic conditions and created a forest type that became associated with this culture's values. In the pre-industrial British landscape, we see how economic and social forces shaped the origins of the British forest and cemented this as a defining landscape form. In the post industrial era we will see how this landscape changed from being one designed by economics to one that was maintained out of a sense of history and tradition.

*Post Industrial Revolution* --- With the economic upheaval of the Industrial Revolution traditional land rights and tenure security were eroded under a number of economic changes that made such a long-term investment as forestry economically unfeasible. Aristocrats, living extravagant lifestyles, found them unable to generate income in the face of the rising class of industrialists, and, as a class, experienced insolvency for the first time in hundreds of years. Furthermore, an extended agricultural depression
following Napoleon's defeat at Waterloo, a continued rural-urban migration that reduced rural rents, and rising maintenance costs, all shook the once impervious upper class.

The traditional forests of Britain also lost ground economically, as iron cladding replaced oak for ship hulls. With the development of iron ships, the mainstay of the British forest industry vanished (Hyams, 1977).

However, the emerging class of wealthy industrialists, eager to gain status in the eyes of the landed gentry, adopted many of the visible trappings of established wealth. This included adopting old style of country manor, and an affection for wooded properties, thus maintaining the traditional association between the natural landscapes the social elite. This class bought up the estates of bankrupt gentry, and quickly adopted their life style (Miles, 1967). This sociological transition, together with an increased popularity in game shooting, coincided with innovations in the design of sporting rifles such as breech loading, and central firing (James, 1981). These innovations allowed hunters to fire more rapidly, with greater precision, and over longer distances, thus increasing their ability to kill dramatically, and lead to a high demand for game birds.

Ideal hunting habitat was old hardwood coppices that had not been managed in some time, and as a result, tended to be understocked with trees. Therefore, the stands of oak which had been planted to provide the navy with stout wood for battleships came into demand as a battle ground for a war against grouse and partridge, and a new social relationship was forged between mature deciduous stands and the elite of society.

The increased interest in game, and wooded areas, is perhaps part of a larger phenomenon that can be observed in all classes in Britain during the Industrial Revolution. Due to the unmitigated, and seemingly unstoppable industrial development
of the nineteenth century, the increasingly urban population of Britain began to romanticize the country (Bunce, 1994). Between 1800 and 1900 the population of England nearly quadrupled from ten million to nearly forty million (Hyams, 1977). At the same time, the population went from being primarily agrarian to primarily urban. Slums were seen on a large scale for the first time, disease spread rapidly, and the wide-spread use of coal blackened buildings. All this contributed to the conclusion that the world of nature represented an earlier golden age that contrasted with the squalid city conditions of the time. This reaction took many different forms, including a literary genre set in romantically pastoral settings, an artistic movement of landscape painting, and an architectural/urban planning movement that tried to break away from oppressive urban conditions (Bunce, 1994). From an artistic perspective, and coinciding with the loss of the forest industry, single trees, and small groves of trees entered the culture as a dominant theme, while from a planning perspective, English cities started to emphasize planned greens spaces as a reaction to unplanned industrial sprawls (Sewell, 1993).

Perceiving a fundamental split between city and country, landscape painters and authors of the eighteenth and nineteenth century set to work representing the pristine rural environments that were being destroyed. This was applied to architecture in the late nineteenth century by such notables as Ebenezer Howard in his book Tomorrow: A Peaceful Path to Real Reform. The English School of landscape architecture established that the country could come into the city in the form of green space planning, and minimize the negative effects of industrial manufacturing. This involved more than just an architectural movement. Howard, as the title to his book suggests, saw his proposal as a radical new approach to life itself, that would be in harmony with nature and combine the
best that both the city and the country had to offer. His work was not so much a form of architecture, but an attack on what he considered a vulgar, lower-class morality, and a wholly immoral and unsuitable existence in the modern urban sprawls the (Aalen, 1992).

The emphasis that Howard placed on coupling nature with a zeal for social reform sees its roots in earlier British Landscape architecture. Until the end of the seventeenth century the continental (specifically French) style of landscape architecture was found in many formal gardens. This school stressed symmetry, with lines of trees surrounding wide avenues. The dominant figure in the eighteenth (and into the nineteenth) century, however, was Lancelot “Capability” Brown, who consciously tried to emulate nature in his designs. While Brown made liberal use of lakes, and clusters of trees, his emphasis was on single and small groups of trees that accented a landscape. He was so successful at imitating nature in the built landscape that upon his death it was remarked that his work would be soon forgotten because it was so indistinguishable from nature (Walpole on Brown’s death, taken from Miles, 1967).

The effect of these various influences on the perception of English forestry was complex. On one hand the economic incentives to maintain what had become a traditional English forest changed. No longer did the needs of the commoners and those of the landlord coincide in one silvicultural prescription, and the old economic incentives to maintain coppices and hardwood forests had disappeared. However, the emerging rich middle class that bought up the expansive manor homes of the bankrupt gentry, combined with a more general concern for public health in the cities, created a considerable social force for conserving the ancient forests as part of Britain’s heritage.

A number of acts and recommendations were passed in the late eighteen
hundreds and early nineteen hundreds regarding Britain's forest that reflected this conflict in British forestry. Some of these were designed to conserve Britain's forests for recreation and prevent the conversion of these old hardwood forests to conifer plantations, while others sought to revitalize Britain's forest industry by promoting softwood plantations. For example, in 1909 a Royal Commission on Coastal Erosion and Afforestation recommended that 150,000 acres be planted with conifers each year for 60 years, totaling 9 million acres of plantation, in order to create a domestic supply of softwood. Wisely, perhaps, this project was never carried out as "...the technical knowledge of softwood forestry under English conditions was not sufficiently advanced at the time to cope with such large undertakings." (Miles, 1967). On the other side of the coin, however, was an earlier Act from 1877 to conserve the New Forest, an ancient and ornamental beech and oak forest in Hampshire. Although in the generations since the industrial revolution the economic incentives that caused the hardwood stands to be managed in the first place changed, there has been sufficient association between the British identity and this form of forest management to ensure its preservation. The expansion of British cities and the urbanization of the British people have only reinforced this.

Summary --- From at least the 1600s a relationship was established between the social elite and naturalized areas based on the king's hunting rights that is reflected by today's British community. At that time the forest had at least two uses, game and firewood, that were managed using some variation on the coppice system. In the era of Britain's naval empire this relationship was reinforced and planting an oak for the navy became a land owner's supreme act of allegiance to the British empire. Again, the demands placed on
the forest by the navy and the needs of the commoners were met using the same silvicultural system. As land tenure became unstable in the Industrial and post-industrial era there were fewer and fewer incentives to invest in forestry. At the same time, however, the emerging middle class, both to embrace the trappings of the aristocracy, and to escape oppressive urbanization, placed a huge amount of value on the old forests. The twentieth century, therefore, has seen a conflict between the economic importance of softwood plantations, and the need for natural recreation sites.

In this overview of British forest management, we see how a social and economic relationship established hundreds of years ago was an early link in a chain of British cultural identity that has been passed down over the generations with some modification. Now, despite the fact that the forest type which was supported by the economics of the 1600s is no longer viable, it still is the most desired landscape-type for Canada's British population. This early affinity for naturalized areas, large homes surrounded by mature hardwoods, and an appreciation for privacy still plays a dominant role in how people with a British heritage approach the urban environment. To close, the following quote comes from a homeowner in a "posh" (and very English) neighbourhood in Vancouver. It epitomizes this perception and attempts to justify her negative attitude towards the influence that other cultures are having on the landscape of her neighbourhood by evoking the traditions of British silviculture that were laid down centuries ago in England:

"we are striving for tasteful seclusion, privacy, trees, [and] setbacks. We hate tacky bungalows with their open lots. They look functional, like they are for living and nothing else. We love old Tudors, Victorians...things which are authentic." (in Duncan, 1992)
Introduction --- Of all the populations studied, the Chinese were the most incongruous with the goals of urban forestry. With a seemingly negative attitude towards the urban environment, a dislike of trees on their property, and a much higher proportion of unkempt yards than the other populations, there is clearly something different about the Chinese attitude towards the urban environment. In order to explain the Chinese opinion, it is necessary to examine the history of Chinese planning. Two dominant philosophies lie behind Chinese planning, underscore a tension that existed in ancient Chinese philosophy, and persists to the present day. Five hundred years BCE, tradition holds that two philosophers, Confucius and Lao Tzu, lived and compiled rival ideologies: Confucius’ promoted a humanist and practical regime that resigns the fate of human-kind to the will of heaven. Further, Confucius wrote that, “the bulk of mankind shall travel within the ordinary "rule of life" with its limited outlook, its prejudices, forms and ceremonies...” (Chuang, 1920). Confucianism also maintained a social hierarchy with the emperor on top and all others completely subservient to him. Against this practical and decidedly non-mystical school, Lao Tzu presented his philosophy known as Taoism. Contrary in almost every aspect to Confucianism, Taoism was directed against the growth of complacent luxury and the petty laws which affect people’s every-day lives (Chuang, 1920). Both these philosophies had a large impact on the structure and function of Chinese urban planning.

Confucianism: It has been argued that Asian cities are the material instruments of a political theory that is dominated by the Confucian ideas of a social hierarchy (Reed, 1976). Despite the apparently radical changes in Asia in the last fifty years, the overall
mentality of the political structure is unchanged. Reports, for example, of Deng Xiaoping's death in February of 1997 indicated that there was very little difference between such Chinese leaders as Mao, Deng, and the patriarchal emperors of the Chinese dynasties (The National, CBC News, Feb 19th, 1997).

Confucianism had an impact on Chinese urban planning by imposing a rigid and geometric symmetry on Asian cities, reinforcing the hierarchy of the society (Keswick, 13). For example, Chinese cities were walled, not only to protect its inhabitants and the emperor, but also so that the emperor could keep watch over his vassals. City planning, therefore, was conceived in such a way as to re-create, "the real and perceived social order of the society" (Lui, 41). This contrasts with the West where many cities are built around a square or public meeting place. Lui argues in Chinese Architecture (1989), that the West's democratic system finds its roots in public meeting places --- the agora of Athens for example --- where citizens could exchange opinions and debate the nature of the government. He concludes that Chinese society never had this forum for public debate. Furthermore, there also was no place in classical Chinese cities for public green space, and any reserves or parks were the property of the Emperor, or any citizens rich enough to afford their own gardens. This attitude has changed somewhat, and the Chinese government is now attempting to address the fact that such modern Chinese cities as Beijing do not have adequate green space. In 1979, for example, there were 6.9m² of green space per capita, though the Chinese government is targeting to have 13 square meters per person by the year 2000 (Sit, 1995). However, these changes are being executed in an autocratic and centralized way that is again reminiscent of all Chinese leaders from the emperors of long dead dynasties, to Mao and even the
Within Chinese culture, this hierarchical system and form of planning has historically removed people from playing an active role in the urban environment. In North American cities, it has been estimated that 90% of trees are on private property, or under the jurisdiction of private property owners such as street trees (Moll, 1989). As a result, it is imperative to have property owners working towards a well-established urban forest, or the benefits of urban vegetation will not be maximized. The fact that Chinese citizens could not personally effect change in Chinese greenspace, has removed people from having the expectation that they can change their cities' green areas. This cultural tradition can help explain why Chinese expatriates do not contribute to the green space in Canadian cities to the same extent as other cultural communities.

The layout of traditional Chinese homes is also reinforces this. Chinese architecture has changed very little in the last three thousand years. Generally, the same construction materials have been used following the same principles of design. This relatively unchanging pattern consists of a number of smaller buildings surrounding, and facing onto, one or more courtyards. Private homes, public buildings and the like all fitted into this all-purpose design and differed only in size, dimension, and ornamentation depending on the needs and functions (Tsu, 13). The qualities that were stressed in this design were seclusion and the ability to bring the out-of-doors within the family's private compound. Lui further stresses this idea where he explains that the Chinese symbol for house actually means a building with a courtyard. Lui goes on to illustrate how the layout and design of the Chinese house and courtyard was a reflection of the Confucian hierarchy. The last axis of the courtyard was reserved for the oldest generation, while the
first hall would be for ceremonial events, ancestor worship, etc.

In this context, the courtyard had a number of meanings and a number of uses. First, it prevented any privacy between members of the family, while closing the family off from the rest of society. Lui suggests that the Chinese family, therefore, mimics Chinese society as a whole by being inwardly focused, and without many personal liberties. Again, this historical argument helps to explain why the Chinese community seems more reticent than the other communities to maintain the urban environment. For the Chinese the space outside of the home is unimportant because the inner courtyard is where the family socializes, unlike the British aristocracy who sought privacy by having nature around the home.

In the twentieth century, the traditional family pattern has given way under the centralized socialist planning of the communist party. Most homes built in the last five decades, therefore, have been high-rises and apartment buildings. Victor Sit's book, Beijing describes the period of Chinese planning since 1950 as:

> a period of dramatic political turmoil and planning anarchy....This period of chaos and ultra-leftism brought with it the harmful effect of chaotic land uses, low standards...and deteriorating basic urban infrastructure...(pg. 109-112)

Although these changes have meant that Chinese urban planning has taken a new form from the perspective of urban green space planning, the communist system seems to have had the same effect as the dynasties of imperial China. First, it replaced one autocracy with another, thus keeping citizens dis-empowered and helpless to change their surroundings. Second, because people were living in apartment buildings, there was no opportunity to have gardens or be involved in urban green space. Finally, planning was so chaotic in the twentieth century the cultural significance of the "old style"
of planning was maintained in the minds of many Chinese as a sort of “Golden Age.”

In summary, the relative indifference of Toronto’s Chinese community towards greenspace may reflect the fact that in China, urban planning and house architecture tends to de-value public and natural areas outside the home. This is not to say, however, that greenspace has not played a role in Chinese cities. In the next section, we will consider the fact that when nature was incorporated in Chinese cities, it reflected a distinctive attitude toward nature based on the other dominant Chinese philosophy, Taoism.

**Taoism:** In reaction to the inflexible ceremony of Confucianism, Taoism promotes a simple and experiential approach to life. Nature plays a significant role in Taoist life, and according to ancient tradition a person is judged on their response to nature, more than their response to the “civilized world.” From this perspective, a person who regards mountains and water more highly than personal possessions and power, is considered to have a degree of spiritual cultivation that far exceeds that of a person who is preoccupied by worldly goods (Tsu, 1988). This attitude found artistic expression in the Taoist tradition of landscape painting which created a bond between the natural world and the built world (Boyd, 1962). More significantly, however, Taoism repudiated any difference between nature’s realm and the domain of humans. Rather, humanity plays one of a thousand roles within nature, and is no different from the rocks or trees. The ideal Taoist figure is that of the scholar recluse living as a part of the natural environment in passive contemplation (Boyd, 1962).

The courtyard was the traditional area in the city where the rigidity of Confucianism gave way to the experiential philosophy of Taoism. It was in the courtyard that the rich
Chinese family tried to create the essence of nature within the confines of their family's walls. Within a city, and without having to abandon the city's conveniences or social status, therefore, people were able to create bits of nature for themselves. There are a number of guiding principles, however, behind designing a Taoist courtyard. First, garden builders try to prevent the ends of design features from being visible. There always is, therefore, some sort of intervention before the end of a path or pond. Secondly, straight lines are avoided or concealed by hills, rocks, buildings, and water. Finally, the house (i.e., the buildings) is considered an element of the garden, and not visa versa. An emphasis is placed, therefore, on integrating the built structures into the garden, rather than fitting the garden into left over space (Boyd, 1962). Description of gardens date back hundreds of years, and tend to emphasize the built parts of the garden, far above the vegetation.

Naturally, design ideas have evolved over the three thousand years of Chinese history. Evidently, circa 500 BCE it was common to find full sized representations of nature in Chinese gardens. This presumably would be analogous to large North American gardens with trees, lakes, and lawns, all looking more or less natural. The second phase of Chinese landscape history emphasized strict miniaturization, where gardens attempted to create actual scenes from the natural world on a small scale. This flourished between 400 and 200 BCE, and coincided with a turbulent period of Chinese history called the Warring States. At this time the hierarchy was enforced with such rigour that rich merchants were persecuted for building gardens that were larger than the emperor's (Tsu, 1988). By 1000 CE the tradition of miniaturization had changed slightly and embraced goals that are more abstract. Instead of attempting to create nature in
miniature, landscape designers worked towards less concrete representations of nature. This third stage of garden design was a part of the Taoist tradition of landscape painting that tried to create, not so much an imitation of nature, but to contain the essence or spirit of nature within a medium controlled by humans (Tsu, 1988).

There are two key points. First, the progression of Chinese landscape design has been towards impressionistic gardens. Hence, people who have lived their entire lives in China will have only experienced nature in the city in a highly abstract way. In contrast, North American parks tend to be full of large trees and expansive lawns --- in other words, full sized recreations of nature. High Park in the west of Toronto is one example, and there is even an effort now to restore areas of the park to a functioning ecosystem representative of what the area would have been like before European development (Cherry, 1996). To the Chinese immigrant, such a literal recreation of nature in North American parks and in the "natural" English landscape with lawns and trees would seem empty and uninteresting (Keswick, 1978).

It has also been suggested that while a lawn in England suggests a pastoral environment, and counters the oppressive industrialization of British cities, a lawn in China evokes images of the northern steppes, an area beyond civilization, and historically associated with barbarian hordes and raids (Keswick, 1978).

The second point, which is important in discussing the influence of the Taoist tradition on urban vegetation, is the type of vegetation that is grown in Chinese gardens. The climatological benefits of urban vegetation require that certain types of vegetation be planted. More specifically, the strategic planting of trees for energy savings normally involves mature hard woods with established canopies. It is estimated, for example, that
a 21m high shade tree in full canopy can transpire the same amount of water as five
room-unit air conditioners running twenty hours each day (Federer, 1976). Many of these
climatic benefits are related to the total canopy volume or leaf area. To maximize these
benefits a city needs to increase the leaf area (Kenney, personal communication, 1997).
Trees play a very small part, however, in Chinese Gardens. Water, stone, and buildings
are the critical elements of the Chinese garden, and a highly influential style manual,
Yuan ye (The Craft of Gardens), from the eighteen hundreds only mentioned plants in
conjunction with water, rocks, and buildings. It makes no mention of the tending or
arboriculture of garden trees (Titley and Wood, 1991). This likely reflected the dominant
natural forces which shaped the Chinese culture, as the river valleys are the only fertile
areas in China that can support a high population density, and the mountains imposed
boundaries on hospitable habitat (Morris, 1983). As a result, fallow fields and naturalized
areas, which comprise a common part of the North American landscape, have been
functionally impossible in China for centuries (Morris, 1983). Chinese gardens, therefore,
do not have the types of vegetation that would be useful to maximize the benefits of the
urban forest.

Finally, urban forest experts considered that the tradition of Taoist tradition of Feng
Shui influenced how Chinese related to the urban forest, and caused many people of
oriental descent to have a negative impression of trees in the city. According to
contemporary practitioners, Feng Shui, literally means wind and water, and is an ancient
Chinese study of the natural environment. Appropriate consideration of Feng Shui can
determine the best, or most favorable, location for anyone and assists that person to
avoid their worst or least desirable location in any environment. Feng Shui, similar in
some ways to Western astrology, determines an individual's optimal environment based on the year the individual was born, the environment surrounding them, and the movements of the solar system. Pragmatically, Feng Shui is a 3000 year old Chinese belief that all things contain energy, called CH'I, that is possible to tap into. One common interpretation of Feng Shui, is that trees standing in the ways of doorways are inauspicious, and will contribute to illness. While no one in the Chinese community themselves mentioned Feng Shui during the interviews, numerous of the expert mentioned it as significant, and one urban forester even mentioned that a European contractor modified his designs because of Feng Shui, when building homes which targeted the Asian market.

Summary: Different philosophical ideals can lead to different and conflicting values, experiences, and planning strategies. In China, the literature shows an early and enduring connection between the rigid hierarchy of Confucianism, and a form of urban planning that removed everyday people from effecting any sort of change on their environment. By the same token, the centralized planning of Communist China also removed people from being able to direct the shape of their cities. There is also, however, an equally early and equally enduring connection between Taoism and an abstract style of garden design that is incongruous with North American traditions.

The resulting and understandable Chinese indifference to mature trees in urban green spaces in North America is now in conflict with the practical advantages of urban forestry. In North America, a well developed urban forest canopy can reduce the impact

1 American Feng Shui Institute at www.amfengshui.com
2 Carol Meltzer Feng Shui Designs at www.meltzerfengshui.com
which cities have on the environment. As a result, it may be in the interest of the common good to promote a vibrant and well tended urban canopy. Given the structure of Canadian cities, however, much of the existing urban canopy is on private property. It is necessary, therefore, to bring all communities “on side” in order to tend the urban forest. In the case of the Chinese community, this may involve education programs to show these recent Canadians that they are able to change their environment, and that although the vegetation and architecture is different from what they might have grown up with, it is still necessary to support the urban forestry programs that we all benefit from.

Italian & Portuguese

As we have seen, both the Italian and Portuguese populations show a strong affinity for fruit trees, and tend to respond somewhat more negatively towards shade trees than the British population. At the same time, the Mediterranean groups are very avid gardeners and have well kept lawns that invariably incorporate vegetable gardens. Given that Italy and Portugal are relatively close geographically, and exhibited similar landscape trends, they will be treated together in this discussion. This is not without precedent, for example: {PRIVATE }

"without denying or underestimating... [regional differences], it remains obvious that a common Mediterranean heritage situates Italy [and Portugal] within the Mediterranean cultural area." (Bethemont, 1979)

Three themes run through the history of the Mediterranean landscape that helps explain the Mediterranean attitude expressed in this study. First, is the fact that the culture that shaped the landscape is an agrarian culture, that has been defined in the past by a fragile relationship between intensive human activity and soil that is very prone to erosion (Bethemont, 1979). The second theme, which is related to the first, is the extent to which
the natural landscape of this area has disappeared. More than in many areas of the world, the western Mediterranean has been completely shaped by human activity (Bethemont, 1979). The third issue is the architecture of the Mediterranean villa that, from the renaissance onwards, created a distinctive relationship between people and the environment.

The Agrarian Landscape

From the middle ages onward, the areas surrounding cities in the Mediterranean were comprised of small-scale intensive agricultural plots. The area adjacent to the city would be made up of irrigated land divided into numerous little plots where fields were combined with gardens. Forming concentric circles around each city, therefore, were first watered gardens with vines, then cultivated fields, followed by open fields, and finally frontier land (Bethemont, 1979). While originally this model does not pose too much difference to other European agricultural systems, it is unique in that monocultures were, and remain to be, uncommon (Houston, 1964). It is also different in that this system endured for quite some time; many of these small holdings were only abandoned immediately following the second world war, as people left the rural Mediterranean for the cities and the New World. As a result, the rural urban exodus that Britain experienced in the 1700s and 1800s, and China experienced centuries earlier, is a product of the post war era in the Mediterranean. Many of Toronto's Italians (and to a lesser extend the Portuguese), who came to Canada during the exodus of the late 1940's, carried on their agricultural tradition, with grapes, fruit trees, grain and vegetables all grown together on the same piece of land (Olschki, 1949). As a result, the typical "Mediterranean" back yard in Toronto is reminiscent of what these garden plots would have been, complete with a number of fruit
trees, grape trellises, and a very densely packed garden of vegetables and herbs.

The fragility of the Mediterranean soil also has defined how this culture relates to agriculture. Houston (1964) summarises the western Mediterranean landscape and culture as a conflict between fruitfulness and frugality, where the ingenuity of the people to harvest rich crops is pitted against soil that has been degraded by millennia of use. As a result, all areas that can be intensively used are under cultivation, and agricultural areas are only broken by infertile and eroded lands (Olschki, 1949). In addition to this, the western Mediterranean is a mountainous region. In Italy, for example, only 70,000 km² of 300,000 km² are plains, while the rest is either hills or mountains. This has meant that the land that is available for agriculture is utilised to its maximum potential. Again, this helps explain the origins of the intensive gardening in the Mediterranean communities of Toronto.

Because of these social forces, terracing is very common in the whole of the Mediterranean, but especially in Portugal and Italy. In these two countries, high population densities allowed for this labour intensive form of land management (Houston, 1964; Bethemont, 1979; and Olschki, 1949). Unlike in North America, where most agriculture is done on highly mechanised farms, the Mediterranean community in North America is used to a form of labour intensive gardening, that is well suited to a small back yard. When irrigation was possible on the terraces of Italy and Portugal, they were used for vegetables, cereal, and tree crops. When irrigation was not possible, figs and other tree crops were used. Again, this seems like a blueprint for the Mediterranean back yard garden in Toronto.

Another key difference between North America and the Mediterranean landscapes is the role that the natural landscape plays. Due to its position as one of the earliest hubs of Western society, the Mediterranean has undergone a vast transformation over the
centuries. North America on the other hand, has a much shorter history of destructive land management, and still has much of its original landscape and flora. Therefore, while North American naturalists and park planners are able to re-create degraded ecosystems (for example the Don Valley and High Park in Toronto), no one really knows what a "natural" landscape in the Mediterranean was like. Confusing this further, is the fact that there have been a vast number of introduced species into the Mediterranean. For example, a millennium ago saw grapes and figs imported from the Near East, and pomegranates from Greece. In the 13th century mulberry (and by association the silk industry), came from Levant; in the 16th century citrus came from Persia, China and India; and corn, tomatoes, tobacco and wheat came from the Americas (Olschki, 1949). The concepts and benefits of a "naturalised" landscape, therefore, may well be lost on people coming from a land where the last vestige of their natural landscape vanished centuries ago.

The Villa: While the productivity of the land, and the importance of agriculture has been stressed up to now, it is not the only influence shaping the Mediterranean image of the environment. The Renaissance Villa typifies and defines another part of the relationship between the Mediterranean culture and their surroundings. The crucial element of a villa's design is the view of surrounding scenery. This harkens to the fact that a number of Italian and Portuguese respondents said that the reason they did not like the photographs with trees, was because the trees blocked the view of the house. Therefore, although the villa was intended to be an agricultural centre that enabled a landlord to control his rural affairs, the buildings were intended as a refuge where one could enjoy the view of the surrounding countryside (Cosgrove, 1993). For example, Leone Alberti (1404-72), one of the earliest "renaissance men" praised rural life, and included in his list of the virtues of the country, the
villas with its enclosed gardens. He stressed that these were designed to be on sloping grounds so that the surrounding landscape could be seen over the walls and from the buildings themselves (Thackar, 1979). Again, the most important aspect of this was the sloping ground that provided a view both from and into the garden. The renaissance architect Palladio stressed this theme again and again. Comments he made of his villa near Venice highlight the view that the building afford him over the surrounding country side (Cosgrove, 1993).

Finally the villa’s garden was the place where nature is brought into the civilised world in a controlled and planned way, with "no wild rush to the jungle" (Thackar, 1979). The garden, therefore, is an extension of the villa, and trees ought to be planted in exactly even and straight lines (Thackar, 1979).

**Summary:** The experience of the Mediterranean, is one dominated by agriculture. Many Italian and Portuguese immigrants to North American, having grown up in an agrarian setting, that placed a profound weight on growing food, have brought that ethic with them and found it very easy to apply it to an urban setting in Toronto. Perhaps also carrying with them architectural expectations established during the Italian Renaissance, Italians and Portuguese emphasised the importance of being able to see the house, and did not exhibit the same interest in seclusion as the British.
Chapter V --- Concluding Remarks ---

This paper began with the idea that a city has certain problems and weaknesses that can be ameliorated by the urban forest, and has examined how cultural differences shape communities’ attitudes towards the urban forest. Given that this argument began with the notion that cultures, because of these differences, can come into conflict with one and other, it has also been suggested that some cultures may be at odds with the ecological management of an urban forest. It would be easy, therefore, to take these arguments and use them against the concept of cultural diversity in our city. It would also be easy to insist that, from a management perspective, it is necessary that different groups assimilate. Given the results presented here, why not conclude that ecological management of the city requires a cultural homogeneity that is based on the standards of the British community that enjoys naturalised areas, and shade trees? I feel the answer to this question is simple. It must be stressed that the strongest feature of many cities’ is the rich diversity that occurs culturally, architecturally, and commercially. This is especially true in Toronto where we are lucky enough to be surrounded by representatives of most cultural groups from all parts of the globe. The conclusion that should be reached from this work, therefore, is that appropriate management of the urban forest takes into account, and works with, the cultural constraints of the members the urban community.

Perhaps the most influential urban planner of this generation is Jane Jacobs, who’s seminal work, The Death and Life of Great American Cities, (1962) pioneered an era of planning that has tried to work with and promote urban diversity. Cities, Jacobs feels, are natural incubators of diversity, and the larger, and more interesting the city, the more diversity it will have. In the foreword to John Sewell’s history of Toronto’s urban planning
The Shape of the City, Jacobs analyses why Toronto withstood the same, often debilitating, planning experiments that destroyed many American downtowns (Sewell, 1993). One major reason that she discusses, is racial prejudices and discriminations were not exacerbated by the creation of ghettos that locked people in artificially homogenous areas.

Creating ghettos actually required much deliberate and calculated effort: for instance, redlining; well organise “block busting” on the part of ruthless developers...; contrived property-value panics to empty whites out of ghettos-to-be. These efforts were largely missing in Toronto. (Jacobs in Sewell, 1992)

Because cultural groups in Toronto are not divided along as ridged a social hierarchy as many American cities, Jacobs feels we have escaped the fate of many American downtowns. Diversity, in terms of architecture, space, land-use and culture creates a stronger, more interesting, and healthier city where it is safe for people to walk the streets at night.

The conclusion that should be reached from this study, is that the cultural heritage that Toronto has is a valuable asset, and should be promoted and protected. When this comes in conflict with the ecological management of the urban forest, a two way educational effort is required. First, urban planners, foresters, community organizers, landscape architects, and others involved with the urban environment must be aware of cultural needs, and perceptions. Hopefully, this study has provided a basis for this awareness, and points the direction towards even greater understanding. As discovered in the expert opinion surveys, many professionals are not aware of the issues of cultural pluralism, or are not comfortable making assumptions based on them. Armed with the specific knowledge that the very large Mediterranean community enjoys the benefits of urban agriculture, planners can now ensure that there are sufficient areas left
for gardens when planting shade trees. In this case urban planners, foresters, landscape architects, and community workers must realize the benefits of urban agriculture and balance them with the benefits of the urban forest.

The second thrust of the education effort would be directed towards the communities themselves. The benefits of the urban forest are quite abstract, especially compared with the benefits of growing your own vegetables. As a result, it is much easier to appreciate a fresh tomato from your own back yard than it is to understand that the entire urban forest indirectly reduces carbon pollution by reducing summer temperatures. It is necessary, therefore, to educate the population that the urban forest creates a myriad of effects that benefit all urban residents, just so long these effects are properly managed for. This study has also shown where education programs might be useful. For the Chinese community, stressing the fact that the urban environment is not being centrally controlled, as it is in China, may give Chinese people a sense of empowerment that is required before they will start tending their gardens. For the Mediterranean communities, it may be necessary to contrast the benefits of the urban forest and urban agriculture in order that a compromise can be reached.

In closing, I would like to make one final comment on the nature of cultural perceptions, and suggest that even the concepts of environmentalism, ecological restoration, and bio-diversity, are all cultural constructs that shape people (such as myself), to have a certain perception of the urban environment. Until recently, I have considered the ideas of environmentalism, as absolute and empirical conclusions based on the scientific principals. While to a certain extent this is true, it is also important to acknowledge that these ideas were arrived at through a cultural process in such culturally
determined institutions as universities. I am a product of this cultural process, as are
most of the people that are making decisions about how our cities work. It is useful,
therefore, to put our own assumptions to the same scrutiny as this study has done with
other cultures’ assumptions about the urban environment. In this way decision makers in
the urban environment will have the perspective, and hopefully even the wisdom, to make
culturally and environmentally sound decisions that will benefit all urban residents.
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Urban Forests Centre

Dear Resident,

The Urban Forests Centre, University of Toronto, will be conducting a survey of land use in your neighbourhood in the next few days. This research will help city planners better understand residents' needs for urban green space, and contribute to a better managed city.

Our research involves identifying the way land is used on private property. Our students will be conducting short interviews and will need to gain access to some back yards in order to conduct their survey. Your cooperation in this important piece of environmental research is deeply appreciated.

If you have any questions, or would like further information...
Appendix B — Interview form

Interviewee's Land Use

1.1.1) What changes have you and would you make to your driveway/walkway (have) (would)

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</table>

1.2) If you were to add one (single) tree to your property what kind would it be

1) large shade tree  
2) fruit tree  
3) small ornamental shrub or tree

1.2.1) Is there any particular species?

1.2.2) Why did you make this choice?

Perceptions

2.1.1) (interviewer, circle one) Brick house | White house... code: t=tree, b=brick, g=grass, v=veg.garden, s=shrub)

If you lived in this house which front yard would you prefer.

1st (write letter here) | 2nd | 3rd | 4th | 5th

2.1.2) What caused you to make your first choice?

2.2.3) What caused you to make your last choice?
Appendix B — Continued

2.2.1) Please evaluate each of the following photos according to the following statements:

Photo #1
i) You would feel: 1) safe 2) 3) 4) 5) Unsafe using this area regularly
ii) The way this areas is used is:
   1) useful 2) 3) 4) 5) Not useful
iii) This scene is: 1) beautiful 2) 3) 4) 5) ugly
iv) If more places in the city were like this the city would be:
   1) more pleasing 2) 3) 4) 5) not appealing

Photo #2
i) You would feel: 1) safe 2) 3) 4) 5) Unsafe using this area regularly
ii) The way this areas is used is:
   1) useful 2) 3) 4) 5) Not useful
iii) This scene is: 1) beautiful 2) 3) 4) 5) ugly
iv) If more places in the city were like this the city would be:
   1) more pleasing 2) 3) 4) 5) not appealing

Photo #3
i) You would feel: 1) safe 2) 3) 4) 5) Unsafe using this area regularly
ii) The way this areas is used is:
   1) useful 2) 3) 4) 5) Not useful
iii) This scene is: 1) beautiful 2) 3) 4) 5) ugly
iv) If more places in the city were like this the city would be:
   1) more pleasing 2) 3) 4) 5) not appealing

Photo #4
i) You would feel: 1) safe 2) 3) 4) 5) Unsafe using this area regularly
ii) The way this areas is used is:
   1) useful 2) 3) 4) 5) Not useful
iii) This scene is: 1) beautiful 2) 3) 4) 5) ugly
iv) If more places in the city were like this the city would be:
   1) more pleasing 2) 3) 4) 5) not appealing

2.3.1) Would you prefer to shop in photo (Mall) A) or photo B)? A) (reed) B) (w/out trees)
Why?

2.3.2) Would you prefer to shop in photo (Street) A) or photo B)? A) (reed) B) (w/out trees)
why

Personal Identification

Name (optional)...
Address (optional)...
Do you own the house you live in? Yes No
Age 19 20-29 30-39 40-49 50-59 60-69 70-79 80-89
3.1.1) Personal Background (nationality)...
3.1.2) If possible where did you or your family live before Canada (as specific as possible)

3.2) How many years or generations have you or your family been in Canada?
years: 0-5. 6-10. 11-20. 21-
generations 1 2 3 4 5
3.3) How many years have you lived in your current house? 0-2. 3-5. 6-10. 11-20.
Appendix C — Residential Photographs Used

Lawn Photo

Shrubs Photo

Treed Photo

Brick Photo
Appendix C---Photographs Used Continued

Vegetable Garden

Flower Garden

Athletic Field

Hiking Path

Playground

Recreational Photographs
Using this area regularly you would feel...

very safe  moderately safe  average  moderately unsafe  very unsafe

The way this area is used is...

very useful  moderately useful  average  moderately useless  very useless

This scene is...

very beautiful  moderately beautiful  average  moderately ugly  very ugly

If there were more places in the city like this the city would be...

much more pleasing  more pleasing  average  less pleasing  much less pleasing
Appendix E Statistics Tables

#1 Anova for weeds on front lawns

<table>
<thead>
<tr>
<th>Dependent Variable — Area of Front Garden as Weeds</th>
<th>DF</th>
<th>SS</th>
<th>F Value</th>
<th>Pr&gt;F</th>
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<tbody>
<tr>
<td>Front Area</td>
<td>1</td>
<td>0.87</td>
<td>0.73</td>
<td>0.39</td>
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<tr>
<td>Community</td>
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<td>18.91</td>
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<td>0.0017</td>
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<tr>
<td>Area*Comm</td>
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<td>0.16</td>
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#2 Anova for back vegetable gardens and back weeds

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<tr>
<th>Dependent Variable — Area of Back Yard as Vegetables</th>
<th>DF</th>
<th>SS</th>
<th>F Value</th>
<th>Pr&gt;F</th>
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</thead>
<tbody>
<tr>
<td>Back Area</td>
<td>1</td>
<td>386.4</td>
<td>5.94</td>
<td>0.015</td>
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<td>Community</td>
<td>3</td>
<td>485.6</td>
<td>24.88</td>
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<tr>
<td>Area*Comm</td>
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<td>8168.1</td>
<td>41.85</td>
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<table>
<thead>
<tr>
<th>Dependent Variable — Area of Back Yard as Weeds</th>
<th>DF</th>
<th>SS</th>
<th>F Value</th>
<th>Pr&gt;F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back Area</td>
<td>1</td>
<td>5.33</td>
<td>0.14</td>
<td>0.7</td>
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<tr>
<td>Community</td>
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<td>562.44</td>
<td>5.01</td>
<td>0.0024</td>
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<td>Area*Comm</td>
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<td>226.23</td>
<td>2.02</td>
<td>0.113</td>
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#3 Anova for back yard shade, fruit, ornamental and other trees

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<thead>
<tr>
<th>Dependent Variable — Back Shade Trees/square meter</th>
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<th>SS</th>
<th>F Value</th>
<th>Pr&gt;F</th>
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<tbody>
<tr>
<td>Community</td>
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<td>0.0041</td>
<td>10.31</td>
<td>0.0001</td>
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<table>
<thead>
<tr>
<th>Dependent Variable — Back Ornamental Trees/square meter</th>
<th>DF</th>
<th>SS</th>
<th>F Value</th>
<th>Pr&gt;F</th>
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<tbody>
<tr>
<td>Community</td>
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<td>0.0054</td>
<td>3.72</td>
<td>0.0126</td>
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</table>

<table>
<thead>
<tr>
<th>Dependent Variable — Back Fruit Trees/square meter</th>
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<th>Sum of Squ</th>
<th>F Value</th>
<th>Pr&gt;F</th>
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<tbody>
<tr>
<td>Source</td>
<td>3</td>
<td>0.74</td>
<td>14.69</td>
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<table>
<thead>
<tr>
<th>Dependent Variable — Other back vegetation/square meter</th>
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<th>SS</th>
<th>F Value</th>
<th>Pr&gt;F</th>
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<tbody>
<tr>
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<td>0.008</td>
<td>3.72</td>
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#4 Anova for maintenance levels

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<tbody>
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<td></td>
<td>DF</td>
<td>SS</td>
<td>F Value</td>
<td>Pr&gt;F</td>
</tr>
<tr>
<td>Community</td>
<td>3</td>
<td>21.47</td>
<td>27.62</td>
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</table>

#5 Contingency tables — respondents who would have or would add fruit, shade and ornamental trees

<table>
<thead>
<tr>
<th>shrub</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>British</td>
<td>16</td>
<td>34</td>
</tr>
<tr>
<td>Chinese</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td>Italian</td>
<td>8</td>
<td>42</td>
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<tr>
<td>Portuguese</td>
<td>5</td>
<td>45</td>
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</tbody>
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<table>
<thead>
<tr>
<th>fruit tree</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>British</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td>Chinese</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>Italian</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Portuguese</td>
<td>13</td>
<td>37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ornamental</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>British</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Chinese</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>Italian</td>
<td>8</td>
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<tr>
<td>Portuguese</td>
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<td>41</td>
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<table>
<thead>
<tr>
<th>Shade</th>
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<tbody>
<tr>
<td>British</td>
<td>16</td>
<td>34</td>
</tr>
<tr>
<td>Chinese</td>
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<td>Italian</td>
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<td>Portuguese</td>
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#6 Anova for residential photographs (all photographs)

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<td></td>
<td>DF</td>
<td>SS</td>
<td>F Value</td>
<td>Pr&gt;F</td>
</tr>
<tr>
<td>Community</td>
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<td>1.54</td>
<td>0.2</td>
<td>0.96</td>
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<tr>
<td>Photo</td>
<td>4</td>
<td>336.76</td>
<td>53.5</td>
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<tr>
<td>Comm*Photo</td>
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<td>127.07</td>
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#7 Anova for residential photographs (each photograph)

<table>
<thead>
<tr>
<th>Dependent Variable — Rank of Shrub Photo</th>
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<td>0.64</td>
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<td>Age*Community</td>
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<td>2.58</td>
<td>0.7</td>
<td>0.5544</td>
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</table>

<table>
<thead>
<tr>
<th>Dependent Variable — Rank of Trees Photo</th>
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<th></th>
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<tbody>
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<td>SS</td>
<td>F Value</td>
<td>Pr&gt;F</td>
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<td>Age</td>
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<td>11.5</td>
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<td>18.2</td>
<td>3</td>
<td>0.03</td>
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<tr>
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<td>19.2</td>
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#8 Anova for recreational photographs

### Dependent Variable — Rank of Grass Photo

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<th>Pr&gt;F</th>
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<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>0.23</td>
<td>0.16</td>
</tr>
<tr>
<td>Community</td>
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<td>5.82</td>
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<tr>
<td>Age*Comm</td>
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<td>1.5</td>
<td>0.41</td>
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### Dependent Variable — Rank of Brick Photo

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<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>24.2</td>
<td>18.02</td>
</tr>
<tr>
<td>Community</td>
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<td>42.5</td>
<td>10.53</td>
</tr>
<tr>
<td>Age*Comm</td>
<td>3</td>
<td>10.4</td>
<td>2.6</td>
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### #9 Contingency table for types of trees respondent would add

<table>
<thead>
<tr>
<th></th>
<th>British</th>
<th>Chinese</th>
<th>Italian</th>
<th>Portuguese</th>
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</thead>
<tbody>
<tr>
<td>none</td>
<td>1</td>
<td>22</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>shade</td>
<td>23</td>
<td>4</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>fruit</td>
<td>9</td>
<td>13</td>
<td>29</td>
<td>18</td>
</tr>
<tr>
<td>orn</td>
<td>4</td>
<td>11</td>
<td>7</td>
<td>19</td>
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