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PARKS FOR SAUDI ARABIA

by

Saeed Ahmed Al-Awais

A Thesis Submitted to the Faculty of the
SCHOOL OF RENEWABLE NATURAL RESOURCES
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF LANDSCAPE ARCHITECTURE
In the Graduate College
THE UNIVERSITY OF ARIZONA

1986
STATEMENT BY AUTHOR

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ACKNOWLEDGMENTS

In the Name of Allah, the
Most Gracious
Most Merciful

Praise be to Allah (the one and the only God),
The cherisher and sustainer of the worlds;
Most gracious, most merciful;
Master of the day of judgment.
Thee do we worship, and thine aid we seek.
Show us the straight way,
The way of those on whom
Thou hast bestowed thy grace,
Those whose (portion)
Is no wrath
And who go not astray

(The Translation of the Holy Qur’an, Sura 1)

I would like to express my thanks for every person--my parents, my wife, my advisors and my friends--who helped, shared, encouraged, and advised me while I was working on this thesis.
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ABSTRACT

Parks have become very important planning requirements, since they are the closest natural spots that people can go to escape from the routine and noise of modern life.

This thesis focuses on the different stages of park development in Saudi Arabia. The study starts with the Islamic principles that should impact and control park design in any Islamic community. A descriptive analysis of existing park conditions in Saudi Arabia was then given. A list of criticisms and mistakes in existing parks was given from the viewpoints of Islam, users, and professionals. Finally, the author suggests some important recommendations and practical guidelines for the different parties involved in park establishment. This conclusion was based on Islamic principles, existing errors, people's requirements and behaviors, and the latest available data regarding park design.
CHAPTER 1

INTRODUCTION

Parks have become one of the major elements in planning our modern societies. A park is a place which people visit to escape from the complexity of life to the simplicity of nature. Parks are defined as considerable areas of open space organized primarily by landscape means, for both active and passive recreational functions of the general public.

The purpose of this thesis is to shed light on Islamic principles which concern parks, and then analyze the existing conditions of selected parks. In order to solve a problem, it must first be well defined. So a definition of the mistakes of planners, designers, gardeners, and laborers will be followed with recommendations and guidelines which should be applied to enhance existing facilities.

The park concept is not new. In the past, people used private fruit gardens to serve the functions of active and passive recreation. In the Islamic world, this concept started because of many values and principles that Islam introduced to humanity. Muslims became very happy if any person used their own gardens. Nowadays, relations between
people have become weaker because they have forgotten about Islamic values. So a lot of gardens owners have closed their gardens and use them only for themselves, relatives and friends. This encouraged the establishment of parks to serve the general public. The growth of cities makes it difficult for people to own gardens within the city because of the high price of land and the horizontal expansion which occurs in the cities. Parks become essential elements for people, not only from the viewpoint that they are recreational agents, but also to increase the greening of the cities. Parks supply the environment with oxygen, and absorb large quantities of carbon dioxide through their plants. Parks also reduce high temperatures, encourage wildlife, and reduce noise through their plants.

Saudi Arabia is considered one of the fastest growing countries in the world. Since parks are one of the main components of the city, planners have decided to include them within urban areas. Unfortunately, because of the pace of city growth, park designs have not been successful to this point. In fact, park designs have not considered the needs of the people because they failed to observe religious and cultural principles of Islam (see Appendix A).

The reason behind the failure of parks to satisfy and attract Saudi people could be summarized by the following:
1. Park designers were not professionals in park design. For example, most existing parks were designed by civil or agricultural engineers. In some cases, the designers were draftsmen.

2. In some parks, the designers were professional firms, and they were park specialists who design parks all over the world. Their parks failed because of poor background experience and research into the people of Saudi Arabia: the parks were designed according to Western cultural requirements, which in some cases conflict with Islamic principles and standards.

These two factors are considered world-wide problems in park design. "The present atrophy of park design may be ascribed to two factors: a lack of conviction, and the employment of skilled horticulturists who are not necessarily also skilled designers" (Chadwick, 1966, p. 316). These are only two points among many possibilities related to bad planning, design and maintenance of parks.

The goals and objectives behind this thesis can be summarized as follows:

1. To define the meaning of the park from an Islamic perspective.

2. To study existing park conditions and define their positive and negative points.
3. To develop some guidelines for park planners and designers, and also to prepare some recommendations and suggestions concerning the development of parks.

Parks can be used as areas for relaxation, enjoyment, quietness, sports and pleasure. But in a country like Saudi Arabia, the park is also an oasis in the middle of a very hot, arid environment.
CHAPTER 2

PARKS AND ISLAMIC PRINCIPLES

Introduction

The development of the public gardens concept in Islamic societies is the result of the application of Islamic principles to the private garden. For example, after Islam the owner of a fruit garden will be more happy if people use his garden or take its fruit because of the strong brotherhood principle that Islam introduced. So these new principles, and their influence on garden design, are the subject of this chapter. The Holy Qur’an and the Prophet Mohammad’s teachings and practices (Sunnah), "Peace and blessings be upon him," are the major source of Islam on which this chapter relies. But before analyzing the relation between Islamic principles and the public garden concept, a description of gardens before Islam is essential.

Gardens Before Islam

The public garden concept developed from gardens of many different civilizations before Islam, such as Egyptian, Babylonian, Persian and Roman cultures. "For example, in the time of the Babylonian King Boktanassor, the famous
Babylonian hanging gardens were established. These gardens stood on a mountainside in different terraces. It became one of the seven wonders of the world" (Aldiri, 1980, p. 299).

The rectangular or square was the general shape of the old gardens (Lehrman, 1980). A high wall surrounded the garden and contained one or more gates, depending on the size of the garden. The wall protected the garden from various environmental factors, such as the hot summer wind in the hot regions. It also served as a boundary for the garden, and to keep animals out. The design of the garden followed the a style, and water played an important role in the garden. For example, many gardens were divided by water channels into four equal sections (Lehrman, 1980). In this point, many Western authors relate the four sections of the garden to Islam. But this proposal or theory does not exist in the Islamic belief. In fact, it might be, as Lehrman said, "the form of a garden is influenced by tradition and culture. Long before Islam, four elements were considered sacred: water, fire, air, and earth" (Lehrman, 1980, p. 61). The owners of the gardens were from the rich class, and access to them was limited to relatives and friends. Poor people had access to the gardens as workers, servants, or slaves. In some large-scale gardens, there was access to
the public but the design was based on the hierarchy of
different classes of people (Lehrman, 1980).

People used the garden mainly for recreation and
pleasure. Moreover, "royalty and rich people held their
dancing parties inside the gardens" (Keswick, 1980, p. 40).
On the other hand, this kind of mixed party was prohibited
by Islam. In fact, it can be seen that the concept of the
public garden was not a big issue in the old civilizations.
Most of the daily life was based on a hierarchy of
divisions. The communities were divided according to a
material scale. In brief, the concept of public gardens or
parks was practiced in a very limited way inside the private
garden because of the laws that governed these societies.

**Gardens of the Arabian Peninsula**

When Islam began to spread among the people, the
garden design and concept in the Arabian Peninsula were
similar to any garden of neighboring communities. But the
lack of construction materials, human skills and water in
the Arabian peninsula caused some differences and difficulties in garden design. In the Western part of the Arabian
peninsula, where the Prophet Mohammad began proclaiming
Islam, the garden was a private fruit farm with a water well
or spring inside it. *Haeat*, *bostan* and *hadikah* are
different Arabic words for fruit garden. Date palms,
pomegranates and grape vines were the major fruit plants
that thrived in the severe climatic condition of the Arabian peninsula. As in the other civilizations, the rich class owned the gardens and the poor people worked for them, either as laborers or slaves. Gardens were used as summer pleasure spots, when it became very hot inside the buildings.

The New Islamic Principles

After Islam spread, there were new teachings and values that had to be considered in order to satisfy the users in the Islamic world. Islam is the Arabic word for peace, purity and acceptance. Furthermore, Islam is Allah’s (God’s) last message for humankind, which was revealed to the Prophet Mohammad. Beside being a religion, Islam is a complete way of life which contains laws and answers for every matter in every place and time. So Islam came to establish love and respect between different people and nations. It brought justice, and gave people new behavior patterns upon which they could build their society. As Allah (God) says in the Holy Qur’an, which could be translated as:

O mankind! We created you from a single (pair) of a male and a female and made you into nations and tribes, that ye may know each other (not that ye may despise each other). Verily the most honoured of you in the sight of Allah is (he who is) the most righteous of you. And Allah has full knowledge and is well acquainted (with all things) (the Holy Qur’an, s. 49, 13).
So the degree of belief in Allah and practice of Islam became the new scale of measure for people instead of the materially hierarchical scale. In fact, Islam changed most of the old ideas about life and the creations around mankind. Life after death became the goal of the Muslim. The garden is one aspect of life which was influenced by new Islamic principles at that time. Following is a set of behaviors and principles that influenced garden design and encouraged the development of public garden concepts--parks--from the private garden.

Brotherhood

From those feelings of love between the different parts of society that Islam brought, the public garden concept developed. The owners of private gardens were more happy if other people passed through their gardens. Moreover, they encouraged poor people to use their gardens: to relax in the shade, to eat from the fruits, and to drink from the water, which will increase their reward in the hereafter. The Prophet Mohammed said what can be translated as: "None of you (truly) believes until he wishes for his brother what he wishes for himself." (Annawawi, 1978, p. 56).

In fact, it becomes alright for anybody to enter the garden even if the owner is not at home. Also, many of the prophet's sayings (hadith) or practices insure this fact.
The Prophet Mohammad said what could be translated as, "Whoever enters a garden (haeat), he can eat from the fruit of the garden but not to carry away" (Altirmidhi, 1937, p. 583). Another hadith concerning entering others' gardens is the one reported in Albukhari, which could be translated as "Allah's apostle and one of his companions entered upon an Ansari man while he was watering his garden. And the prophet said 'If you have water kept overnight in a waterskin give us..." (Albukhari, 1973, Vol. VII, p. 356). Also, Albukhari reported "Narrated Abu Musa: The Prophet, peace and blessing upon him, entered a garden and ordered me to guard its gate. A man came and asked the permission to enter. The Prophet said, 'Admit him and give him the glad tidings of entering paradise..." (Albukhari, 1973, Vol. V, p. 31). The point that is shown here is that the Prophet entered a garden and the owner was not on the site, which made it legal for Muslims to use the garden. So it is clear how this new behavior affected the development of public parks from the private garden.

Endowment

From the viewpoint of brotherhood and charity, the Muslims started leaving their gardens to the general use of other Muslims as a public trust (wa'quf). This meant that they no longer owned the gardens, and they remained as endowments forever. Albukhary reported:
Narrated Ibn Abbas: A man said to Allah's apostle, "My mother died. Will it benefit her if I give in charity on her behalf?" The Prophet replied in the affirmative. The man said "I have a garden and I make you a witness that I decided to give it in charity on her behalf" (Albukhri, 1978, Vol. VI, p. 26).

Also Albukhary reported:

Narrated Anas bin Malik, Abu Talha had the greatest wealth of date-palms amongst the Ansar in Medina, and he prized above all his wealth (his garden) Bairuha, which was situated opposite the Mosque (of the Prophet). The Prophet used to enter it and drink from its fresh water. When the following Divine Verse came: 'You will not attain piety until You spend of what you love,' (3:92). Abu Talha got up saying, 'O Allah's Apostle! Allah says, 'You will not attain piety until you spend of what you love,' and I prize above all my wealth, Bairuha which I want to give in charity for Allah's Sake, hoping for its reward from Allah. So you can use it as Allah directs you.' On that the Prophet said, 'Bravo! It is profitable (or perishable) property.

So, the private gardens began to serve the function of public recreational areas because of this new Islamic principle.

Thinking About Allah's (God's) Creations

Islam encourages Muslims to always look around them and think about the different creations of God which will lead them to appreciate the greatness of the Creator. In the hadith it was reported that one hour of looking and thinking about Allah's creations is better than praying all night. The garden is one place where the Muslim can find a quiet environment for this faith. It is the place where a person can recognize the greatness of Allah when he watches
the growth of different plants from very small seeds. It is the place of different tree colors, fruits, fragrances, habits and sizes, although they are all planted in the same soil and irrigated by the same water. In the Holy Qur'an Allah says what could be translated as:

It is He who sends down rain from the sky; from it ye drink and out of it (grows) the vegetation on which ye feed your cattle. With it He produces for you corn, olives, date-palms, grapes and every kind of fruit: verily in this is a sign for those who give thought (The Holy Qur'an, S. 16, 10-11).

Also, because of the quietness that gardens provide, "the Prophet Mohammed liked to pray inside the gardens" (Altirmidhi, 1937, Vol. 11, p. 155).

Thus, the new view of life encouraged Muslims to design and arrange the garden in a very beautiful, sensitive method using different elements in order to remember Allah all the time as the one and only God. And good-quality work is a desirable issue in Islam; the Prophet said that Allah likes when somebody involves or does any work to do it accurately.

Planting Benefits

Since good actions and works were considered part of the faith in Islam, planting became a very important issue. For example, there is a hadith in which the Prophet Mohammad says "If any Muslim plants any plant and a human being or an animal eats of it, he will be rewarded as if he had given
that much in charity" (Albukhari, 1973, Vol. VIII, p. 26). Also, providing shade for people to sit in is considered a charity in Islam for the person who plants trees or maintains them for the purpose of shade. In another teaching, the Prophet mentioned that if a Muslim was working to plant a plant, and the day of judgment starts, it will be better for this person to plant it if he could do so. Since pleasing others is of great importance in Islam, so planting for others to enjoy and share fruit, shade, color or fragrance is worth more than the cost of planting. This theory was understood by Muslims, and it encouraged the idea of planting for the benefit of the community.

Planting Rules

Islam issued some rules and recommendations to regulate planting. One of these rules prevents indiscriminate cutting of any plant in any place without having a logical reason. Planting any plant that will cause problems for others is another concern in Islam. For example, growing a plant that will narrow or close the public path is not acceptable in Islam. Also, planting a thorny plant near a public way is discouraged since it might injure other people. On the other hand, there are some recommended plants to grow in Islamic gardens because of their great benefits, such as the palm tree. In the Holy Qur'an Allah says what could be translated as:
And we send down water from the sky according to (due) measure, and we cause it to soak in the soil; and we certainly are able to drain it off (with ease). With it we grow for you gardens of date-palms and vines: in them have ye abundant fruits: and of them ye eat (and have enjoyment" (The Holy Qur'\'an, S. 23, pp. 18-19).

Also, regarding the date palm, one of the Prophet Mohammad's companions reported, "While we were sitting with the Prophet a spadix of palm tree was brought in to him. The Prophet said 'There is a tree among the trees which is as blessed as a Muslim.' Then he continued 'It is the date palm tree" (Albukhari, 1973, Vol. VII, p. 259). So Islam added or enhanced the concept of edible landscape which will provide food for the community, besides the other landscaping and environmental benefits of the plants. For example, Muslims transplanted the date palm to Spain when they ruled it. As a result, it is clear that these rules influenced the landscaping of the garden by what and where to plant, in order to achieve a design that would meet public needs and requirements.

Privacy

The privacy concept became a major design requirement in the gardens after Islam. Both males and females had to limit their actions and movements when they are outside the house. In many areas, the principle of privacy affected and divided the use of the gardens. In some gardens there are two sections: one for males, and the
other for females. In another garden, division is based on time. It might be division by hours or days, depending on the feature of the site such as a water well, natural spring, or swimming pool. Also, the importance of the wall which surrounds the garden increased after Islam invented this principle. In brief, privacy added a new consideration to garden design.

Economic Factors

From an economic standpoint, Islam prevents the wasting of money or energy. Accordingly, the design of public garden had to insure simplicity and low construction and maintenance costs. As a matter of fact, the Alhambra’s gardens in Granada, Spain were considered a very great and beautiful achievement of Islamic architecture. But they were unlawful projects to build in Islam because they wasted money from the public treasury and the efforts of the Muslims. Also, the ruler did not have the right to make use of public water in his gardens before releasing it to the general public. Another criticism is the introduction of animal statues, which are forbidden in Islam. These gardens existed as a cultural and scientific achievement, but how they were built will remain an example of waste. Of the issue of waste, Allah says what could be translated as:
It is he who produceth gardens, with trellises and
without, and dates, and tilth with produce of all
kinds, and olives and pomegranates, similar (in
kind) and different (in variety): eat of their
fruit in their season, but render the dues that are
proper on the day that the harvest is gathered. But
waste not by excess for Allah (God) loveth not the
wasters (The Holy Qur’an, S. 6, p. 141).

Plant selection must also be based upon this principle.
Accordingly, the plants that are available in rainy areas
cannot be used in arid regions if they will consume a lot of
water. In brief, the feasibility of any project became a
very important task in Islam. Also, how the project
affected the public, and how much benefits it offered were
also important. The Prophet Mohammad says what could be
translated as "There should be neither harming nor reciproc­
cating harm" (Annawawi, 1978, p. 107). This principle
became the guide for any proposed project after Islam.

The Way of Sitting

Facing each other, while sitting in any place, is a
behavior which Islam encourages. In the Holy Qur’an Allah
says, describing the believer’s condition in heaven, what
could be translated as:

The righteous (will be) amid gardens, and fountains
(of clear-flowing water). Their greeting (will be):
Enter ye here in peace and security. And we shall
remove from their hearts any lurking sense of
injury: (they will be) brothers (joyfully) facing
each other on thrones (of dignity) (The Holy Qur’an,
S. 15, pp. 45-47).
Indeed, Muslims became eager to practice this way of sitting because it was mentioned in the Holy Qur'an as the best way of sitting. In fact, this way is the only way that signalled respect for other people.

Recreation Limits

Recreation is desirable in Islam as long as it does not divert the Muslim from fulfilling his duties toward Allah. There is an Islamic teaching that says: "Teach your boys shooting, swimming and riding horses." The concept behind this is to motivate Muslims to practice any kind of sport that helps keep the body strong and healthy. Also the game must not conflict with any Islamic teaching. Thus, gardens became an important place for practicing many sports and recreational games. The Prophet Mohammad encouraged Muslims to recreate themselves. Also, picnicking in the gardens was appreciated by Muslims because it would give them a chance to renew their energies and socialize with each other; this will strengthen relations between members or the society.

Rules of Behavior in Public Areas

For the benefit of the public, Islam issued some rules to regulate the use of public space. Regarding this matter, the Prophet Mohammad said what could be translated as "Beware of sitting on the road" and the Prophet's...
companions said, "O Allah's apostle! We can't help sitting on the roads where we have talk." The Prophet said, "If you refuse, but to sit, then pay the road its right." They asked "What is the right of the road, O Allah's apostle?" He said "Lowering your gaze, not harming others, returning greetings and enjoining what is good and forbidding what is evil" (Albukhri, 1973, Vol. 8, p. 163). This teaching is one of the major principles for public areas such as parks. Another major principle is mentioned when the Prophet said "There should be neither harming nor reciprocating harm" (Annawawy, 1978, p. 107). This hadith also declared that private freedom ends in front of public rights. In short, it is clear that the recreation concept was maintained in the Islamic garden according to definite rules and teachings that gave the public space its real value.

**Garden's New Function**

Finally, the Islamic gardens started serving new functions different from the singing, dancing, and pleasure purposes because of the new behaviors that Islam introduced. These behaviors played a very important role in developing the public garden concept inside the private garden, both in direct and indirect ways.
The Islamic Influence on Other Cultures

From Madinah, the Prophet's city, Islam spread until it reached China in the Far East and Spain in the west. Accordingly, as part of these societies changed to Islam, the garden's designs and functions were naturally directed toward Islamic values (Merklinger, 1981). For example, the man-made statues and carvings of humans and animals disappeared from the gardens of all cultures after the spread of Islam. Also in China the holy concept of directing streets, houses and gardens toward the south became no longer the controlling design criteria after Islam (Boyd, 1962).

As a result, a unique garden concept in the Islamic world existed because of the marriage of the different cultures under the Islamic teaching and values. But differences in the design occurred according to the region's climate, geography, and traditions which did not conflict with Islam.

Conclusion

This chapter is a description of the new behaviors, rules and social values that helped to develop the concept of the park inside the private gardens of the Islamic world. The results of these Islamic teachings can be summarized as follows:
1. Increased social relations between the people.
2. Introduction of competition in doing good works among the people.
3. Encouraged Muslims to think of the greatness of Allah (God) through his creations.
4. Declared benefits of planting.
5. Establishing of rules and suggestions concerning planting and plants.
6. Introduced the privacy concept.
7. Made economic recommendations.
8. Recommended a new way of sitting.
10. Provided rules for public areas.

In fact, the behaviors of any society are the controlling factors in the design of any public project. Thus, failure to apply these principles in park design is a signal of an unsuccessful project. This chapter has presented the underlying principles behind successful park design for any Islamic community where the reality and purity of Islam are practiced.
CHAPTER 3

THE EXISTING CONDITIONS

Case Study

Dammam is the major city in the eastern province of Saudi Arabia and the largest port on the western side of the Arabian Gulf. It is located at longitude 50°06' E and between latitude 26°06' N and 26°30' N (see Figures 3-1 and 3-2). Dammam metropolitan area is a low-lying coastal plain with a wide tidal zone that slopes gently from inland towards the gulf. Dammam sits on aeolian sand and sabkhas (salt flats) area. Ground water is found within a meter of the surface, but only within 200-300 meters of the coastline. The seawater content appears to be significant.

The climate of Dammam is generally hot in the summer and mild during the rest of the year. The hot period begins in May, and reaches a peak of about 45°C in July and August. The coldest months are January and February, with a minimum temperature of about 10°C (see Figure 3-3). Rainfall in Dammam is very slight and extremely irregular. The period from June to October is completely dry, while rain occurs during the rest of the year in irregular patterns. The average annual rainfall in Dammam is approximately 73 mm.
Figure 3.1. Map of the Arabian Gulf region.
Figure 3.2. Map of Dammam city.
Number of Rainy Days, 1966-1974*

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<td>18</td>
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</table>

Humidity in Dammam is relatively high due to the large surface of open water of the Arabian Gulf. Relative humidity ranges from 53% to 96% in January and from 15% to 75% in July (see Figure 3-4). During summer, humidity is uncomfortable because of the hot weather.

The prevailing winds in Dammam are north and northwest, between 290° and 360°. High-velocity winds occur, especially during late spring and early summer and cause the dust storm called "Al-Shammal" (see Figure 3-5).

Number of Days with Duststorms*

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<td>5</td>
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</table>

The population of Dammam exceeds 200,000. Dammam is different than other cities in Saudi Arabia: the distribution of population in Dammam indicates relative percentages of people from the various provinces of Saudi Arabia. Also, as a business and trade center Dammam has residents from almost every part of the world. In fact, the different Saudi backgrounds and world nationalities of the residents

* Dammam Master Plan.
Figure 3.3. Monthly average temperature in Dammam.

Figure 3.4. Monthly average humidity in Dammam.
Figure 3.5. Wind rose of Dammam.
of Dammam make it the best case study for many future projects or plans in the Kingdom.

Walk Through the Existing Parks

In order to present a general description of the existing parks in Dammam, a short discussion of local park history is necessary. The first park to open its doors to the public was King Saud Park, in the downtown area. It was opened in the 1950s (see Figure 3-6). Ibn Khildon park in Maddeinat Al-Ommal section became the second park to open for public use. During the 1970s more parks were opened, but these were built according to the same design as King Saudi Park (see Figure 3-7). Plants and maintenance developments are also the same throughout all the parks. For example, in the late 1970s, circular marble water fountains were built at the center of the most of the parks. Also, in 1981, plastic seating was distributed throughout all the parks in Dammam. Thus, for a new visitor, it would be difficult to distinguish between the different parks without reading the name of the park. In the 1980s the design of parks and the construction materials used were changed, but the concept of construction and maintenance stayed as before (see Figures 3-8, 3-9 and 3-10).

The following paragraph is a description or a general perspective view of the existing parks in the Dammam area. But it more or less represents the condition of most
Fig. 3.6. King Saud Park was the first park to be open to the public in Dammam.
Figure 3.7. Alandalus Park in Dammam is another copy of King Saud Park.
Figure 3.8. A new park in Dammam; although the design was developed, the concept did not change.
Figure 3.9. Another new park designed according to the same concept.
Figure 3.10. In this park the designer introduced a better concept and design than those of the old approaches.
of the parks in Saudi Arabia. In fact, this case of unity in design, construction, and maintenance is a reflection of the unity in the design and administration sources. But there are exceptions in some parks because of natural variations such as site features, climate, or geographical locations.

The rectangular design is the general shape of most parks in Dammam. From the outside, the parks are usually surrounded with a steel or aluminum railing supported by a short concrete wall (see Figure 3-11). This railing is to control foot traffic, enabling the park to be closed at certain hours, and to prevent animals from entering. Normally there are four gates, but there could be more or less depending on the shape and need of the park. On every gate there is a lighted plastic sign stating the name of the park. In general the design of the park follows a formal system; two major linear paths divide the park into four equal sections. In some parks, minor paths run through every section (see Figure 3-7). Cement-colored concrete tiles are the common paving material (see Figure 3-12). At the intersection of the two major paths, there is an approximately 5-meter-in-diameter circular marble water fountain. This fountain acts as the focal point of the park (see Figure 3-13). For night lighting, there are rows of mercury lamps. The children's playground is contained in one
Fig. 3.11. Fencing the parks is a common practice in Saudi Arabia.

Fig. 3.12. Ordinary street tiles are used inside the parks.
Fig. 3.13. This fountain was introduced in five parks in Damman City alone; however, because of the salinity problem, they broke down in a few months.
section of the park. Metallic swings, slides, teeter-totters and turning discs are the common games of the children's playground (see Figure 3-14). Restrooms are located at any side of the park. Near one of the four exits there is a smaller service area for storing sand, fertilizer and maintenance tools. In some parks, there are small nurseries to serve parks and urban forestry. Alongside the walkways there are shaped hedges to control foot traffic and provide privacy for the Bermuda grass lawns. Bedding plants, such as vinca, also grow alongside the walkways. They are planted in geometric forms which are scattered throughout the lawn areas (see Figure 3-15). Shrubs such as Nerium oleander, Lantana camara, and Clerodendron inerme are quite common. Different trees such as eucalyptus, mesquite, ficus, tamarisk, casuarina and palm species are commonly scattered throughout the park. White concrete benches, colored plastic seats or colored wooden benches are found in almost any place in the park (see Figure 3-16).

In summary, the park exists according to the personal efforts and thought of the different personalities involved. These people did their utmost to provide the community with green spots. Now a functional analysis study according to the latest landscaping techniques and theories and cultural requirements should take place. It should
Fig. 3.14. A common children's playground in any city park.

Fig. 3.15. Bedding plants grow in geometric beds.
Fig. 3.16. Benches in one of the newest parks. -- Notice the different colors of benches.
evaluate the existing experience and provide the guidelines for future park development (see Appendix B).

Survey

A social or behavioral survey is very important in the evaluation stage of a public area. It is the key to better design in the future. So a functional survey of what, when, where, who, and how the users are behaving inside the park can provide the designer with valuable information. Then, with some reflection, a better approach to the problem can be reached.

To conduct this survey inside parks in Saudi Arabia, four parks were chosen as case studies. They are: (1) King Saud Park in Dammam (downtown area), (2) Ibn Khildon Park (located next to governmental agencies), (3) Rawdah Park (surrounded with residential units), and (4) Alandalus Park (on a major traffic intersection).

In general, most of the people use the parks between 3:30 p.m. and 10:30 p.m., depending upon weather conditions, holidays, and special occasions. In the morning, there are usually no users during the summer season. In winter, there are few users; most of the users are children or teenagers. The only exception to these times occurs in King Saud Park, where shoppers and workers use the park throughout the day.

Park visitors can be divided into four categories: families, single males, women, and teenagers. The family
usually consists of father, mother, daughters and young children. In fact, the older sons do not usually participate with the family in the park. If there is more than one family coming together, then the males have to sit away from the females. Some males also come to the park, individually or as a group. Females who come to the park in groups mainly live within short walking distance from the park. Female visitors consist of neighborhood mothers with their daughters and young children. Teenagers are the boys, who come with their families, mothers, or alone.

Most of the families or groups bring small carpets for seating. Hot tea, Arabian coffee, or refreshments can be noticed in the hands of most of the users.

Families or female groups always choose the hidden spots, protected areas, or locations far from the public, especially from the areas that single males frequently visit. So it is normal practice to notice that families or female groups sit by a hedge or shrubs which will offer them some kind of privacy. Single and young males spend most of their time walking through the park. In fact, at the time of final exams many male students use the park until midnight for studying. Reading while walking is a common practice for Middle Eastern students. Teenagers always ride their bicycles through the parks' walkways.
In general there are two kinds of recreation: active and passive. But from the survey, it is clear that the existing parks are built to meet only part of the passive recreational needs.

The maximum number of visitors in all the parks where records are kept occurs on Friday afternoon. Thursday comes after Friday in terms of number of visitors. At night, the number of females increases. On the other hand, the number of males and children (teenagers) drops off. This phenomenon occurs for two reasons. First, the lack of good privacy during the day, while the darkness of night can ensure privacy for families and females. Second, the children (teenagers) who come by themselves during the day, do not come at night.

In summary, the public is the real client of the parks. Their behavior and actions while in the parks are the functional indications to the designers of public needs. So the landscape architect should consider in the survey every small action the users are doing or participating in while in the park.
Total users of the four parks on different days. Notice that Alrawdah Park is the first park in terms of night users. This is because of the good lighting and a suitable location. Alandalus park is not doing well because it is bordered by two major roads within a different use area. For Ibn Khildon Park, there is no acceptable ratio between Friday users and use at other times. In fact, this means that many of the Friday users come from relatively far distances to visit the park.
Figure 3.18. Ibn Khildon Park. -- This park has the highest number of visitors because of its size and the abundance of shaded areas. More females visited on the weekday nights than during the day. This relates to the privacy factor. Also the number of boys and children drops off at night because the non-adult accompanied boys and children stay at home. The location and bad lighting discourages night visitors in general (see Rawdah Park night visitors graph).
Figure 3.19. King Saud Park. -- Because of the location, males are almost the only users. Few boys and children, mostly accompanied by their fathers, visit the park. Generally there are no females using the park. On some nights a very limited number of non-Saudi females use the park. Friday afternoon has the maximum number of users because it is the only weekend for many laborers. So many of them come to do their shopping in Dammam from outlying areas.
Figure 3-20. Alandalus Park. — Unlike the other parks, Alandalus Park has a great gap between the number of male and female visitors. This is due to the location of the park. At night the number of females increases to match the number of males. This means that they come together (i.e., as families).
It can be noticed that Friday afternoon brings the maximum number of visitors just as in the other parks. But in terms of night visitors Rawdah Park has more than all the other parks. This fact can be related to the good lighting and good location. In fact, the park is surrounded by its visitors, which makes it easier for them to come. The number of boys and children increases at night for the same reason. Also, the number of female visitors is at all times higher than the number of males.
Table 3.1. Evaluation of parks according to Islamic principles.

<table>
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<th>Islamic Principles</th>
<th>Ibn-Khildon</th>
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Excellent = 3  
Good = 2  
Fair = 1  
Poor = 0
Table 3.2. Evaluation of parks according to design principles.

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Excellent = 3
Good = 2
Fair = 1
Poor = 0
CHAPTER 4

POINTS OF CRITICISM

Designing for the general public is usually a difficult goal to fulfill. It becomes easier to meet public requirements in a certain project when there is prior experience. For a park designer, it is not a big problem to design a park according to hypothetical data that is provided. But how this park will actually work and be evaluated by the public is another important matter. On the other hand, if a park designer finds an existing park which was built according to the same requirements as the proposed park, then the new product should be better in terms of public satisfaction. It is proposed that the park designer study the advantages and disadvantages of the old park. Also, the designer should try to make use of public reaction and survey data. Then, with some thought, more acceptable results can be assured. But even so, there will be no guarantee of satisfying all people. As a matter of fact, every subsequent experience must make use of previous ones, and so on, until the maximum number of people can be satisfied. In critiquing the existing parks, a certain order will be followed to insure the evaluation of all steps.
and points. This order consists of planning, design, construction, planting, maintenance and administration stages of evaluation.

**Planning Stage**

The distribution of parks in the various communities of Dammam is the responsibility of the Land Planning Department of Dammam City. For example, if a land owner wants to develop his land, he must submit a number of documents pertaining to his land to the Planning Department. Then the department handles the final plans, which delineate the lot's boundaries, roads and public facilities. These facilities include room for some or all of the following: a mosque, shops, a park, schools, and public utilities. So the decision to include a park is in the hands of city planners. Yet, there are no standards for the planners to help them determine the need for a park in a certain neighborhood. It becomes a planner's decision, utilizing hypothetical assumptions, and the way that the master plan will fit together in order to introduce a park in the new neighborhood. In fact, this kind of planning and determination of park needs creates many problems for the communities.

Looking at the existing location of parks in Dammam City can illustrate the results of bad planning situations: Ibn Khildon Park is bounded by two major highways, from the
north and the west (see Figure 4-1). From the east there is the Technical Training School, and on the south there is a small neighborhood street. Furthermore, the park is surrounded by different governmental buildings such as the Traffic Police Building. The questions of how easy and safe it is to reach the park has a very disappointing answer, and it will remain the planner's responsibility. Also, the fact that most of the park's visitors arrive at the park by car means that either the park is placed far away from the actual users, it is unsafe to walk to the park, or the users' requirements are not met in another park. The distances from the parks to the mosques are not within walking distance. In other words, the relation between mosque and park was not considered during the planning stage.

The definition of the park users is not clearly stated. In many areas or zones, parks were established because there were vacancies for them in certain parts of the city. But orientation for prospective users or even whether or not there was a need for a park was not considered. For example, King Saud Park has become the recreational spot for non-Saudi male workers who live or shop in the downtown area of Dammam. As a result, families who live in the area cannot use the park any more because of the privacy principle (see Figure 4-2). Therefore, the
Fig. 4.2. Visitor numbers in King Saud Park.
location of the park should be very close to its actual users. For instance, because Rawdah Park is located inside the neighborhood, most of the users walk to the park. Unlike Ibn Khildon Park, where there are usually about 80 visitors' cars around the park, Rawdah park has normally 10 visitors' cars around it.

Planning is a very important stage in the park life. A successful park approach is a result of much research and many functional studies. Failing to define the park users and to analyze their requirements and values leads to establishing the wrong project for the wrong users.

**Design Stage**

Method of Design

Most, if not all, parks in Saudi Arabia follow the classical or architectonic design methods whereby the park is divided into regular geometric shapes. Walkways run in straight lines through the park as if they ran through a military base. For a person walking inside the park, the feeling that he is being forced through the park's walkway network to reach a certain point inside the park is an expected issue. Also, to work with a classical design, great thinking and imagination are needed to correlate the design with the geomorphic nature. For example, if we proposed the existence of a rectangular natural lake and a natural shape man-made lake, then by common sense, most
people would prefer the man-made lake as a place to spend a holiday. In fact, natural instinct will guide the human to choose the shape that he is more familiar with. Other than that, people escape from the life of buildings and streets to the parks, looking for a few hours in a beautiful, natural setting.

Privacy

The behavior of people inside the park reflects their needs. For example, there are many benches in every park, but most of them stay empty all the time. As a matter of fact, people feel more relaxed when they sit on the ground, because of their cultural background and the privacy aspect. Privacy is considered to be a major important principle for the Muslim family, especially while the family is outside their home. But unfortunately, the design of the parks does not correspond well with this requirement. So most of the families sit next to hedges and shrubs that can shield them from other people's eyes.

Services

The definition of park according to Christiansen is "a recreational service agency principally provides recreational experience and support services to its clientele" (Christiansen, 1977, p. 3). So a park without supporting services that meet the users' requirements will not be a
good place to visit. Plants are only one element in the park, and supporting services is the element which gives the plants their real value. In addition, if there is a very beautiful natural area but there is no reasonable access to it, then this natural resource will not be a valuable spot to the people. In Dammam's parks there is almost a shortage of all services. Some of the services that are ignored by the designers are mosques or prayer areas, picnic areas, and sports facilities.

In brief, by ignoring the useful and valuable services, many of the people choose to spend their weekend in other areas where they might find better services. So providing services means attracting people to parks as recreational areas.

Materials

One of the major purposes of the existence of parks is to remove people from the noisy industrial city to the quiet natural life. To achieve this goal there must be a contrast between the construction materials used and the plants that are planted in each site. But the existing condition exhibits exactly the opposite. For example, all the walkways are paved with concrete tiles. These are the same tiles which are used for walkway pavement on the sidewalks of city streets. So for a person who enters the park, there is no hierarchy in pavement construction
materials that allows the visitor to distinguish between the two different environments (outside and inside the park). Another example is the benches, which have strikingly different colors such as red, orange, blue, yellow, and green. Illumination is also a major defect affecting the natural aspect of the space. Mercury lights are used all over the park to the extent that the park becomes like a parking lot due to the intense lighting and the number of lamps.

In summary, choosing suitable construction materials is the key for a successful park project. The materials should not conflict with the textures or colors of nature.

Construction

Due to the lack of clear, realistic working drawings and construction documents for the park, the construction stage is left up to the discretion of the contractor and the municipality inspector. Also, availability of materials within easy reach for the contractor without waiting or ordering from another city or country may affect the design. Unskilled laborers on landscape construction projects often leads to major defects in the construction. As a matter of fact, many contractors do not pay any attention to the abilities and skills of their laborers because they are only interested in cheap labor. For example, Abdullah Fuad Park in Dammam is built over ground which is polluted with oil. Before the park was established, oil was spread over the
sand to prevent dust. When the contractor started building the park, he removed only a few centimeters of the top soil and covered the rest with approximately 10 cm of clean, sandy soil. At this time, the park is still under construction, but the possibility that plants will not survive, may contract diseases, or at least experience stunted growth and cost more to maintain, is expected. Another construction problem is that many elements are fixed in the park without considering the rough usage of the public. For instance, many benches fail or break within the first weeks of opening. Also, in many parks there are many benches which are misplaced by construction workers or staff. A lot of these benches are located next to trees, but they do not receive shade when they should.

In brief, the construction stage is very important, and the absence of professional working drawings and construction documents is the main culprit in bad construction.

Plants and Planting

Because plants are the main component of park layout, they should be chosen, organized and planted with very intensive care. Success in this stage means a better park, with lower maintenance costs throughout the life of the park. However, the existing situation reflects the opposite. In most parks, the plants selected do not fulfill the objectives behind their existence. In spite of the fact
that providing shade is considered one of the major goals of the plants, palms or vertical trees are used to fulfill this objective.

Appearance is also important in terms of selecting the plants. But most of the commonly used trees such as eucalyptus and casuarina are not accent or handsome plants.

Contrast between the different species from the viewpoint of form, color, seasonal changes, leaves, or living properties is also missing in the existing parks. For example, in many locations there is a mixture of palms, eucalyptus, ficus, and tamarisk species. However, each species has different properties, so an unattractive, hazy spot occurs in the parks, where the visitors do not experience the unity and the sensitivity of nature. The distribution of flowering plants and other bedding plants in every part of the park disturbs the beauty of any open green area and breaks down its continuity.

From the viewpoint of irrigation, the flood system is the common method in Saudi Arabia. But for desert conditions, with a shortage of water, it is considered the worst method. That is because much of the water evaporates and salt accumulates in the ground. Flood systems waste water, and water is very expensive. In fact, the timing for watering is not very practical either. It is usually done
during the hot hours of the day, which aggravates the evaporation problem.

As a result, working with plants is not a simple decision of a gardener; it involves study, imagination and expectations of the plants' future before planting.

**Maintenance**

Maintenance for public-oriented projects means looking for problems before they occur. It is always recommended to solve problems as soon as possible for two reasons. The first is that the park administration should not give the users time to see the damage: this might encourage some to be careless in protecting the park and using the facilities. The second reason has to do with attracting people to the park. Despite these two reasons, the actual picture of the existing parks shows no response in terms of maintenance. In fact, a lot of money and effort are invested for the first few months, and thereafter the park suffers a slow death. The attitude of ignoring problems affects benches, railings, walkways, pavements, fountains, playgrounds, light fixtures, and plants.

**Administration**

The administration of the park is the "middleman" between municipalities and users. It is the body which controls the park and translates its message to the public.
Motivating the people to share the usual and occasional activities that the park provides is one of the administration's duties. But the existing condition shows that the administration's role has been relegated to occasional maintenance. Other than that, it is not apparent.
CHAPTER 5

PARKS AND THE FUTURE

Since parks are considered very important public facilities, just like schools and hospitals, the need for ideal park solutions is essential. The argument about the importance of the park for modern societies is no longer valid. From past experience all over the world it has become clear that the demand for parks is increasing. Actually, as the contemporary world produces a new technology for modern life, the need for natural spots becomes greater. For instance, in the nineteenth century, the people of England found themselves living with the garbage of the Industrial Revolution. In fact, the beauty and simplicity of their cities were distorted by the chimneys of the modern factories. Because of that, people "fled with their families and belongings to the countryside. There they asked the designers to plan their communities in an associated with nature method" (Rutledge, 1971, p. 12). They wanted to live away from city noise, pollution, streets, and buildings. Ironically, the countryside is changing these days toward the modern life style in Saudi Arabia. So the necessity for parks within the city borders
to provide a natural shelter from the stress and dis-ease of contemporary life becomes very important. "The measure of any great civilization, according to John Ruskin, is its cities; and the measure of a city's greatness is to be found in the quality of its public spaces—its parks and squares" (French, 1973, p. 4). As a matter of fact, the design of outdoor space should reflect the behaviors of the people using that space. So it is clear that the park should be designed according to the user's needs and beliefs. But in order to accommodate the best park design, a serious study of people should be considered. In his book, Urban Green, French suggested a list of people who should engage in park decision: "landscape architect, civil engineer, elementary school teacher, naturalist, planner, architect, psychologist, public service official, religious official, high school coach, local businessman, mother (with young children)" (French, 1973, p. 56). In fact, it is clear that a successful park approach is the result of coordinating the users' needs and site features by the different professionals involved.

This chapter will state some points and suggestions concerning the different stages of park life. It will mainly give a better alternative solution against the points of criticism which appeared in the previous chapter. It will also shed light on Islamic principles that are stated
in Chapter 2, from the viewpoint of how to handle them as user requirements in contemporary parks. This chapter will also follow the same organization as the previous chapter in terms of discussing the various stages of park life.

Planning Stage

The practical step in collecting data about any proposed development leads always to a better solution. In park planning, it is always recommended to accumulate the necessary data related to site history, existing conditions, and proposed future development and use. As Cluston said in his paper "The Role of the Landscape Architect in the Middle East," "we must try to avoid as much as possible untried technology, but spend time in acquiring a deep understanding of the climate, soils, plants, local materials, water management, local craft and management skills and above all, of the people" (Landscape Design for the Middle East, 1978, p. 13).

Park Locations and Demand

Park locations should not remain the personal opinions or thoughts of planners. Parks must be distributed throughout the city according to their present and future demand. For instance, it is not advisable to suggest a park in an area which is expected to lose residents in the near future for economic, social, or other reasons. In fact,
demand for a certain area can be determined in association with many regional planning factors. Parks, like any public service agency, should be located on the city master plan during the regional planning stage. Some of the factors that affect the distribution of parks can be summarized in the following list:

1. People's intention and understanding of the park concept; social behaviors.
2. Size of the city's different neighborhoods; population and area.
3. Relation to other existing and proposed parks.
4. Relation to other public facilities such as mosques and schools.
5. Access to the park; distance and safety.
6. Proposed users and activities; age and sex.

Because the demand decision has a very strong relationship to users, the classification and identification of users must be stated as a first step. As was discussed earlier in the survey section, the parks' users can be divided into four categories:

1. Family: fathers, mothers, daughters, and children.
2. Single males.
3. Females: mothers, daughters, and children.
4. Boys (teenagers).
Both groups one and three are listed under passive recreation; groups two and four are listed under active recreational demand. Perhaps young fathers can join the single's category for the active part of their visit. For example, in the Half Moon Bay in Saudi Arabia, there are usually many families who come together. Then the adult males separate from their families and sit alone. Older adults spend their time socializing with each other, watching others, walking and swimming. Younger adults like to socialize and participate in soccer, volleyball, swimming, fishing, and off-road driving. Females like to stay calm, socializing with each other, watching, and walking around. As a result, when there are many families who come together, then the family category will break down to the second, third, and fourth categories.

In order to satisfy each category of park users and to know the demand for a park in a specific area, a definition of needs must be explained. Moreover, it will be an appreciative idea to make use of preceding experiences in this field. For example, the British divide park users into six groups:

1. Mothers and small children who want to be able to easily reach parks with sandpits and play facilities;

2. 4-12 year olds who like animals and birds, and want interesting play areas and plenty of room for active ball games;
3. Teenagers who are interested in swimming, sports and entertainments, and also like space to flop about in;

4. Young adults who want places to take young families, to walk and to picnic;

5. The middle-aged, who like parks where they can walk, sit and talk;

6. The elderly, who, like group (1), want easily accessible near-by parks where they can sit and chat and watch younger people and their activities" (Whitaker and Browne, 1971, p. 29).

So it is important to define the different users and find out their needs. Table 5-1 provides information regarding this matter.

This information is based on what people do while they are picnicking in parks or beaches. Also, the data are mainly based on the available recreational facilities and the possibilities to participate according to the structures and traditions of society. There could be many other activities which people want to share and reflect, but because of the existing parks' condition, people are disappointed and discouraged. In fact, the table indicates the following findings:

1. Family and females have approximately the same attitude toward recreation (passive).

2. Single males and boys ask for active recreation.

Reaching to this extent of park planning, attaining a decision considering the relation of users and the desired
Table 5-1. Participation in parks by differing groups of users.

<table>
<thead>
<tr>
<th>User</th>
<th>Activities Description</th>
<th>Plan and Design Needs</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. One family</td>
<td>Mainly toward passive recreation, sitting, picnicking, watching others. Little walking. Children participate in ball games, run, etc.</td>
<td>Adequate privacy, good shade, easy access, Quiet environment</td>
<td>Boys usually do not participate with the family.</td>
</tr>
<tr>
<td>2. Many families come together</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grandfathers</td>
<td>Little walking, sitting and watching children’s activities.</td>
<td>Close and safe access, easy circulation, quiet environment, close to mosque.</td>
<td></td>
</tr>
<tr>
<td>Fathers, young</td>
<td>Active recreation, sports, games, soccer, basketball, volleyball, walking, or playing with their children.</td>
<td>Playgrounds for the different games</td>
<td>Like to drive their cars to the parks.</td>
</tr>
<tr>
<td>Fathers, old</td>
<td>Mainly toward passive recreation, talking with others, and mosque. Watching their kids, and helping them and walking.</td>
<td>Close access to park</td>
<td></td>
</tr>
<tr>
<td>Grandmothers</td>
<td>Passive recreation, sitting, watching, and socializing.</td>
<td>Close, safe, and easy access, good privacy.</td>
<td></td>
</tr>
<tr>
<td>User</td>
<td>Activities Description</td>
<td>Plan and Design Needs</td>
<td>Remarks</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Mothers</td>
<td>Young mothers like to walk around. Mothers take care of their children, sit together, and socialize.</td>
<td>Close and easy access. Privacy is important.</td>
<td></td>
</tr>
<tr>
<td>Sons</td>
<td></td>
<td></td>
<td>See single category.</td>
</tr>
<tr>
<td>Daughters</td>
<td>Walk around, watch, talk, and read some magazines or newspapers. Also like to enjoy the landscaping.</td>
<td>Privacy is a great requirement, quiet dramatic areas for walking.</td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td>Active recreation, open fields, play games, run, hide, shout.</td>
<td>Play equipment close and safe access.</td>
<td>See boys for more activities.</td>
</tr>
<tr>
<td>Single Males</td>
<td>Active recreation, like sports and games such as soccer, basketball, volleyball, swimming, running.</td>
<td>Parking for their cars eliminate the walking distances to the field heavy-duty structures.</td>
<td>Young fathers could be included.</td>
</tr>
<tr>
<td>Females</td>
<td>Mainly passive recreation.</td>
<td>Close, safe, and easy access. Privacy is important.</td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>Active recreation, soccer bicycling, swimming, gymnastic, games, running, and hiding.</td>
<td>Safe access, heavy-duty structures.</td>
<td></td>
</tr>
</tbody>
</table>
activities must be clarified. This decision is essential to give the park designer the confidence and save time while involved in park design. In fact, many planners do not know how to act when they reach the design stage for a public recreational project. The question of how to integrate the park with the privacy aspect is a question which will always be raised. For example, some planners think to eliminate the singles from the parks and keep the parks just for families and females. This is the case of the parks of Dammam, although it is not yet practiced. Another example, from Japal Abu Makhrog Park in Riyadh, is where access is limited to females and children only. Other park's rules furnish the privacy concept according to different day's users: single males, families, and females, like Alshaibany Park in Alahsa and other theme parks. So the planners are in doubt of their decisions and are not able to observe a standard solution for the community. To close the park for a certain category and leave others out is not a fair solution. For a person living in that community, he in many times wants to visit the park at the time he wishes and not at the time he is forced to. That method will also encourage vandalism inside the park. "A well planned park should aim to keep families together by providing something for every generation" (Whitaker and Browne, 1971, p. 32). However, special user parks are highly encouraged to be
extra parks and not be the substitute of the neighborhood city parks. For example, it is an urgent matter to provide a special park for females, where they can have their special activities and sports which do not conflict with the Islamic teachings and principles. Special parks for children are also another demand. On the other hand, to maintain a well-developed park concept that provides room for all visitors at any time is a great achievement for the community. So the author suggests the following concept that will mainly rely on activities separation. Since active recreation has a strong relation to single males and boys, their area should be around the sports fields. Family areas can act as a passive recreation spot. An adequate access should be provided between the family location and the sports fields and active facilities for those who accompany their families and want to practice some sports. Moreover, a very strong connection between the family section and children's play area is highly appreciated. Females' areas can be contained within or next to the family section. Also, a strong relation is needed between the females' area and the children's area (see Fig. 5-1). In conclusion, this conceptual planning will introduce a better product for it will correct and avoid past mistakes and problems and will also enhance the beauty of the park.
Fig. 5.1. The suggested concept which divides the park according to the users' needs and behaviors.
After the picture of the park's users and user's requirements as well as the park concept become clear, it is essential to focus upon demand. So the decision about park demand depends upon the existing neighborhood and future structures. Planners should study the neighborhood from various viewpoints, such as the following:

1. The number of residential units and their types. For example, high-rise apartment residents have greater demand for parks than residents of villas or large houses.

2. The expected average family size and the birth and death rates.

3. The building codes and regulations which will help to determine the average covered structures. In fact, that can lead to rough estimation figures concerning the number of people.

4. A social and economic survey to accomplish a better understanding of the residents. For example, there is a difference in participation among wealthy, medium-, and low-income families.

5. A broad survey from the existing neighborhoods regarding parks will furnish the planner with very beneficial data.

6. A Behavioral and psychological study of the different ages and people is essential material.
7. The relationship of the neighborhood to other parts of the city.

In summary, without a sincere effort and scientific research, decisions about the location, structure, and activities of parks will remain a haphazard one.

Standards

Park and recreation standards are very important data for park planners and designers. Standards are helpful in determining the size of the park and the recreational facilities within the park. Standards also help identify the need for a certain area. In fact, most public projects are designed according to certain standards. However, standards do not necessarily reflect or represent the best alternative. Even with standards, there could be many major defects in park design. Unless intensive thinking and imagination are associated with standards, the result cannot be guaranteed. For example, the National Recreation and Park Association in the United States mentioned a number of points that will affect the 1980s Park and Recreation standards. They are:

- Changing attitudes toward recreation and leisure,
- Changing population and household composition,
- Changes in the workplace, changing housing patterns,
- Depressed regional economies, changeable world energy situation and its impact on personal transportation, new forms of leisure equipment technology,
- Advances in medicine, growth of electronic games and

So the standards do not represent a constant data base, but must have some flexibility according to different natural or manmade variables such as site features, geophysical locations, and inflation.

There are three types of standards for parks and recreation; space standards, facility standards and development standards. Space standards are the most usable and practical standards for parks. They handle the space demand or standard by four methods: "Population ratio method (acres of park land per 1000 people), recreation space based on area percentage, needs determined by user characteristics or demand projections, and carrying capacity of land" (NRPA, 1983, p. 40). So space standards reflect the minimum space needed to satisfy the demand of a certain person, in a certain time, at a certain place. Standards need to be revised from time to time in order to update the standards.

Since there are no such standards for parks and recreation in Saudi Arabia, the National Recreation and Parks Association standards in the United States can give great benefit; however, cultural differences must be absorbed cautiously and considered seriously. The NRPA standards can be used as outline and comparison documents until local park and recreation standards are accomplished. For example, the NRPA suggests 6.25-10.5 acres of developed open space per
1000 people as the minimum space that can be provided. On the other hand, in Dammam there is approximately one acre of park land per 4,000 people. Dammam's ratio of park land per 1000 people is much better than many other Saudi cities' ratios. In fact, it is clear how urgently standards are needed.

Preparing standards is a very broad, long-term issue. It will consume time, energy and money. But in the end, planners will reach the best possible results. The NRPA recommended several criteria for the development of standards for a community. "They must reflect the needs of the people in the specific service area, be realistic and attainable, be acceptable and useful to both the practitioner and the policymaker, and be based on a sound analysis of the available information" (NRPA, 1983, p. 39). In conclusion, standards are very important documents for the development of parks, but they should work as flexible guidelines and not as rigid base documents.

Mosques

It would be an ideal planning solution if the park has a strong relation with the Friday Mosque. Usually every neighborhood, has one big Friday Mosque which is considered the neighborhood focal point. So by connecting the neighborhood park with the Friday Mosque, many existing problems will be eliminated:
1. Providing a prayer area for the park’s visitors which will encourage many people to use the parks.

2. Providing automobile parking for the park and make the maximum benefit from Friday Mosque’s parking, since it is designed to carry the Friday Mosque capacity.

3. Giving the chance to the daily and Friday users of the mosque to make use of the shade. And to think about the plants through their different sizes, shapes, colors, fruits, fragrances, and seasonal changes while walking to the mosque for prayer.

4. Linking the park’s users with the weekly events and occasions of the park. In short, the linkage of parks with the Friday Mosques is a positive relationship and recommended issue (see Fig. 5-2).

Streets

Access to the park should be highly integrated with the surrounding neighborhood. It will be a good experience if some of the neighborhood’s minor streets are designed to end at the park. By doing so, a better and safer access pattern is guaranteed for the users to reach the park, especially the children (see Fig. 5-3). This also encourages more visitors since the park will be sensory and actually closer to the community. However, a park needs to have at least one road that will pass by the park. This
Fig. 5.2. Mosque and its relation to the park.
Fig. 5.3. Providing easier access to the park and restricting the movement of cars around the park.
road will carry the vehicular traffic to and from the park and will act as an advertising device for the park.

Schools

Schools should help the park system and reduce the demand for sport land from the parks. By integrating the schools' location with parks, more open space can be available for the public. With a little thought, the designer can associate the school's sport fields within the single male's section of the park. This will, in turn, provide more passive recreational land; also, the waste of land for additional parking lots will be avoided, since the school uses the parking in the morning and the park uses it in the afternoon. On the other hand, parks will provide a quiet environment for schools and will offer many facilities that help the students, such as swimming pools, small museums, children's zoos, vegetable gardens, and playgrounds.

The school park plan, in which schools and parks were sited adjacent to one another, continued through the era... This coupling contributed to the development of the neighborhood theory, the idea that a given geographic unit and a given population cluster should have one each of a series of urban facilities (schools, housing, health, commercial, transportation) (Cranz, 1982, p. 120).

In brief, the joint relation between parks and schools must be carefully introduced during the planning stage, since it will save a lot of costs of both construction and maintenance.
Planning for the public is a very big responsibility for the planner. They are the policymakers for neighborhoods, cities, regions, and countries. It is always easier to issue an immediate decision to decrease the time of well-prepared research. But the reality of irrational order will in fact consume public monies.

**Design Stage**

Design is the second stage in a park's life. Design represents the result of arranging the different site data according to special analysis and conceptual ideas. "Park design (physical planning) is the process of conceiving and structuring the physical arrangement of recreational areas and facilities and their necessary functional support elements" (Christiansen, 1977, p. 44). In order to proceed to the final plans of a park, there is a series of stages that the designer must realize and follow. These stages are collecting all relevant data concerning the proposed park, recognizing the project goals, analyzing the site and data, producing different conceptual schemes, evaluating the different schemes, developing the best concept, and producing the final documents and plans (Christiansen, 1977). In summary, the design stage is the translation of people's needs through the designer's mind into the form of plans and other documents.
Method of Design

It is important to realize that people go to the park seeking natural views and quietness. Therefore, the park's designer should be very sensitive to this point. In the past, people could easily reach the wilderness since they had strong contact with it. But nowadays, there are many social, economic, and political factors that occur as a result from the complexity of life which leads the person to look for the closest natural area to visit. So the designer of the park should avoid straight lines and utilize natural curved lines as much as possible. However, the designer must be aware of the fussy results that might happen if high level of thought and imagination are not considered.

In the parks, especially the small parks, the intention of making the user feel that the park is large and open is a functional concern (see Fig. 5-4). To let the user walk slowly and quietly are other concerns, for the user will have a chance to think about the different creations (trees, sky, water, and other park features). These concerns cannot be achieved by straight-line circulation, but by gentle curve circulation techniques. "Diagonal and zigzagging lines are active and spirited . . . curved and undulating lines are not as dynamic as zigzags. Being slow and meandering, they are inclined to be gentle and tranquil. But if the curve changes direction rapidly,
it can produce an animated or gracefully spirited feeling" (Rutledge, 1971, p. 38).

One of the important points of park design is to create some mystery and secrecy and to avoid direct or rapid discovery of the park facilities (see Fig. 5-5). Natural curvilinear circulation will demonstrate good results toward that concern. On the other hand, the circulation method must satisfy the needs of people's movement, and not force them into certain paved routes.

In the past, parents sent their children with Bedouins to the desert in order for them to grow up in a natural environment. So, to emulate the natural design model becomes an essential need in parks, since they represent the only close alternative to natural areas.

Privacy

Since privacy is a major concern for Muslim families, failing to maintain it in a park will reduce the number of users. In fact, the concept of dividing the park into four sections according to the different users' needs will encourage a lot of people to participate in park activities. However, there are still some gaps that can be maintained by design techniques. A good survey concerning the personal privacy distance can provide very good data regarding privacy. In order to distribute the sitting and picnicking areas, there should be a clear standard based on
Fig. 5.4. Curved paths give the feeling of wide space.

Fig. 5.5. Giving the opportunity for the visitor to discover the park step by step, enhancing a sense of mystery.
the privacy aspect of each user. For example, the standard distance between two picnic sites in the family section will be different from the standard for the single male's section. In fact, it will be more than the distance of the single section (see Fig. 5-6). So a survey based on user's personal space should be carefully handled and researched.

Changing levels, and building some hills or berms, enhances the privacy aspect and provides more places to hide from others. Shrubs and hedges create nicely defined secure places (see Fig. 5-7). However, designers must understand that people are not coming to the parks to find themselves inside an enclosure. So, sitting or picnic spots should overlook the park but provide a maximum guarantee of privacy.

Light and dark is another design technique which affects the night visitors. Light should be directed toward what people watch or do, and not toward people's faces (see Fig. 5-8). Controlling the lighting can provide more private nightly areas. In fact, the importance of privacy comes out of human nature, and failing to address this principle means eliminating people who indeed need the park.

Services

There are many services that do not exist in the parks of Saudi Arabia, although they are of urgent need. These services are recreational facilities, sports
Fig. 5.6. More privacy precautions in the family section than in the single section.

Fig. 5.7. Plants and landforms can ensure privacy if used well.
facilities, utilities, and minor services such as drinking fountains. Perhaps the need of a certain service will depend on the people's need, size of the park, and site features. To be more specific, a description of the content and structure of each service category will be the following issue.

Recreational Facilities. For the recreational facilities, a standard list of needed or recommended activities will contain picnic area, water feature, children's play area, children's zoo, special features, and social or exhibit building.

Picnic and Sitting Areas

Picnic and sitting areas should have as much shade and green as possible. In fact, providing specific places for picnicking will help to distribute the visitors through the park according to the personal privacy distance (the author proposes that the designer locate the picnic spots according to the personal privacy distance). There is no specific area where the picnic must take place, but there are some preferable locations for that function. For example, it is desirable that picnic spots overlook a water body, water fountain, mountain, sport activity, public square, city view, or pedestrian traffic. A broiler will be a strong indicator for a recommended picnic spot. Prepared places for putting the rug must be well designed and secure
(see Fig. 5-9). Picnic tables could be added as places to prepare the food. In fact, putting a broiler and picnic table in every area is not recommended; the flexibility and freedom of the design must be assured. Areas for sitting and watching should be close to the attraction spaces. "Adjust traffic-channeling earth mounds so that they face the action; angle retaining walls toward the game as handy elements to sit upon or lean against" (Rutledge, 1981, p. 20). Also, the sitting place should assure reasonable privacy and security. Avoiding the direct western orientation is appreciated. "Where interaction is to be encouraged, benches should be grouped to face each other" (Rutledge, 1971, p. 26). But the designer must keep the number of benches to the minimum and leave public behavior issues the final decision. Therefore, park administrators can increase benches if they record heavy use in an area.

Water

Water features could be the sea front, natural or manmade lakes, natural springs, or a fountain. The importance of a water body comes from the strong relation of the human to water. Water can add another dimension to the park by reflecting the sky, trees, mountains, and light. In fact, water enhances the aesthetics of the park. Water can also mask unwanted sounds or noise by creating constant water movement between rocks, falling on a hard surface, or
Fig. 5.8. Lighting should be directed toward the action or what the people are doing.

Fig. 5.9. Seating arrangement over gravel ground.
in a fountain form. Water also modifies the severe arid climate of the desert. However, using water in coastal areas should be carefully planned, since the relative humidity is already high.

It is clear that water is a very expensive material in an arid environment, which makes it difficult to use for artificial lakes. In fact, artificial lakes are an issue of disagreement for many planners and designers. But reasonably sized lakes should be introduced in some parks for the following reasons:

1. Water was used in public areas and gardens throughout the history of Islam.
2. Water can modify the arid microclimate of the park.
3. Water enhances the park and increases the spatial volume of the park by reflecting the sky, sun, moon, and clouds.
4. Water can increase wild and domestic life forms.

The water supply can be obtained from:

1. There are many artesian wells which are not good enough quality for human consumption because of certain biological or chemical factors.
2. Harvesting the winter storm runoff for each neighborhood through its park.
3. Sewage treatment can supply water for both the lake and irrigation.
4. Sea water can be a cheap alternative for coastal areas, where some fish can be introduced as well.

The lake should be shallow (50 cm) if water is expensive, and shaded by trees to minimize evaporation. Light blue painted concrete would be a good choice for the lake bottom. Rocks are another dramatic material for the lake basement.

Fountains can substitute for lakes in Middle Eastern countries. However, the high salt content in the water usually closes the holes of spraying fountains; cascading fountains are best from the maintenance viewpoint.

**Children's Play Area**

The children's play area is a very important item among the park facilities. It is required to pay much attention toward children's behavior in order to design for them. "Watch kids playing in undesigned settings as trash piles, backyards in the wood, or on the beach etc. Describe recurring tendencies . . . physical items that seem involved" (Rutledge, 1981, p. 46). So the designer will know the different kinds of plays that the children of a certain neighborhood participate in. Moreover, in some parks in the United States, they left children to design and build their own play areas.

The play area should be shaded as much as possible. Eliminating metallic play equipment can avoid many cases of
skin burns. Wood play equipment is the most safe equipment available for children. Clean, sandy soil is the best material for the grounds of the play area, since it attracts most of the children and provides a chance for them to touch, feel and develop their understanding and love of the land. A careful setting for the adults who accompany the children is a functional concern. For example, parents were very upset in most of the parks in Saudi Arabia because the designers ignored their role in the children's play area. In fact, many designers forget that most young children need their parents to be around them. They want to feel that they are secure but not watched. So a good design provides sitting areas or benches for parents to use while watching their children play.

Linked systems offer circuits around which the child can manipulate himself in a variety of ways and also provide enclosures for more ordered activity. They also offer items which encourage cooperation and graduations in difficulty which correspond with a child's changing capacity level (Rutledge, 1981, p. 42).

An educational function could be incorporated into play areas. For example, numbers and alphabet letters can be written, painted, or stuck on the play equipment and the play area barrier or wall. A blackboard may also reduce the danger of writing on other features of the park.

An article in the New York Times concerning children's play areas stated:
It was supposed to help children discover their own physical resources, provide separate areas for different aged children to facilitate their different interests, and give children a sense of independence from their parents without making parental supervision any more difficult (Cranz, 1982, p. 192).

A bike route or track is a highly appreciated element in the park. It could be an adventure track where children will find a place to spend their energy, which will reduce vandalism. It also encourages children to play in a safe place rather than streets.

In summary, the children's play area is an important element of the park, since it will affect the life of the future generation.

Children's Zoo

A small domestic zoo becomes a necessity in the park design. The zoo will teach the children about native and domestic animals. It will provide a closer looking and touching experience of the animals. Elementary schools can gain many advantages from the children's zoo. The "zoo has a new role to play in teaching city folk about their natural heritage. For example, the domestic zoo with its goats, chickens, and milking cows may hold more meaning for a ghetto child than caged lions and tigers" (French, 1973, p. 54). Animals will also provide milk, eggs, meat and fertilizer. In fact, children's zoos become very important for the children since they are the only places for most
children to watch, think, see, touch, understand, and make friends with the animal world.

Recreational Building

A small museum, art room, or a multipurpose hall is a recreational building. This kind of building is intended to encourage a stronger social relationship between neighborhood residents. For example, park administrators can run a children's painting gallery, choose the best paintings by the residents, and award prizes to the winners. A multipurpose hall can be used for many recreational and social activities that are related to the surrounding neighborhood.

Sports Facilities. For sports facilities, the author suggests seven activities: swimming, shooting, horseback riding, running, track, soccer, volleyball, and basketball.

Swimming

Swimming is a recommended activity in the Islamic religion. An adequate size pool can be designed according to the neighborhood population. The pool should be enclosed and temperature-controlled so that both males and females can use it on different days, and it can be used in all seasons.

Shooting

Shooting is also a highly encouraged sport in Islam. An archery range can face a ridge or a closed space. A
rifle range is a very good place for youths to spend their time at a useful sport.

**Horseback Riding**

This is also a very historical sport, which the Islamic religion encouraged the people to learn. Two or three horses can be accommodated in the children's zoo. They will make a good amount of money for the park, since many people are ready to pay for a ride. Other people can also bring their horses to the park during the open hours for private rides. It is a popular sport and will increase the number of visitors, since many people like to watch horses. A well-designed horse track must be surrounded by shrubs and trees to absorb both dust and sound. However, it could be opened in some areas so that people can watch the horses while they are running. A linear track will be the best solution, because it will limit dust and noise and will save the park land for other activities (see Fig. 5-10).

**Running Track**

A running track will provide a safer and better environment for athletically inclined people to practice this useful sport. They can run around the area devoted to sports activities. Some athletic games can be encouraged, with some signs to define running direction and assist the runner to build his muscles and self-confidence.
Soccer

Soccer is the most popular ball game in Saudi Arabia. It is popular for children, youth, and older people. One standard-size soccer field will be enough. But a few small fields must be maintained according to neighborhood population density.

Volleyball

Volleyball is a game which almost everybody plays in Saudi Arabia. One or two sandy fields with steel pillars to hold the nets should be sufficient for a normal neighborhood park.

Basketball

Few people play basketball in Saudi Arabia. It might be because of the absence of basketball courts and the difficulty in building them (unlike soccer or volleyball). However, some people like to play it. One basketball court should be enough for a neighborhood park.

Finally, soccer, volleyball, and basketball fields need very good lighting for nighttime use, especially when it is very hot during the daytime. The designer must also provide a sitting area for spectators. Drinking fountains must also be close to the active sports fields. Another factor is to avoid the direct sun by orienting the sports fields in parallel to the north-south longitude. Spectator
areas will face the east, since most sports are played in the afternoon.

Utilities. Utilities include rooms for prayers, parking lots, toilets, service areas, small shops, and room for a gardener.

Prayer Area

A small mosque or prayer area is a major necessity for people if there is no mosque beside the park. The size will depend on the number of park users. It should have a central location and easy access. The structure should be as simple as possible. For example, a tensile structure can do the job. It will be appropriate to use clean sand for the floor of the prayer area.

Parking Lot

The parking lot size can be determined from the expected number of visitors who live beyond walking distance from the park. The designer should keep the single males' parking away from family parking. To hide cars from vision, it can be surrounded by shrubs, or natural or manmade hills. The south side is best for parking, since wind is normally blown from the north. In fact, that placement may prevent heat from cars and the pavement from entering the park. It may also help encourage air movement in the humid area, since the cooler air will move to replace the hot air (see Fig. 5-11). A smooth gravel layer can be used over the
Fig. 5.10. Linear horse track to eliminate noise and dust problems.

Fig. 5.11. Cooler air may move toward the parking to replace the hot air, which may help to reduce humidity in coastal areas.
asphalt to reduce the heat and enhance the natural visual appearance of the park.

On the other hand, if the park is planned in conjunction with a mosque or school, parking lots should serve all facilities.

**Toilets**

For every section of the park, there should be adequate toilet buildings. However, the number and location of toilets will vary according to the size and shape of the park. The toilet buildings should have very strong structures which can resist heavy public use. A natural ventilation and lighting system will reduce maintenance costs. The toilet buildings should be located away from the heavy traffic paths and be hidden through the use of plants, for people do not like to be seen while going to the toilets. The toilets should also be easy to reach by maintenance vehicles.

**Service Area**

The service area consists of a small plant nursery, maintenance room, small storage area for sand and fertilizer, water cistern, and a sewage treatment plant if the park will rely on this method to irrigate.

**Small Shop**

This shop will sell refreshments, candy, popcorn, balloons, etc. It is usually owned by the park guard.
Guard's Room

The guard's job is to look after the park and do some maintenance work. He should be a skilled gardener. He needs a room in which to put his personal belongings while on duty.

Minor Services. Minor services, such as drinking fountains, trash baskets, light fixtures, tiles, benches, picnic tables, signs, and other fixtures will be discussed in the following section.

Materials

Materials are the details that the park visitors will see or use. Aesthetic factors are a big concern when choosing suitable materials or fixtures. The color and shape are also important factors. It is a major concern to coordinate the fixture's shape or appearance with the natural appearance of the park. For example, it would be an irrational decision to fix a small aluminum and glass bridge over a water channel or stream in the park because the aluminum bridge reflects the very modern society of skyscrapers rather than the simplicity of nature. Colors and texture must also reflect the natural existing environment. However, a small detail of bright colors will satisfy the needs of some communities where people grow up with these bright colors. The chosen material or fixture should withstand heavy public use, and it should resist weather
factors, such as sun, rain, wind and humidity. The following are some materials and fixtures that are heavily used in parks:

1. **Tiles**: If tiles are used as a paving material, they should be different than the tiles that people see outside the park. Sand and cement colors are the most proper colors for pavement, since they will prevent glare and heat radiation. The designer must predict the texture of the combined tiles.

2. **Light fixtures**: These are the most important night elements. Lights should illuminate paths, picnic areas, entrances, important features, and parking lots. In fact, they should guide users to the action rather than blinding them. Lights can enhance the privacy and beauty of the park if used well. For the sports fields, intensive high mercury lighting is needed. But the lamps should be designed to concentrate the light on the field itself and not on the spectators or other parts of the park. On the other hand, low-pressure sodium lights can be used where low lighting is required, such as in picnic or sitting areas and around parking lots. It will be more practical from the viewpoint of vandalism to hide the light fixtures
and depend on indirect lighting methods (see Fig. 5-12).

3. **Trash cans**: These must be close to the areas of action and movement of people. A concrete or wood coating for the trash cans will reduce the ugly appearance of the metallic trash cans. Trash on the ground means that people do not know where the trash cans are, or they are too far away to reach easily.

4. **Benches**: The benches should be set to face each other, which will encourage social interaction. However, benches around recreational or sports facilities should directly face the action. Woody colors are the best choice for wooden benches. The number of benches should be kept to a minimum.

5. **Picnic tables**: Concrete or heavy wooden tables are better than metallic tables because of their durability and stability. Picnic tables will serve for food preparation.

6. **Drinking fountains**: These are very important park services. It is better to put them inside concrete or wood structures to hide their mechanical appearance. Drinking fountains should be close to areas where people gather and close to sports fields.
7. **Signs:** Simplicity and unity are two major aspects of park signs. It is recommended that use of signs be minimal. In fact, good design does not require a lot of signs. Designers must also comprehend that signs are to guide people and help them, but not to order people around.

8. **Fireplaces and broilers:** They should be distributed among the picnic areas. For a natural look, they can be situated between rocks or built from concrete. The designer must consider the wind direction so that smoke will be carried away from people.

"The structures themselves, whether they be buildings, signs, picnic tables, fireplaces, or drinking fountains, should be sturdy, remembering that the fewer the moving parts, the less chance of their being moved" (Rutledge, 1971, p. 77). In short, success in choosing the right material for the right people at the right time will enhance the park, increase the number of visitors, and reduce maintenance costs.

**Future Concerns**

The best design is the one that insures flexibility for the future. "It is advisable when designing a park to make its plan flexible and capable of as much future change
as possible" (Whitaker and Browne, 1971, p. 48). It is recommended that the designer think of future development while designing for the public. On the other hand, it will be a wasted matter to build a park for a maximum capacity of 20,000 people after 20 years, while the present users number only 2000. But it is reasonable to reach the final approach by stages.

General Points

1. The designer should think of locating the heavy use facilities and maintenance area near the parking areas. In fact, that will avoid nonfunctional traffic in the park, which disturbs people using other areas of the park.

2. To put a fence or wall around the park is a practical solution for many problems, but to let the fence or the wall be seen by the public may create a feeling of enclosure. Shifting the fence or wall away from the sidewalk and covering it with shrubs and vines will eliminate the structure, and at the same time will maintain the privacy of the people and the identity of the space (see Fig. 5-13).

3. It is always recommended that the park should have some mystery, which will encourage people to use their minds to search out truth and discover the park’s elements step by step. Hiding the end of the
Fig. 5.12. Light around the walks should illuminate the walks and not the people.

Fig. 5.13. Hide the park fence or wall from both inside and outside.
park through trees or mounds is a successful technique. If people can discover the park from the entry points, then there is no need for them to use their talents. "A sense of magic and mystery is needed. The park must not reveal all its secrets at once or it will be a bore" (Whitaker and Browne, 1971, p. 38).

4. Every park should have its own design. The location, size, and shape of the land must react with park design to produce different plans and experiences. For people will then find many beautiful, different alternatives rather than one routine choice.

5. Quality, not quantity, should be the goal of the planner. Minimizing the different facilities but raising their quality will enhance public appreciation and eliminate the danger of many but empty facilities.

6. It is important for the designer to remember that he is building the site and not building over the site. The designer should be alert to the original land form and vegetation. He must try to protect the land form and coordinate his design with it. That will help to provide the best drainage plan of the park.
7. It is recommended that the designer must take advantage of the old, existing experience in conjunction with the adaptation to the desert environment. For example, an old technique of squeezing the wind through small holes in the wind side of walls to make the wind cooler is a technique that can be used on park walls and for the sitting or picnic areas (see Fig. 5-14).

8. A major concern that the designer must understand is that there are many disabled or handicapped people who wish to use the park. The design must assure easy and safe access for them. On the other hand, the designer should not provide a special area for them, but allow them access to every place that the average person can go.

Design is a broad subject and a long process to be discussed in a limited number of pages. To execute one statement concerning one design idea or element may take weeks or months of long discussion and research. However, there is always time that best shows the value of an experience. "What is planned on today's research may become a Maginot Line tomorrow" (Whitaker and Browne, 1971, p. 48).
Fig. 5.14. Forcing wind through small holes may help cool the air.
Construction

The construction stages will mainly rely on the design stage. If the construction documents and working drawings are produced by professional landscape architects, then better results can be expected. That is because every small construction element will be specified in the construction documents and the rough standards for public projects materials will be considered. However, the contractor has the second part of the answer, since he is the one who will put the materials together. The contractor should bring skilled labor to do the work. He must be specialized in landscape projects. The municipality should choose the best qualified contractor, even if he offers the highest bid. For public projects, which are exposed to vandalism and heavy movement, quality, beauty and strength are not negotiable issues.

Plants and Planting

Although plants are not everything in parks, they are considered the major component. Without a functional planting scheme, parks can easily lose their value and identity. Choosing a special plant for a special location must be the result of careful thought, research, and imagination. Every plant has to have a reason why it was chosen for a particular location. The reason can be aesthetic, historical, social, economic, or functional. To choose a
plant, there must be a priority scale. The plant which promises fulfillment of the major reason and assures more benefit than other plants is the right choice. So it is what the designer wants this plant to do is the main reason for it standing in the park.

The plant range is limited in Saudi Arabia. The severe arid conditions limit the life to only those which can thrive in winds, drought, heat, and salinity. In fact, plants that cannot survive these conditions will cost a lot to grow and maintain. "Therefore, why not try to avoid all but the minimum amount of fertilizing, watering, cultivating, spraying ... by planting only those species which appreciate the conditions found on the site. Let nature do most of the work for you" (Rutledge, 1971, p. 66). In short, choosing the right plants will cut future costs and enhance the park. However, how the designer puts all these plants together is the major question. Following are some suggestions regarding the planting scheme:

1. Shade: Shade is an important factor in the environment of Saudi Arabia. So massive planting of shade trees will help to modify the microclimate of the park.

2. Trees: Trees can be used to catch wind and channelize it to a certain place.
3. **Composition:** Avoid planting many different species in the same place. On the other hand, designers should not limit the park's plants to a very small list. So if a specific species gets a disease, the park will not lose most of its trees.

4. **Green tones:** Two or three tree species for massive shade areas with different green tones is a recommended practice.

5. **Aesthetics:** To show the deciduous trees, they should be integrated with the evergreen trees. This concept is to let the users see the opposite, where they can find out the different values of each tree.

6. **Planting layout:** Think of the planting layout against the horizon. It should be a continuing natural line. Trees can give the effect of joining the sky with the earth.

7. **Flowers:** Flower beds should be limited to very small protected areas to show their value.

8. **Shrubs:** Shrubs can be used to guide foot traffic and provide privacy for picnic and sitting areas.

9. **Grass:** Grassy areas are considered most desirable by the people of Saudi Arabia. On the other hand, it is very expensive to maintain large grassy areas. "Grass areas tolerate little pedestrian wear in a desert environment and high quality lawns are
difficult to achieve without intensive irrigation and careful control" (Landscape Design for the Middle East, 1978, p. 16). The unnecessary areas should be planted with ground covers such as morning glory or ice plant or with low native shrubs.

10. **Edible landscape:** Edible landscape is a growing issue in the field. Thinking of plants that produce food is a good idea. For example, *Phoenix dactylifera* and *zizyphus* are some of the great desert trees, and they are also food producers. Alfalfa, with its cooling effect and beautiful color, can be used as a ground cover in large-scale parks. In fact, that will save a lot of money since alfalfa is the best food for cattle and it has a high selling rate. So, moving toward edible landscape will guarantee the maximum results of time, energy, and money.

11. **Native.** Using native and naturalized plants is the solution for many maintenance problems.

12. **Growth rate:** Fast growth rate is a recommended behavior for the selected plant. Many desert trees and shrubs can be grown rapidly if good watering and feeding are scheduled. Increasing the quantity of water until obtaining the desired size is not a negative matter, since faster benefits will be
guaranteed. Also, it is possible to let the plants mature in the nursery before planting. Many plants grow faster and better under nursery conditions than outside conditions, such as zizyphus species and lantana species (Adams and Willens, 1979).

13. **Appearance:** Appearance is also an important issue for the park's plants. Many desert plants can develop nice forms by giving them some occasional clipping and pruning.

14. **Allergies:** Allergies become a major issue in modern arid communities because of newly introduced plants. For example, Tucson, Arizona used to be a good place to live for people with breathing problems because of its healthy, clean air. But after many years of development, many people began to complain about allergies. Research found that imported plants from other regions that produced allergic pollen such as Bermuda grass, olive and mulberry species are the reason behind many allergy problems. The designer should carefully choose the plants that will not release large quantities of allergic pollen into the air, thus causing problems for park users.

15. **Lifespan:** Avoid the concentration on short lifespan trees, such as *Parkinsonia* species. Short life trees cost more in terms of repeating the planting
and growing process. However, short-lived fast growing trees are sometimes very useful in creating quick shade and shelter, while slower-growing species are developing and maturing.

16. **Planting:** A very critical stage to the future of plants is the shipping of the plants to the site. For example,

One shipment of plants for University of Petroleum and Minerals in Saudi Arabia (U.P.M.) was flown at a cost of $30,000 from Egypt to Dhahran specifically to avoid some of the pitfalls of long shipping times. But the plants were not properly prepared for shipment and nearly all of them died in spite of the great expense (Kelly, 1976, p. 66).

So many precautions should be provided in order to maintain a sufficient park planting.

A. **Planting holes** should be prepared in advance, so when plants arrive at the site they will be planted without delay.

B. **Protect the plants** from wind, heat, rain, and insects during transportation periods.

C. **Planting steps:**

1. Excavate planting holes according to the container size and prepare the planting mix (1/3 soil amendment with 1/2 topsoil).

2. Cover the bottom of the holes with planting mix.

3. Remove plant from container with its soil carefully. Trim broken or matted roots.

4. Put plant in the hole, keeping it in the same level of container and press the soil around.
5. Water the soil to settle the plant.

6. Keep soil highly moist for 10-14 days.

7. Trees should be staked for more erect form and to resist wind. Tying should be made loosely with soft flexible material which will allow the tree to gain strength by resisting the wind" (Duffield and Jones, 1981, p. 33).

17. Some recommended trees:

A. *Albizzia lebbek* (parrot tree, or dhaken el basha). Large dark green tree, nice shade, tolerates drought and full sun.

B. *Azadirachta indica* (neem). Excellent shade tree, widely used in urban planting, tolerates drought and salinity.


D. *Ficus benghalensis* (Banyan tree). Very large dense shade tree.

E. *Parkinsonia aculeata* (Jerusalem thorn). Short life (20 years), fast grower, tolerates desert conditions.

F. *Phoenix dactylifera* (date palm). Produces edible fruits, tolerates desert conditions.

G. *Prosopis juliflora* (mesquite). Dark green tree, large shade tree, tolerates desert conditions and salinity.
H. *Terminalia catappa* (Indian almond). Horizontal branching, tolerates salinity.

I. *Zizyphus spini-christi* (Naba). Light green tree, edible fruits, tolerates desert conditions and salinity

18. Some recommended shrubs:

A. **Clerodendron inerme** (Glorybower). Very nice shrub, hedge plant, tolerant of heat and salinity.

B. **Lantana camara** (bush lantana). Fast grower, colorful hedge plant, tolerates saline conditions.

C. **Nerium oleander** (oleander). Very fast grower, colorful natural hedge, tolerates desert conditions.

D. **Dodonaea viscosa** (clammy hopseedbush). Clipped or natural hedge plant. Tolerant of heat, drought, saline conditions, and wind.

19. Some recommended ground covers:

A. **Carpobrotus edulis** (common ice plant). Very good ground cover and erosion control, nice flowers, tolerates saline conditions and drought.

C. *Cynodon dactylon* (Bermuda grass). Tolerates foot traffic, spreads quickly, tolerates desert conditions; use hybrids that do not cause allergy.

D. *Bougainvillea* spp. (Gohanamia). Ground cover or climber, very nice colors, widely tolerant.

**Maintenance**

Maintenance plays the second most important role in park life. It is the continuing stage that stands behind the existence of the parks.

**Irrigation**

Growing nice green plant materials requires a good irrigation system. For that, there are three irrigation methods: flood, sprinkler, and drip irrigation.

**Flood Irrigation.** Flood irrigation is a very old method. The main concept is to flood the area with water. But there are many disadvantages of the system, such as wasting a lot of water, giving a chance for salt to gather on the top of the soil, and many weeds can grow around the flooded areas. However, this system can be used for the plants that require a lot of water, such as bedding plants.
Sprinkler Irrigation. This method depends on spraying the water just like rain. This system can be used to irrigate ground covers, such as grass. It will give an adequate water distribution and will minimize the labor cost. However, it needs a lot of maintenance, especially if water has a high saline content.

Drip Irrigation. This method gives the plants a continuous supply of water. It also eliminates the growing of weeds and wasting of water. Drip systems can guarantee the distribution of water to the different species requirements. Nutrients can also be fed to the plants through the system. However, drip systems require good maintenance when using high-salinity water.

Fertilizer

The best maintenance factor for the soil is the adequate use of fertilizer. But in case of saline soil, which is common in the coastal area, it is required to water heavily for a long time. This method lowers the salt concentration below the root area (Landscape Design for the Middle East, 1978).

Diseases and Insects

Plants, like people, get some diseases during their life cycle. But with the presence of good agricultural experts who can check the plant materials and maintain them
well, diseases and insect dangers can be lowered. In fact, using wide insecticide spraying is not the proper solution. Insects and disease can be resisted and cured by peaceful organic or natural methods. On the other hand, not all insects destroy plants; some of them are very beneficial (Duffield and Jones, 1981).

**Pruning**

Pruning is very important maintenance work during the life of the proposed plants. The purpose of pruning is to improve the structure, form, size and health of the plants. Also, it is a practical way to encourage more flowers or fruits. The end of winter or the early spring is the best time for any heavy pruning. Light pruning to encourage growth or cutting dead or infested branches can take place any time.

To get the best framework which will support the future weight of a tree, certain steps must be applied:

1. Encourage the tree to maintain a wide angle between branches.
2. Plan for well-spaced branching. Do not leave the tree to grow branches from the same level.
3. Prevent limbs from being over each other; cut to ensure a radial form.
4. Maintain the desired height under the tree when young.
5. Pinch some branches to encourage more growth and more branches.

Mature trees need pruning to restrict massive branching. Cut out dead, infested, or weak branches. It is recommended to use tree healing paint after the cut has dried to prevent fungus infection (see Appendix C for tree, pruning and maintenance).

Maintenance Against Vandalism

Vandalism is a great danger for parks. However, the successful design and maintenance can reduce the danger of vandalism to a minimum.

1. Repair the damage as soon as possible and do not give a chance for the public to see it.

2. If repairing the damaged body will not return the unit to its normal condition or strength, then it is better to replace it with a new one.

3. Pay attention to what people need or do. For example, a blackboard located in a perfect place may end teenage writings on walls or floors.

4. Using the outdoor standards in choosing the materials or fixtures will help a lot in this matter.

There are general objectives of the park and recreation maintenance:
1. Park and recreation areas and facilities should have a clean, orderly appearance at all times.

2. Areas and facilities that are aesthetically pleasing should be developed and maintained.

3. Areas and facilities should be maintained to create a healthful and safe environment (Sternolff and Warren, 1984, p. 10).

Since the proper parks and urban forestry knowledge and practice are not at present fulfilled by staff and laborers, a rapid educational and training program should be initiated. This program will help them to know the basic information about urban forestry and park maintenance. On the other hand, if the municipality has the idea of hiring a contractor for the maintenance, the contractor must prove that his men are qualified, whether by training them or bringing skilled people in for the work. In brief, proper maintenance means better and longer futures for parks.

Administration

A park's administration is the key to success or failure. Good administration will tend to bring the people to use the park in the best manner. Park management or administration is responsible for keeping the park in good condition and answering the public's needs and solving problems. The administration of a park should fully absorb and understand the objectives and goals behind the existence of parks. Arranging public meetings, sports activities, neighborhood competitions, and other activities are some of
the urgent needs in parks. In fact, these activities will encourage both strong social relations and the development of personal skills and hobbies. The administrative body of parks should be knowledgeable about public behavior and psychology. Also, they should have good expertise in urban forestry and recreational facilities, maintenance, and planning.

A private agency that provides information about parks is a necessary issue; the National Recreation and Parks Association in the United States is a good example. To make use of its experience in parks and recreation management and maintenance will reduce time and energy of public park officials. However, it must be noticed that what works best in the United States might bring about the opposite result in Saudi Arabia. In fact, administrative bodies are the source that give the park its role and power. And with an administration that knows its users, the park will always progress.
CHAPTER 6

CONCLUSION

1. The planner must think of parks in the very early stages of city planning. Special ordinances and standards regarding parks and recreation are the most important need for future parks. The planner must consider the different relationship between parks and other neighborhood facilities.

2. An agency that will take care of parks in the different regions of Saudi Arabia becomes an urgent concern.

3. Users are the real clients of the park. So, considering their needs and behaviors will insure better results.

4. Considering the natural design concept will enhance the park and make it closer to the natural areas.

5. Dividing the park according to the different types of users will guarantee and maintain adequate privacy for each category.

6. The park is a recreational facility which contains different services which are desired by users. The
absence of one service may reduce the number of visitors or encourage vandalism in the park.

7. Choosing the right materials may go a long way toward reducing construction and maintenance costs.

8. Construction is a very important stage in future park life. Professional working drawings and construction documents are the first issue in the construction stage. Skilled workers are the second issue.

9. Climate is a very important aspect that designers must understand.

10. The designer should, as much as possible, use plants which will thrive in the harsh desert conditions. Color, shade, texture, and form are very important factors in choosing the park's plants.

11. Good maintenance increases the life of the park, and solves problems before the public becomes aware of them.

12. Good administrative agencies will try to bring the people to enjoy the park. The administration must know the park's mission and user behaviors.

Since proper parks and recreation and urban forestry knowledge and practice are not presently fulfilled by staff and labor, a brief but thorough educational program must be developed. This program is to help staff and labor to know at least the basic information about parks and recreation:
1. To set up various films and lectures for staff concerning parks, recreation, and urban forestry.

2. Inviting pioneers in this field to lecture and train personnel.

3. To establish a training program for laborers to provide them with the latest ideas and techniques involving parks and urban forestry construction and maintenance.

4. Maintaining a very good specific academic landscape major in the universities of Saudi Arabia rather than having departments of landscape which are mainly directed toward architecture.
APPENDIX A

PEOPLE AND PARKS

This appendix consists of letters which were sent to the public newspapers concerning parks. Different issues were discussed. Some letters came from average citizens, and others came from officials who answer the citizen queries. Since the public is the real clientele, therefore, listening to their ideas and concerns is a very important matter. However, it is not necessary that the author agree with all the following letters.
1. Trees in Islam

Fig. A.1. Maintaining plants according to the Quran and sunnah, declaring the benefits of planting in Islam. It also shows the importance of maintaining the plants in Islam (Al-Dawa, November 2, 1985).
2. Desert Landscape

Fig. A.2. Desert landscaping as a new idea. -- The writer recommended using natural existing elements of the site. The picture shows a park close to the capital city of Saudi Arabia, Riyadh and how the designer developed the site according to the desert landscape principles (Alriyadh, October 20, 1985).
3. Administrators' Replies

![Fig. A.3a. A reply from the head of Rahimah Municipality regarding cleaning the beaches and developing a seaside park (Alyaum, October 22, 1985).](image)

![Fig. A.3b. Reply from the vice president of Dammam Municipality regarding the rough behavior of a gardener in Qurnatah Park. He promised the users to study the case and take the necessary action (Alyaum, July 20, 1985).](image)
Fig. A.3c. A reply from the head of Dareiah Municipality regarding the absence of parks in Dareiah City. He said that there are many parks under construction, and the municipality will soon add more parks (Aljazeera, October 14, 1985).

Fig. A.3d. A reply from Dammam Municipality concerning delaying the closing hour of Qurnatah Park if most of the users want to stay longer (Alyaum, July 13, 1985).
4. Letters Concerning Privacy in Parks

Fig. A.4a. A female asks the administration of the Half Moon Bay Leisure Park to use female workers on female days, since the mixing of males and females is against the beliefs of Islam (Alyaum, July 10, 1985).

Fig. A.4b. The writer asks to designate private days for families in Shaibany Park in Alahsa, since a lot of families do not like single people to be around them in the park (Alyaum, October 27, 1985).
5. Maintenance

الأشجار تموت طفاً

** حدائق حانئ تسأل المياه!!**

الإحساء أخمد منفجع الملكة المضللة والحظيرة بها. وهم ممسارين في منطقه المناخ الممطرة، لكنهم ليسوا قادرين على استخدام الأماكن التي قاموا بها.دفاعهم في المظاهر المهمة، ولكنهم ليسوا قادرين على استخدام الأماكن التي قاموا بها.دفاعهم في المظاهر المهمة، ولكنهم ليسوا قادرين على استخدام الأماكن التي قاموا بها.دفاعهم في المظاهر المهمة، ولكنهم ليسوا قادرين على استخدام الأماكن التي قاموا بها.دفاعهم في المظاهر المهمة، ولكنهم ليسوا قادرين على استخدام الأماكن التي قاموا بها.دفاعهم في المظاهر المهمة، ولكنهم ليسوا قادرين على استخدام الأماكن التي قاموا بها.

A letter to Ha'ael Municipality asking it to irrigate the parks, since many of the plants show signs of death because of negligence in watering (Aljazeera, October 14, 1985).

A letter asks the Alahsa Municipality to kill the dangerous insects that bite visitors in Mahassen Park in Alahsa (Alyaum, October 1, 1985).
Fig. A.5c. A letter asking the Jubail Municipality to fill the swamps that surrounds the park because of the insect problems and bad smell (Alyaum, July 20, 1985).
Fig. A.Sd. A letter to Khobar Municipality concerning the waste of water when irrigating the urban forestry by the water truck (Alyaum, September 19, 1984).
6. The Public Asking for Parks in Their Areas

Fig. A.6a. A letter from the residents of Haffer Albaten to the Minister of Municipal Affairs asking for parks, since there is only one park under construction (Alyaum, September 11, 1985).

Fig. A.6b. A letter asking for more parks in Qateif, since their is only one existing park (Alyaum, July 15, 1985).
Fig. A.6c. A letter to the Onaizah Municipality asking for a park in a vacant land area (Alyaum, October 16, 1985).

Fig. A.6d. A letter asking Safwa Municipality to turn this vacant land into a park, since the existing small parks are not enough (Alyaum, September 14, 1985).
رسالة مفتوحة إلى
رئيس بلدية منطقة حائل

على طريقة الختام، و عمم و عصم من
التي ندب لمبادئ كثيرة من أجل تنمية
والصحبة العامة. يتضح لنا كيف}
EXECUTIVE COMMITTEE-
جاجية، وضمنًا من الحذاء الهذيان،
كثيرًا من النزلة المعمارية. هل
шихيبها من كل كثافة وأمتداد
من[d] إصدار هذه القضية، بلبااء
لعبة في مجال نشاط قديم علا
هبنا النية، ورغمها عام 1985.
لDropDown إصدار في النطاق
المشكل ي.NotNull في خيال
الشمال القابض، من ملعب الكحلا
وإدراكه: إذا آتيت هذه العملية
البيانات، استمتعنا هذه المرة
بما على ما بعينة هذه الشهيرة
بالeker. وهو كأن
بإذاعة هذه الشهيرة تُبد
الإمام...
وفي النهاية، الإجابة أن تكون وفق
بلغ هذه الشهيرة، التي تأتي
الدكاتري من كل انتمائ، الذين
للضة: هم ساكنهم، للنحو الأصلي
الذين الأبد أو خارج البلاد
وينزوغون الحفيز سماعتكم. بكل
 pesticlar من الأشياء.
ووفقًا للكل ما نقله صالح
فوق ومت الواقع،
عبدو الفحوش بلغ المعرفي

Fig. A.6e. A letter asking Khamis Moshaita Municipality to turn some vacant land into parks (Alyaum, September 19, 1985).

Fig. A.6f. A letter to Ha'ael Municipality asking for a zoological park in Ha'ael City (Alyaum, October 16, 1985).
Fig. A.6g. A letter asking Alahsa Municipality to construct a park in Alshoqaiq village (Alyaum, September 4, 1985).

Fig. A.6h. A letter asking Alahsa Municipality to construct a children's park in Alououn City (Alyaum, September 19, 1985).

Fig. A.6i. A letter asking for a park on Tarot Island (Alyaum, September 16, 1985).

Fig. A.6j. A letter to Abqaiq Municipality asking it to increase green areas (Alyaum, August 21, 1985).
7. Services

Fig. A.7a. A letter concerning providing access for disabled people to use existing recreational facilities (Alyaum, September 4, 1985).

Fig. A.7b. A letter to Abqaiq Municipality concerning adding some important services to the existing park (Alyaum, September 11, 1985).
8. Vandalism in Parks

Fig. A.8a. A letter regarding vandalism in Garah Mountain Park because of the lack of maintenance and administrative personnel (Alyaum, August 21, 1985).

Fig. A.8b. A letter concerning vandalism in parks (Alyaum, August 20, 1985).
APPENDIX B

PICTURES FROM THE EXISTING PARKS
Fig. B-1. Ice cream, refreshment and sandwich vehicles are usually parked next to parks because of the absence of this kind of service inside.

Fig. B-2. There are usually plastic lighted signs at each park entrance. In fact, wooden signs are more appropriate to the environment of the park.
Fig. B-3. The central fountain of King Saud Park is a copy of the same fountain in every park.

Fig. B-4. Some people like to sleep or relax in the shade during the hotter times of day.
Flood irrigation is the common irrigation system in the parks of Saudi Arabia.

Washingtonia species is planted heavily in spite of evidence that Washingtonia species are provide neither shade nor fruit.
Fig. B-7. There are special standards for park structures and materials, to give them the ability to resist public use.

Fig. B-8. Maintenance is a very important stage in a park's life.
APPENDIX C

PRUNING TECHNIQUES

Pruning is a very important step for trees. In fact, pruning will enhance tree shape and contribute to their health. The following figures show the different pruning steps and techniques (Hitchings, 1981).

Fig. C.1. Branch attachments. -- (a) Weak, narrow angle; and (b) Strong, wide angle.

Fig. C.2. Well-spaced branches are less likely to split out or break than those close together. -- (a) Well-spaced branches; and (b) Close together branches.
Fig. C.3. Two limbs, one over the other, interfere with the proper development of the other.

Fig. C.4. Branches retain their position on the trunk, but as they increase in diameter they become closer to the ground.
Fig. C.5. During the growing season, a nonbranching leader can be pinched to induce development of laterals. The two pinches induced branches to occur at the heights desired (leaves removed).

Fig. C.6. Pinching of the two lowest laterals (left) will keep the upper lateral and leader from being "choked out" (right).

Fig. C.7. When a leader has lost its dominance (left), select a new one (right) by thinning out the original.
Fig. C.8. A headed tree will force many vigorous upright shoots. -- The tree loses its natural form.

Fig. C.9. Thinning reduces the height of and opens up a mature tree (right), retaining the natural appearance and form of the tree (left).
Fig. C.10. Removing a large limb; first cut at (A), second at (B), final cut made at crotch (C).

Fig. C.11. For close, easy cutting, place blade next to trunk and cut up.

Fig. C.12. Final cut made at shoulder rings.
REFERENCES


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