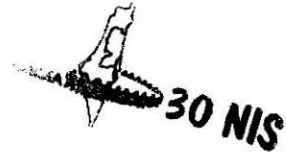


**KHALED A. KHATIB**

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THE  
CONSERVATION  
OF **JERUSALEM**

**PASSIA**

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# Introduction

## **The Conservation of Jerusalem - our Old City**

The national and international book markets have never been short of literature on the City of Jerusalem in general and the Old City in particular. Available publications vary between map/photo formats, investigative research and statistical analysis. Politics, history and archaeology are amongst the most popular themes; the City's architecture is a common element present in discussion, described alone or in conjunction with other issues. Descriptive accounts constitute the bulk of architectural literature. Authors have generally concentrated on the outstanding beauty and exotic nature of the ancient city. Thus the first part of this report attempts to cast some light on the more practical, "real-life" issues largely ignored in the past.

In my work as an engineer in charge of technical and administrative affairs related to maintenance and restoration operations in the City's Moslem Quarter, I have come to understand the inconveniences and more serious drawbacks of Old City residence as observed and felt by its own inhabitants. Our work brought us into close contact with the residents during work carried out in their dwellings and led to a clearer understanding of their daily social, political and economic situation.

As an Arab and a native Jerusalemite, I am greatly concerned with the welfare and well-being of my fellow country- and towns-people currently living within the City walls. With the future in mind, I am convinced of the importance of a detailed report on living conditions in general, and, in particular, what is being done to preserve the City's heritage. Technical terminology has been limited in order to reach the widest possible readership. The main goal of the publication is to bring to the attention of all concerned the undesirable features of Old City residence presented within their context, and including a look into the past and to the future. We hope that, once publicised, the findings of the report may encourage local and foreign organisations and individuals to take swift action towards providing material and moral support to the City's residents and bodies working for its preservation.

## **Chronology of major construction and architectural periods**

### ***Pre-Roman peoples in Jerusalem***

Kanaanis c. 3000 B.C. onwards

Egyptians 1550-1230 B.C.

Philistines and Israelites 1221-587 B.C.

Ashoreans, Babylonians, Persians and Greeks 560-65 B.C.

***Romans 65 B.C.-314 A.D.***

An amphitheatre and a huge palace were amongst other structures constructed in the south-western corner of the City during Herod's reign. The City's prestige, temporarily lost to Caesarea, was regained in 37 A.D. when Herod's grandson claimed the throne. Herod Agrippa immediately ordered a costly facelift for the City, building palaces, theatres and other public structures. New neighbourhoods were established within the City walls which in turn expanded to accommodate the new construction. Soon after the Jewish exodus, its new ruler ordered that Jerusalem be razed to the ground, only to be rebuilt in 139 A.D. on its ruins.

***Byzantines 314-636 A.D.***

Palestine at that time belonged to the Eastern Roman Empire, Byzantium. Christianity soon commanded a large following. In 335 A.D. the Church of the Holy Sepulchre was built and the Wall of Jerusalem expanded to include the holy site. During the Byzantine reign, numerous churches, hospitals and other Christian institutions were established in the City. Almost three centuries later, in 614 A.D., the Persian Emperor Kiswa conquered Jerusalem; however, only fifteen years later, the legendary Roman Emperor Heraclius recaptured the City along with the rest of Syria and Palestine.

***Islam***

Following successive Moslem military victories over the Romans in Syria and Palestine, the Moslem Caliph Omar was invited by Jerusalem's Patriarch to take over the City.

***Umayyads and Abbasids 660 A.D.***

Towards the end of the reign of Ali, cousin of the Prophet Mohammad, the Umayyad caliphate was established with Damascus as its capital. The Umayyad rulers however gave favour to Jerusalem. Special attention was allocated to architecture, as the Dome of the Rock and the Aqsa Mosque majestically testify. Umayyad control over Jerusalem came to an end in 750 A.D. with the emergence of the Abbasid dynasty in Iraq. The City's previously strategic role diminished as attention shifted towards the coastal towns such as Ramla.

In 784 A.D., the City suffered a major earthquake, causing severe structural damage to the most stable of its buildings; in particular the Aqsa Mosque. Subsequently it was restored, along with the Dome of the Rock.

***Pre-Crusader Jerusalem***

Tolonians, Akhsheeds, Seljuks and Fatimids exercised control over Jerusalem during the one hundred or so years before the Crusader invasion. Fatimid ruler Al-Hakem ordered the demolition of the Church of the Holy Sepulchre in 1008.

***The Crusaders 1099-1187 A.D.***

During fighting between Seljuks and Fatimids, Crusaders overpowered both. After a prolonged siege and many fierce battles, Jerusalem finally surrendered to the invaders and Moslem control over the City was temporarily lost. Historians described the atrocities committed by the invaders as they swept into the City.

The Church of the Holy Sepulchre was one of the few beneficiaries of the Crusader occupation of Jerusalem. Renovations carried out at the time included the joining of the individual church structures on site under one roof as well as constructing additional sections. A new hospital and inn, traces of which are still evident today, were also constructed during their reign.

***Ayyubids 1187-1250 A.D.***

Salah Eddin Alayyoubi defeated the Crusaders, finally liberating Jerusalem in 1187 A.D. Salah Eddin ordered removal of all Christian imposed decorations in the Dome of the Rock and Alaqsa Mosque. Major achievements in new construction and architecture during his reign include: a hospital, the Muristan, in the vicinity of Dabbagha Market (traces of its stone foundations can be seen today); the Salahieh School near St. Stephen's Gate just inside the City Walls; Al-Khankah Alsalahieh next to the Church of the Holy Sepulchre; Yousef's Dome, a few yards from the Dome of the Rock; and the Wall of Jerusalem was rebuilt with added towers.

In order to ensure an Arab majority within the City, the leader brought Arab tribes such as Bani Hareth and Bani Murra into various neighbourhoods. Most influential of Salah Eddin's descendants was King Issa, who was especially known for his deep affection for Jerusalem. Many architectural accomplishments stand as proof of that today: the Muathamiyya School, a few hundred yards along the Via Dolorosa from St. Stephen's Gate; the seven portal arches just north of the Aqsa Mosque; the central tower of the Castle (Citadel) at Jaffa Gate; Sabil Shaalan to the north side of the Haram; the Badriah School in Alkirami neighbourhood. A side street in the Bab-Hutta neighbourhood is named after him.

According to the terms of a treaty signed between King Issa's brother, Al-Kamel, and the Faranj's (Westerners) King, the City of Jerusalem, excluding the Haram Al Sharif compound, was handed over to the latter for a brief period ending with King Alnaser's invasion in 1239. Ayyubid reign in Jerusalem ended with the death of their King Giath Eddin in 1250 A.D.

***Mamluks 1250-1517 A.D.***

The first Mamluk Family was established in 1250 A.D. by King Almuizz in Egypt. During the three hundred years of Mamluk dominance over the Holy City, they established schools, *ribats*, *zawiyas* and convents throughout the City, particularly close to the Haram perimeter. Magnificent decorated stonework was their trademark in architecture as observed in many of the Old City's existing structures. Souqs, pathed

archways, *sabils* (drinking fountains) and *khans* (inns) were amongst other Mamluk achievements in architecture. The Mamluk dynasty was finally displaced by the Turkish Sultan Saleem in 1516 A.D. who peacefully conquered Jerusalem a year later in 1517.

### ***Turks 1517-1917***

The Ottoman Empire occupied the land for 400 years. Despite being ruthless, the governors of Jerusalem were generous in their efforts towards restoration and new construction projects in the City, especially during Sultan Suleiman's reign (1520 -1566). The Wall of Jerusalem was renovated over a period of five years with the replacement of a considerable number of eroded stones and other material. In addition, the Dome of the Rock was completely retiled, with its walls and dome completely repaired, along with those of the adjacent Haram Alsharif compound. All fountains inside the City walls were repaired and improved. A school (Madrassa Alrasasiyya) and an Orphanage (Tikiyyat Khasqui Sultan) were also established during the Sultan's reign. At that time the City accommodated within its walls the following structures of architectural significance:

- Six Turkish baths (*hammams*);
- Eighteen drinking water fountains (*sabils*);
- Five Christian churches and two Jewish synagogues;
- Two hundred and forty *mihirabs* (Moslem praying sites);
- Seventeen homes for teaching Koran and Islamic religion;
- Seventy convents (*ribats, zawiyas, khankas*);
- Two thousand and forty five stone, vaulted shops;
- Six inns (*khans*) and several markets.

Jerusalem, with the rest of Palestine, was granted to the Egyptians according to a later treaty between the two armies. Turkish troops swept into the City soon after the Egyptian army's departure in 1840 and stayed there until 1917 when the Ottoman Empire was finally dissolved and defeated by the Allied forces at the end of World War I. Other major Ottoman achievements in Jerusalem and Palestine are as follows. A railway line was opened in 1892 between Jerusalem and Jaffa, with a total length of 87 km; the first major highway joining the two cities was completed in 1867. The town hospital was rebuilt in 1891 in the west side of Jerusalem. The first windmill was built in 1839. The Citadel, near Jaffa Gate, was wholly repaired, adding a few adjoining structures in the process. The Clock Tower, a magnificent square tower with four huge towers at the top of each side, was built in 1909 on top of Jaffa Gate. In 1863, the local authority ordered the removal of all market platforms in order to create additional space for pedestrians. In 1885, old street tiles were replaced in all of the City's alleys and main streets, with the provision of side channels for drainage.



***Twentieth Century: Turkey, Great Britain, Jordan and Israel***

On the eve of the ninth of November 1917, the British army swept into the Holy City following the Ottoman pullout, and immediately assigned a military governor to administer local affairs. Three decades of British colonial rule paved the way for the establishment of a Jewish state in 1948, a year known by hundreds of thousands of homeless Palestinian refugees who were scattered over the adjacent Arab countries as the year of "the Catastrophe" or *Al-naqba*.

The Jordanian and Palestinian peoples were so interrelated socially and economically, that the inclusion of part of Palestine in the Hashemite Kingdom was not wholly considered as occupation at the time, with all efforts directed towards fighting the common enemy, the state of Israel.

Under Jordanian rule, Jerusalem thrived as a major tourist spot, frequented by visitors from all over the world. In 1967, the weakness of Arab armies and their unwillingness to fight, invited the expansionist Israeli army to an easy victory, which resulted in further homelessness and deprivation for the Palestinians.

Less than six months since the six day war had elapsed before major town planning projects were initiated all over the City. The startling speed with which new suburbs of sky-scrapers and stepped residential buildings were created at strategic locations in and around East Jerusalem exceeded the time period Jerusalemites needed to absorb the shock of their defeat. At present an almost uninterrupted circle of "Settler' Cities" totally engulf East Jerusalem literally strangling the Arab population and greatly limiting their building expansion possibilities. Arab land confiscation orders were issued together with strict local building regulations forcing immigration of local residents into new neighbourhoods outside the City limits.

The recent inauguration of the No. 1 highway along the western edge of East Jerusalem conveyed the symbolic message to locals and outsiders alike, that Jerusalem's unification was irreversible. Further confirmation was provided by intensive new construction activity centred around the new North - South highway, namely the yet to be completed over 100,000 square metre David's Village Project at Mamilla, (just outside the Old City's Jaffa Gate) the Dan Hotel, under construction at the New Gate / Jaffa St. intersection and the swiftly rising new Border Police Headquarters complex in Sheikh Jarrah exactly at the east edge of the new highway. It is worth pointing out that the last project is being constructed on Islamic Waqf (Trust) owned land. Palestinian residents of Jerusalem however vowed to reject and defy the unlawful annexation of the City. Armed with unwavering determination and driven by strong nationalistic and religious beliefs Arab Jerusalemites have not lost hope, despite their seemingly desperate cause, and have continued to defend their rights against extremely unlikely odds.

Over five years of Intifada has left many Jerusalemites dead, injured, imprisoned or deported by Israeli authorities. East Jerusalem City centre and Arab neighbourhoods have become almost completely out of bounds for Israeli citizens in spite of the huge police/military presence.

Palestinians have still not given up their struggle for Jerusalem despite continued Israeli refusal to discuss the subject. Senior Palestinian peace negotiators acknowledge that the issue of Jerusalem is one of the main causes behind the continued lack of success in the eighteen month old Middle East peace process.

Nowadays Jerusalem is again at the centre of attention as the iron - fist government of Yitzhak Rabain continues to forcefully impose the March closure of the West Bank and Gaza restricting their residents' entry to East Jerusalem and causing severe economic hardship for the local population.

With this present day update and the preceeding brief historical review as background, we shall now move to the main core of this text, the most ancient part of Jerusalem, its Old City. The inclusion of a brief reference to twentieth century social and demographic developments inside the Old City aimed to serve as an introduction to more real and relevant issues and to facilitate a transition into the technical part of the text.

# I. Social Structure and Geography

## Introduction

The Holy City of Jerusalem had been a favourite topic for historians of all countries over the centuries. Ownership of the City has been disputed by East and West, and until this day, Jews and Palestinian Arabs claim the City as their own, on the basis of historical and religious arguments. Eastern and Western historians have described the Old City of Jerusalem, its buildings, alleyways and the way of life of its people, through innumerable narratives, pictures, even films. The City's famous markets, bazaars, inns, *hammams* (public baths) and coffee shops have captured the attention of millions of foreign visitors. Surrounded by its magnificent stone wall, the Old City appears to its admirers as a vast open museum that boasts among its exhibits ancient remains and holy shrines, and a unique mixture of inhabitants representing the three great monotheistic religions, and cultures including Armenian, Turkish and Greek.

Regretfully, the majority of today's inhabitants of the City fail to appreciate the City's unrivalled style and beauty. Both sides attend to the badly needed maintenance and restoration of their respective properties inside the City walls, but have also been engaged in an undeclared war, resulting in frequent long and costly legal battles over the possession of property.

Since the six-day war in 1967, during which the Israeli army conquered East Jerusalem including the Old City, the new possessors have gained the upper hand in repossessing Jewish-owned property previously held by the Jordanian government. Israelis have also successfully claimed a number of non-Jewish buildings through legal purchase or less "legal" expropriation orders. Despite over two decades of Israeli occupation, and the Israeli judaisation policy, East Jerusalem has succeeded in preserving its traditional Arab identity.

All nations, including Israel's staunchest supporters, have so far refused to recognise Jerusalem as the Israeli state's capital. Whatever the future of the Holy City, it is certain, that in spite of all its troubles, Jerusalem shall remain one of the most fascinating cities on earth.

## Social Structure

It is impossible to obtain a genuine understanding of the contradictions and complexities of the social structure of the Old City of Jerusalem from statistics or maps. In order to present a complete picture of the City's present state, in terms of social and cultural development, it is essential to look back to the City's history and to the significant changes that took place, and to the political and economical events of the first half of this century.

### ***Demographic changes***

The Old City has until recently been the most densely populated area in the whole region, although now losing that status to the newly established suburban neighbourhoods outside the City Walls, favoured by the middle classes of Arab society. It had become accepted that only those who cannot afford to live elsewhere continue to dwell inside the walls.

After the Turkish departure from Palestine, and the British takeover, the scene was set for major social, economic and cultural change, especially in Jerusalem. Until the late twenties, residents of the City were mainly Moslem and Christian Jerusalemites, with the latter predominantly in the Christian Quarter of the City. Neighbourhoods in the Moslem Quarter were divided into exclusive family enclaves in which poor as well as rich members of the same family lived side by side. Class divisions were less apparent in those times. Expansion of the City became inevitable as large numbers of villagers and townspeople from other parts of the country flocked into the City looking for employment and the superior standard of living enjoyed by the Capital's inhabitants. The natural choice for native Jerusalemites was to move out of the overcrowded Old City into the surrounding areas.

### ***Local Environment***

Lack of space had always been one of the more undesirable features of Old City residence. Even the finest homes could boast only a few rooms and narrow flowerbeds in place of open gardens. General and local access were far from ideal, with steep staircases and crooked streets. Public services and facilities were primitive. Deficiency in living space was one of the more serious drawbacks, forcing large families, normally including more than one married couple, to squeeze into one or two bedroomed homes.

### ***Social and Cultural influence***

Inhabitants of multi-religious communities such as Jerusalem were generally more influenced by western culture than those of Moslem communities. Social norms differed between native Jerusalemites and newcomers to the City. British presence had widened the existing cultural gap even further. Contact with a western civilisation also encouraged Old City inhabitants, who included a large number of western-educated individuals, to look for better and more comfortable living conditions, even if that meant departure from their birthplace. On the other hand, new residents, in particular poorer Hebronite families who provided the locals with cheap and abundant labour power, were content with prevailing conditions inside the walls. It was not uncommon for families of twelve or more members to share a single 3 x 3 metre room.

### ***Other Factors***

Other factors led to environmental change inside the Old City. People did not need to live in closed communities within confined boundaries as before. Social and family ties became less significant in more open modern society. Another major restraint in the way

of expansion was transportation. The invention of the motor car, however, made easy and comfortable travel a luxury many could afford. Modern destructive weaponry made a mockery of stone wall defenses, and people could no longer be protected by high walls.

### ***Post-1948 period***

Following the establishment of the state of Israel in 1948, a large number of Palestinian refugees, who were forced out of their homes during the war, moved into cities and their adjacent refugee camps throughout the West Bank and Gaza Strip. Jerusalem, and especially the Old City, received its share of these incomers, changing the population composition dramatically to include residents from all districts of Palestine.

During Jordanian rule, the economy improved, largely due to the then flourishing tourist industry. More and more native Jerusalemite families abandoned their Old City homes and shops, and either moved into the new suburbs or left the country altogether, to Arab countries, the Gulf or the United States. When the 1967 war broke out, the less financially able Jerusalemite families shared the homes of the Old City with lower class families from towns and villages throughout Palestine. The six-day war shifted the balance even further in favour of incomers as both Christian and Moslem families became more dissatisfied with living conditions inside the walls. Subsequently, the destructive effect of occupation on the local community was more severe in Jerusalem than any other town.

### ***The Jewish Quarter and archaeological excavations***

Soon after taking control of the Old City, the Israeli authorities subdued the local population into accepting their new status. A previously prepared plan, involving the mass expulsion of Arab families from the Jewish Quarter of the City, was immediately put into effect, with the resulting transfer of hundreds of Palestinian refugees, most to Shufat refugee camp, a few miles north of Jerusalem. A similar fate awaited the members of a notable Jerusalem family who had previously lived within the confines of their own Zawiya compound on the southern edge of the Haram Al Sharif.

While a small proportion of both parties accepted some financial compensation for their property, the majority refrained from doing in order not to be labelled "collaborators". Subsequently the whole Zawiya area was completely demolished to make way for new residential buildings in the Jewish Quarter and for archaeological excavations.

Further archaeological excavations took place at other locations all over the City, mostly in areas closest to the Western (Wailing) Wall. At Bab-al Hadid, close to the Haram Gate, a number of Moslem families were evicted from their homes in response to evidence of severe structural damage and signs of imminent collapse. The Israeli authorities partly remedied the situation by installing support beams and stanchions underneath the affected areas, and steel tie beams across opposite load-bearing walls. No attempt was made to compensate the homeowners.

***Boom in tourism***

A large influx of tourists poured into the Old City each year, especially during the seasonal religious festivities. Merchants of all trades turned in great numbers to dealing in souvenirs and antiques. Youth hostels, bars and street cafes became very common among a traditionally conservative society. The Old City was popular with Israelis, who flocked into the Old City especially on Saturdays, the Jewish holiday. In order to gain a share of this lucrative market, non-Jerusalemite Arab merchants set out to purchase Old City stores for highly inflated prices compared to similar property in other parts of the country. As a result, most of the available shopping space in the City, even outside the walls, is currently either owned or leased by non-Jerusalemites, particularly from Hebron and surrounding villages.

***Western culture and influence***

With regard to social customs, the predominantly Moslem majority were much more conservative than the more open, modern and "permissive" Israeli society (excepting the ultra orthodox Jewish population). As closer contact was established between the two communities, new social values began to reach the Arab residents, particularly the young. Drug dealing and addiction, robbery, even public and private brothels came to exist, to the shock and disgust of the vast majority of the population. As a result of fear of criminal behaviour, Old City streets became almost deserted at night. This was for want of action on the part of the local police, whose almost total negligence of what are termed "non-security" offences in the Arab sector exacerbated the situation.

***Living Conditions***

Today, a wide gap separates living conditions on either side of the city walls. The ancient architecture of the City, despite being admired by many, does not fit modern home requirements. City planning, and the state of streets, markets and public areas, leave much to be desired. Basic public services, such as sewage disposal, are either non-existent or do not function properly. To a certain extent, local conditions are comparable with similar inner-city neighbourhoods in large western cities, where even education and employment levels are far below those in the wealthier suburban districts. A large proportion of Old City children drop out of elementary school without minimum levels of education.

***Better Qualities of Old City residence***

***Self-respect and tradition*** For many native Jerusalemites, a strong attachment to the City outweighs all else. Many Old City streets are named after prominent families, testament to denote their ownership of most property in the vicinity. Especially for the older generation, their continued existence in such locations provides the only remaining cause for pride in an otherwise wholly materialistic world.

**Low rent** Local civil law presents benefits for long-standing tenants and a nightmare for property owners. According to Jordanian law, still applicable in the occupied territories, all pre-1967 rent fees are fixed and changeable only by agreement of both parties, tenant and landlord. High annual inflation is not accounted for. Most existing agreements also include a clause making it permissible for tenants to sublet property, a practise that restricts attempts by owners to improve their property returns or renew older lease agreements.

In many instances, rents have become so minimal after enormous depreciation over the years that landlords do not bother to collect it. In other cases, the smallest available banknote today has become many times greater than the yearly rent. In general, even in post-67 leases, rents are still very low in comparison with New Jerusalem property. Old City residence provides economic shelter for the poorer classes from the inflated cost of living outside the walls. Native Jerusalemite families still living inside the Old City generally do not pay rent, their homes being owned by family Waqf trusts.

**Proximity to city centre** An appreciable advantage of Old City residence is its proximity to the commercial centre of Jerusalem, both Arab and Jewish sectors. Most shops, bus and taxi terminals and public buildings are within walking distance of all of the Old City's neighbourhoods.

**Close community relations** Despite the fact that most residential neighbourhoods extend over a wide area, inter-community relations between the furthest apart of neighbourhoods are extremely close.

## **Geography**

Countless tourist maps, guide books and similar publications show the Old City layout. Such sources, however, focus on historical and religious sites, rather than residential districts or markets. In terms of geographical division, the Old City consists of the Haram Al-Sharif Compound; the Moslem Quarter; the Christian Quarter; the Jewish Quarter; the Armenian Quarter; and the Market area.

### ***The Haram Al-Sharif Compound***

The sacred Moslem enclosure occupies the south-eastern corner of the Old City and approximately one fifth of its total area. It shares a common stone wall boundary with the Old City perimeter on the east and south sides. Residential buildings border the Haram's high walls from the north and west sides. With a total area of 144 dunums (1 dunum = 1,000 square metres) of magnificent scenery and splendid architecture, the Haram is one of the most popular tourist attractions in the whole country if not the world.

The Haram compound is best known for the Aqsa Mosque and the Dome of the Rock, two of the holiest and most glorious Moslem shrines in the world. The Dome of the Rock, in particular, is noted for its magnificent interior design and decoration, blending beautifully the best of Roman and Umayyad styles. Both structures were first built during the Umayyad era and were restored and refurbished by successive Moslem rulers. The adjacent well laid-out surround of slightly elevated stone platforms creates an impression of visual continuity over the whole Haram area, and the uniform and elegant manner in which the Dome platform joins the surrounding lower levels of the Haram are a joy to the eye and add to the same illusion of continuity.

Other well-known, if less spectacular, structures within the Haram compound include the Dome of the Chain, Yousef's Dome, Alkaas (Cup) Fountain, Kait Baay Fountain, Al-Qubba Al-Nuhawiyya, and the Stables.

Moslems can enter the Haram compound through ten gates, while others are only allowed through three gates, all on the western side. Tourists pay an admission fee collected by the Waqf. The Haram is wholly owned by the Islamic Waqf Trust. Until a few years ago, the Waqf, and thus the Haram, enjoyed a rare autonomous status, with civil employees of the Waqf completely in charge of maintenance and security. Today, heavily armed Israeli police and soldiers conduct their own security searches and inspection within the Haram perimeter. These security measures often puzzle the Haram's millions of visitors. The blame for these unprecedented actions can be placed on political instability and the increasing trend of Jewish Israeli extremism. Anti-Arab, and especially anti-Moslem, extremist organisations, the Temple Mount Faithful and others, have frequently incited their supporters to attempt to hold Jewish prayers inside the Haram perimeter with the undeclared approval of the Authorities. In addition to two fatal earlier attacks, the 1969 Al Aqsa blaze and the shooting at the Dome of the Rock in 1981, the Haram was the scene of the killing of seventeen Palestinians in October 1991.

In order to counteract Israeli policies and escalating harassment in the area, the local Arab leadership, in cooperation with the Administration of Waqf and Islamic Affairs, has attempted to boost Moslem presence inside the Haram, and refurbished the majority of previously abandoned structures within the enclosure for office use, such as rooms on the northern side of the Dome platform repaired during the early eighties, which Waqf clergy and other personnel occupy at present. The beautiful domed structure of Al-qubba Al-nuhawiyya, on the southern edge the platform was also restored to serve as the general headquarters of the Mufti of Jerusalem and the Moslem Legislative Court staff, and hosts meetings of the Supreme Moslem Council.

Another significant achievement in the same field was the renovation of the Women's Mosque structure attached to Aqsa Mosque's western side. It now houses offices and lecture theaters for an Islamic higher education institution, the campus of which is located in a northern Jerusalem suburb.

The Waqf also runs a number of schools and a kindergarten on the north Haram boundary. Another two prestigious facilities operated by the Waqf are the Islamic



Museum, and the Islamic Library which occupies the first floor of the Madrassa Al-ashrafiyya on the Haram's western side.

A special committee for the restoration of Al Aqsa Mosque, partly affiliated with the Waqf Administration and set up in 1969 following the Mosque's partial demolition by a Jewish arsonist, employs architects, technicians and specialised craftsmen. Although their focus is restoration of the damaged section of the compound, they carry out regular maintenance operations at other structures within the Haram compound.

### ***The Moslem Quarter***

In geographical terms, no exact boundaries can be specified for each Quarter of the City, the term "Quarter" being unaccepted by local residents, who insist that it denies the Moslem majority their traditional association with the City as a whole. Whereas the Christian, Jewish and Armenian Quarters occupy smaller areas with, more or less, well-defined boundaries, Moslem-owned buildings are scattered all over the City. It can be said that "the Moslem quarter" extends to all residential sectors of the Old City excluding the above-mentioned Quarters. Included in this definition are the densely-populated Bab Hutta and Harat Al-saadiyya neighbourhoods in the northern sector of the City; Al-wad road, Via Dolorosa and Aqabat Al-Khalidiyya in the central sector; and Bab Al-silsileh road and Harat Al-sharaf in the south-central sector of the City.

In general terms, we can say that a rectangular strip, approximately 700 x 1000 metres, bounded by the markets to the west and the walls on the remaining three sides, is almost exclusively Moslem owned.

### ***Property ownership***

Property ownership in the Moslem sector of the Old City is very complex. In general, buildings are either privately owned or, the vast majority, owned by Waqf trusts. Waqf property is divided into the two forms.

***Absolute (Sahih) Waqf:*** This form of property is wholly entrusted and managed by the General Moslem Trust in Palestine. According to Islamic laws, its ownership is not transferable under any circumstances. An ancient practice of wealthy Moslem families or individuals was to entrust property to the Waqf so that certain sectors of the Moslem population could benefit directly or indirectly from its revenue. In the process, this ensured that it would remain permanently in Moslem hands.

***Family (Zurri) Waqf:*** As the name implies, this form of property is entrusted as a single family's Waqf. Revenue can be divided among all eligible beneficiaries of the family. As in Waqf Sahih, ownership is not transferable except under certain circumstances, such as the approval of all beneficiaries and the Moslem Authorities. In addition to its collective long term benefit, the old tradition of Family Waqf was widely popular with the wealthier Jerusalemite families. Two significant benefits of the process were, firstly,

to preserve the family name and prestige for future generations and, secondly, to provide extra income to the less able members of the family.

The two forms of Waqf account for over 80% of all property in the Moslem sector of the Old City. Privately owned property accounts for the remaining 20%, most situated in the northern sector.

### ***Architecture***

Moslem neighbourhoods are known for their old deteriorated buildings, which are generally domed, with two or three storeys and stone tiled surfaces. More recently constructed buildings exhibit flat or Spanish-style sloping roofs with the red clay tiles preferred by wealthier owners. A detailed description and analysis of Moslem sector architecture is presented shortly.

### ***The Christian Quarter***

Many churches and other Christian institutions are located in the north-west part of the Old City. These form the better part of the Christian Quarter of the City, bounded by the walls to the north and west, the Khan El-zeit market to the east and Damascus Gate to its south side. The vast majority of property within the Quarter perimeter is Church owned. Dwellings are often attached to main church structures as residence for poorer followers of the church.

The holiest Christian shrine inside the City is the Church of the Holy Sepulchre, first built in 340 A.D. The present day compound is the result of numerous additions and alterations, including very recent renovation. The Compound consists of a structure of many buildings, with a spacious uncovered front yard with entrances through two opposite gates on the north and south sides of its high stone wall.

Immediately south of the Church are two of the ancient Old City markets in the Christian Quarter, Al-Dabbagha and Aftimos, both famous for their jewellery and souvenir stores and, until recently, leather markets. Further to the south, the visitor faces the Lutheran Church and its tall spire. A number of the most respected educational institutions in the City are situated within the Christian Quarter and run by churches, teaching both Moslem and Christian Arab students. A number of properties in residential and market areas are owned by Moslem families but have been leased by Christian families for many years. Many deeds to such property date back to the Salah Eddin era.

The size of the Christian minority has diminished steadily for many decades. Christian residents of the Old City, more so than their Moslem counterparts, have left their property, lured by the superior living conditions outside the City walls or life beyond Palestine. Shop owners in particular were tempted by the large sums of compensation offered by local Moslem merchants in return for their property. This phenomenon was best exemplified in the Christian Quarter road which was until recently an almost exclusive Christian enclave, with merchants of all trades. Today, over two

thirds of shops in the road are owned by Moslems, most dealing in souvenirs. This transformation was most rapid in the years following the Israeli occupation of 1967.

In comparison with dwellings in the Moslem sector of the City, Christian living quarters are superior and better equipped. Basic services such as sewage disposal are generally provided and regular structural maintenance performed. This is largely due to the great care afforded by Churches to their followers.

### *The Armenian Quarter*

The Armenian Quarter occupies an almost rectangular strip at the south-western corner of the Old City. Most Armenians live within the Armenian monastery compound. In addition to a schools, a sports club and playing fields, the compound includes a large convent and residential facilities for Church staff. A large proportion of Armenian families previously living in the monastery and adjacent buildings have recently been rehoused in a new multi-storey block on the eastern border of the Quarter.

Other Armenian families live in various locations in the Old City such as a large church-owned building at the intersection of Alwad road and the Via Dolorosa, opposite the Austrian Hospice. A handful of poorer families occupy quarters in the densely populated Moslem sector.

Armenians were by tradition expert hand-craftsmen and jewellers. Their high quality exclusive products have invited purchasers and admirers from all over the world as well wealthy locals. Armenian jewellers, photographers and specialised cooks operate businesses in the Dabbaghah market and adjacent streets.

As among the Christian population generally, a sizeable proportion of Armenians have chosen to move out into the suburbs; many have emigrated to the United States and elsewhere. Economic and political factors were behind this trend: the continued political instability and the unpromising prospects of socio-economic progress in the region. Armenian-Arab relations have always been marked by mutual respect and non-interference.

### *The Jewish Quarter*

Surrounded by the Western (Wailing) Wall Plaza from the east, the walls of Jerusalem from the south, the markets from the west and Chain Gate road from its north side, is the new residential Jewish Quarter. After forcibly evicting in 1967 5,000-6,000 Arab residents then living within the Quarter, the Israeli government set about its reconstruction. The 40 dunums owned by Jews in 1948 became 110 dunums after a series of expropriation orders issued by the government in 1967.

Reconstruction of the Jewish Quarter has been a main Israeli concern in the Jerusalem area, and the housing of 5,000 Jewish residents inside the Old City aimed to establish an irreversible political fact in the City. After prolonged arguments between politicians and archaeologists, an agreement was reached as to what to do with the newly acquired land. Ultimately, both paths were followed, new construction and archaeological

excavation. In total, 600 apartments were made available for occupancy, half of which were restored old buildings, half completely new structures.

Archaeological excavations revealed the *Cardo*, a complex dating back to Roman and Byzantine times, remains of a number of old synagogues and other finds from the Second Temple period. All sites are open for public display.

Critics of the new Jewish Quarter dismiss its apparent prosperity as out of place. In contrast, some have been known to remark that the old buildings overlooking the Western Wall look out of place surrounded by renovated new structures. Through its Ministry of Tourism, the Israeli government has continued to manipulate the new Quarter, to direct foreign visitors to look at the City on the government's terms. During organised tours of the City, tour guides make sure of a long stay inside the Quarter in order to convince tourists of the authentic Jewish heritage in the City. Tour guides are generally discouraged from elaborating on thirteen centuries of Moslem tradition in Jerusalem.

### ***The Markets***

Like other ancient cities, the Old City of Jerusalem contains its share of exotic *souqs* (markets). The majority of markets are situated along a thin strip extending from Damascus Gate in the north to the Jewish Quarter in the south, between the Christian and Moslem Quarters to the west and east respectively. Other markets outside this strip include the Jaffa Gate road *souqs*. All the Old City markets are narrow and old, with poor pavements; most are roofed. During the day they can become extremely congested with shoppers and street traders.

Environmental and economic factors have encouraged the gradual transformation in the nature of trades found in the various *souqs*. Unlike in the past, when each was named after the profession or trade of its merchants, the *souqs* today offer a wide variety of goods and services similar to those outside the walls. Ancient specialised crafts have all but disappeared in the face of modernisation; boutiques, bar-restaurants and supermarkets have replaced the old copper, carpet and spices shops. Some of the Old City's most famous markets are the following.

***Souq Khan Al-zeit*** (the oil merchants market), the largest and busiest of all, sells foodstuffs, clothing and other goods, and houses youth hostels and eastern food restaurants. The 750-metre long market road is almost wholly covered by a semi-domed continuous slab, with intermittent ventilation openings. Less than three metres wide in places, the road extends from Bab Al-amoud (Damascus Gate) inner plaza to Souq Alattarin.

Much smaller but no less crowded than Khan Alzeit, *Souq Alattarin* (spices traders) is one of the most ancient in the Old City. Its stuffy atmosphere does not seem to deter its thousands of daily visitors. Its cave-like impression comes from its low roof,

narrowness and lack of ventilation. The heavy pedestrian traffic results from the *souq's* central location in the market area.

*Souq Alquattanin* (cotton merchants), 100 metres long and up to ten wide, is the only almost deserted market in the Old City, due to its location away from the main market strip, just west of the Haram, with which it shares a common gate of magnificent architecture. The other end of the *souq* meets Alwad road from the west, with another beautiful gate. It is said that the *souq* was one of the most crowded and prosperous in the City during Mamluk times. It is still noted for its superb architecture. Its entire length is covered by a tall multi-bay vaulted slab typical of Mamluk construction. Famous historical sites, accessible through the *souq* and to its south, include Hammam Alshifaa and Khan Tankaz. Hammam Alein is located at its western entrance.

*Suweiquat Alloun* is a small *souq* situated between the car park of Jaffa Gate and Christian Quarter road. Almost all of its merchants deal in tourist wares. *Souq Albazzar*, another small *souq*, runs between the Christian Quarter and Suweiquat Alloun. Its traders deal in souvenirs and popular foods.

*Souq Alhousor* (straw carpets) is an ancient very small *souq* at the Jewish Quarter boundary. *Souq Allahamin* (meat merchants) is one of the few markets whose traders more or less continue to live by their title. The small wholly covered *souq* is situated to the west of *souq Alattarin*.

*Souq Alnahhasin* (copper traders) is situated to the north of the meat market and south of Khan Alzeit; its title has been out of use for many years due to the disappearance of the copper trade. *Souq Albashoura*, situated just south of *Souq Alattarin*, is sometimes considered part of it. It served as the Mamluk headquarters in the past. The name of *Souq Altujjar* (jewellers) has also been disused for some time. The *Jewish market* no longer exists, since the reconstruction of the Jewish Quarter.

*Souq Harat Alnasara* (Christian Quarter market) is a long and ancient *souq* extending between Suweiquat Alloun and Khanquah Alsalahiyya and parallel to Khan Alzeit. Its traders today deal mostly in tourist items. *Souq Aftimos* is wholly owned by the Orthodox Patriarchate. It is situated to the west of Aldabbaghah market. Jewellers and antique dealers occupy the few shops currently opened in the *souq*. *Souq Aldabbaghah* (leather market), to the east of Aftimos is one of the City's most pleasant. Its shops display exclusive souvenirs but few leather products. A circular fountain mini-structure decorates the spacious open square at the centre of the *souq*.

Of other *souqs*, Bab Hutta, Bab Alamoud, New Gate *souq*, New *Souq*, and Alkawajat, only the last is known by its old name.

## II. Undesirable Features of Old City Residence

### Introduction

It would be unfair to condemn the Old City of Jerusalem on account of its unsuitability for modern living, with disregard for its great historical value. It must be remembered that the present City layout, with its compact structure and network of narrow and badly paved roads, had been almost unchanged for hundreds of years. General improvements introduced in the past had to cope with the lack of space and other restraints. This one should thus keep in mind when comparing the merits or drawbacks of other cities in the region with Jerusalem.

Be that as it may, living conditions within the walls leave much to be desired. Inhabitants' hardships result from a number of factors related to town planning, public services, architecture and local politics. The following detailed account of undesirable features of Old City residence had been accumulated through years of investigation and close contact with residents. Individual items shall be analysed separately in relation to general features, causes, inconveniences or hazards and possible means of treatment, based on comparisons with modern living conditions and construction.

### Architecture and Town Planning

#### Access: General and Local

General and local access refers to major roads over four metres wide and to smaller narrow alleys respectively. In general, Old City roads with the exception of Via Dolorosa and Alwad road are not fit to accommodate modern means of transport. The vast majority are totally inaccessible to motor vehicles. Cars are not permitted beyond the car park at St. Stephens Gate except for a limited number of permit holders or for emergencies.

Local access is unfit and unsafe. Sharp turns, 1:1 slopes and one- metre wide passages are not uncommon, making even pedestrian traffic demand great care and attention. Residents and frequent users complain of the relatively long distances one has to walk inside the walls, especially inconvenient for the sick and the elderly. Transportation of heavy and large items present similar difficulties. Much inconvenience had been avoided in recent years through the use of small tractors with a one cubic metre capacity; use is however restricted to the transportation of building material and light-weight items. Other used means of transportation include timber carts, mules and donkeys.

Access is affected by a number of factors, both uncontrollable natural conditions and the more controllable human factors.

**Topography** The City's natural topography poses a major obstacle to general access and transportation. Sudden abrupt changes in altitude are very common, especially in the densely-populated sectors. Flat uniform ground is uncommon in the built-up areas, which explains the disorganised layout of buildings. This problem is best exemplified by the numerous flights of stairs that form the majority of inner roads and alleys. We should remember that the local topography as we see it today is the result of many natural and human changes throughout the years.

**Roads and Pavements** The Old City had always been known for its "narrow, dirty and poorly paved streets," as described by a Roman ruler on his first visit to the City almost 2,000 years ago. Even today, with advanced modern technology and despite efforts by successive local authorities to improve it, the City's network of roads is still lacking in many respects. Patches of settled stone tiles lacking drainage channels, both dangerous and annoying to pedestrian traffic, are very common. Following periods of heavy rainfall, these accumulate water and dirt, making many roads impassable.

**Remedial work** Providing an complete solution for pavement settlement is costly and in some areas virtually impossible. It would be ideal if a subgrade base with sufficient bearing strength were used for main road tiles in order to minimise or prevent ground settlement. This form of treatment is far more costly than the single sand layer normally used. At many locations it is not possible to use this procedure due to unfavourable sub-ground conditions, where empty space or underground structures are present. Reaching lower levels can seriously affect the stability of adjacent buildings.

Those involved in Old City affairs confess to the impossibility of eliminating inconveniences related to access and topography. Barring razing and rebuilding the city from scratch, access shall remain restricted for both pedestrian and vehicle traffic.

### **Shortage of unbuilt space**

All of the City's Moslem sector neighbourhoods consist of overcrowded, densely-packed residential buildings. Unbuilt open areas, apart from roads and alleys, are almost non-existent. Except for a small proportion of detached and semi-detached structures in the newer north-eastern sector of the City, all residential and other structures are joined together, from more than two sides in many cases. At road intersections, continuity is maintained through simply supported slabs, spanning across street widths. Public facilities, parks and playgrounds are not found inside the Old City's Moslem sector simply because of the lack of space.

Again, this undesirable feature of Old City residence is not likely to be solved under present circumstances. A solution could only be achieved through large scale environmental changes.

### **Interior home design**

As pointed out earlier, the vast majority of Moslem Quarter dwellings are of Mamluk or Ottoman age. Both societies were famous for their contributions to Moslem architecture and construction techniques. The *Madrassa* religious school, *Khanquah*, *Zawiya*, *Ribat* and other types of compounds formed the bulk of new construction at the time. A sizeable proportion of present residential buildings were originally designed to serve other purposes.

In general, all such public-use structures had a central courtyard, open or arcaded, with a number of surrounding cells or living chambers. As such institutions became less popular and ultimately fell out of use, new occupants transformed them into regular residential quarters without the appropriate alterations. Consequences of their actions are still felt by inhabitants of the Old City. Even the best equipped Mamluk or Ottoman residential buildings could not be expected to satisfy the requirements of today. With reference to the typical Moslem Quarter home as it exists today, one can list the shortcomings in design. This emphasises the transformation in the purpose of use of any single structure and the redistribution of residential compounds. For instance, it is common for a typical *Madrassa* compound to accommodate a number of unrelated families, as opposed to, in the past, one family or group of connected individuals.

### ***Area per person ratio***

Average living space per person outside the Old City is at least twice that inside the Walls. A typical Moslem Quarter family enjoys the use of no more than two 4 x 4 metre chambers which are expected to accommodate sleeping quarters as well as kitchen and sanitary facilities. This particularly unpleasant feature of Old City residence accounts for a large number of complaints by residents. Their grievances stress the resulting strain on inter-family relations and behaviour, particularly in many-membered families.

It is common for a single family, with more than one married couple, to share a single small room. Apart from the obvious threat to public health, overcrowding has serious social consequences.

Having said this, it would be unfair to blame deficiencies in construction for moral problems. Solving or at least reducing the extent of overcrowding is dependent on the level of public awareness of its dangers. Home owners are advised repeatedly and consistently to look for other favourable alternatives at all costs. However, the problem cannot be expected to vanish by merely acknowledging its existence. Ideal remedial steps could only be executed in a collective framework and not individually. In reality, only greater prosperity in Palestine in general and Jerusalem in particular would be likely to bring about the sought-after changes.



### ***Interior access and mobility***

Internal partitioning and living space distribution presents another major inconvenience to residents. Old City homes typically consist of an open courtyard with surrounding unconnected chambers. Particularly in winter, occupants' mobility is largely influenced by climatic conditions. Movement between service quarters and living chambers are very restricted in cold and rainy weather.

Further inconvenience comes from the extremely small door openings common in Old City dwellings. In addition, adjacent rooms are very often joined by steps to overcome the differences in floor level. In multi-storey structures, steep staircases and deformed eroded steps cause much inconvenience to users.

### ***Ventilation***

Conservatism and rejection of the more "open" Western lifestyle is typified in ancient Moslem architecture. The use of exposed openings was minimized to ensure the maximum privacy to occupants. Especially in street level homes, windows are too small and too high for adequate air circulation and sunshine. Not only is the resulting stuffy internal atmosphere unhealthy, but it encourages humidity and deterioration of building material. Above street-level dwellings are still prized in comparison with the basement homes generally occupied by the poorer sector of the population. Windowless rooms, buried at a few feet below street level, are widespread in Moslem Quarter neighbourhoods. Such conditions are very serious, causing illness and even death.

### ***Lack of privacy***

In total contrast to the initial intended purposes of Moslem architecture, the redistribution or division of residential buildings among more than one family has resulted in the lack of privacy increasingly complained of today. The system of open courtyard with surrounding chambers adds to the problem, especially in structures of two or more storeys. Extreme situations where one family's only passage to their living quarters crosses the property of another are not uncommon. However, many residents have no complaints in this respect, making clear their preference for the close neighbourly relations that exist in such circumstances.

Distribution of individual dwellings within the same residential compound is best exemplified in the Madrassa Alloulouiyya at the intersection of Aqabat Alkhalidiyya and Alkiram road. The Madrassa structure is composed of an unsymmetrical scattered arrangement of individual chambers on two levels. At least six families live permanently in the premises. All dwellings are inter-connected through common roofs, walls or windows in addition to main entrance gates. No-one commands even a minimal level of privacy, especially because no exact borders are traceable for the individual dwellings.

***Interior finishing***

Until very recently, the majority of Moslem Quarter homes maintained the ancient often deteriorated floor tiles, a source of much discomfort and inconvenience. Residents regularly complain of water seepage through overlying roof slabs and water or dirt accumulation between non-uniform tiles. Floor surface finish is only a mild example of the low quality of building material in Old City dwellings in contrast with the high standards set by earlier Moslem architecture. Inconsistent maintenance has left the majority of Old City structures in very poor shape. In general, the average Old City home suffers severe deficiencies in all items of interior finishing, plastering, floor surfaces, electrical and sanitary installations, doors, windows and wall paint.

***Plastering*** Severe defects in plaster layers present a constant source of annoyance to occupants and frequent users. In the vast majority of buildings, the existing plaster layer is almost totally useless and often harmful. The weathered, peeling mortar and cement mixture is ineffective in providing the required additional strength and inner layer protection. Stained patches and non-uniform rough surfaces contrast with the intended smooth clean finish. Residents regularly complain of falling chunks of plaster that expose the inner load-bearing components and cause damage to furniture and home appliances. In some homes, interior walls are not plastered at all, revealing the rough rubble surface of the inner wall sections.

***Floor surfacing*** During the last few years, a large number of Old City residents have replaced their old stone floor tiles with modern mosaic tiles. Others, unable to afford the higher cost of such tiles, resort to concrete slabs with a smooth surface finish. Both forms of alternative floor surfacing are generally of poor quality when compared to homes outside the walls, even when first applied. Settlement, cracking and corner defects are very common in the new floors. In view of the irregularly shaped walls of Old City structures, it is almost impossible to use panel lining on the inside of walls as in new construction. Over one third of all Moslem Quarter dwellings are still fitted with old deteriorated stone tiles.

***Doors and windows*** A sizeable proportion of Old City homes are equipped with deteriorated timber main doors. More fortunate homeowners are proud to have reinforced steel sheets as an alternative. Very few homes could claim to have fit and fully operational gates. Interior door openings are in many cases fitted with thick cloth sheets for cover. Windows are similarly non-existent in many homes, except for the wall openings. In others, only deteriorated timber window-frames and broken glass panes are evident. Efforts have recently gone into replacing such unfit installations in Arab homes. Although much has been done, especially in the wake of residents' growing concern for their own safety, there still remain severe deficiencies in door and window fittings in many homes in the Old City.

***Electrical and sanitary installations*** The average Old City home is equipped with at most a single toilet, often shared with neighbouring residents. The toilet generally consists of a flat ceramic or mosaic platform usually with a small rusty tap for a flushing. This is typically housed in a one square metre chamber with little or no ventilation. Kitchens are commonly fitted with small stainless steel or ceramic basins with exterior exposed piping. Many inhabitants never enjoy use of a bathtub or shower and bathe with buckets or makeshift manual showers. Kitchen basins are in most cases the only other source of clean water. Washbasins are fitted in a few homes, typically in the open.

Electrical fittings are generally limited to a single socket and lighting switch per room. Light fixtures consist of a single hanging bulb or fluorescent light. Safety switches are rarely installed in accordance with the local electricity board's regulations.

***Wall paint*** In the majority of Moslem Quarter dwellings, especially in the poorer neighbourhoods, residents rarely bother with wall paint for interior decoration. This is hardly surprising when one recalls the poor quality of plastering. Home owners thus prefer to save themselves unnecessary effort and cost. In better-kept dwellings, wall paint is usually replaced on a yearly basis during the summer months. Peeling and stains start to appear with the cold rainy weather.

***General style and interior partitioning*** In general style, Old City construction is not ideal for the use of modern furniture and appliances. Residents complain that domed roofs do not allow the easy installation of television antennas and solar heating installations. Interior vaulted slabs with large corner columns limit and sometimes prevent the use of wall and corner units. Out-of-place steps, recessed wall-cupboards, unnecessary elevated platforms and limited room dimensions are amongst other unpleasant features of interior home design.

## **Maintenance**

The ageing buildings of the Old City are in permanent need of structural and architectural repair. This is caused by poor natural properties of materials and methods of construction, combined with environmental factors. Maintenance and restoration operations have become a daily concern for residents as well as other parties such as building contractors. Here we give an insight into the heavy burdens, both financial and physical, imposed on residents as a result of those operations.

The greatest burden on homeowners during maintenance work in their dwellings is the need for alternative accommodation for the whole household for the duration of work. As pointed out earlier, the lack of living space per family severely limits their options for coping with such demands. In most cases, complete evacuation of the

premises is necessary, especially when the replacement of wall and ceiling plaster is the most frequently required operation.

While some homeowners can stay with relatives or neighbours, others must remain in their homes and cope with the "building site" environment until work is completed (maintenance work in Old City residential buildings is carried out every three to five years on average).

### ***Cost and quality of work***

Most Old City residents, particularly the older generation, do not possess sufficient technical knowledge and are often cheated and misled by building contractors and labourers. Non-expert craftsmen who are unfamiliar with Old City construction, which is totally different from modern construction, can misguide owners, who usually end up with low quality results. Application of a new layer of wall plaster without bothering to remove the old is the most common malpractice. This procedure is common among local contractors who are tempted by the sizeable savings in time and cost of waste material disposal. Unknowing householders realise the misfortune shortly after work had been completed and the new layer begins to show signs of peeling.

Residents allocate a sizeable proportion of their income to house maintenance and the financial strain on the local community widens the already existing economic and social gaps with the more prosperous Arab neighbourhoods outside the Old City walls. An additional burden on residents is the need to obtain local authority permits for certain forms of maintenance work. All construction operations must be executed in accordance with specific regulations issued by the Israeli authorities.

## **Deterioration of building material**

Age, exposure, non-uniform loading and other factors play a major role in influencing, usually shortening, the "design life" of building materials and structural components. Erosion or weakening of building material has become a major concern for inhabitants, archaeologists and others involved in maintenance and restoration work in the City.

### ***Design concepts***

Modern design concepts are based on experimental and theoretical analysis of tested material strengths in conjunction with new more adventurous building techniques aimed at achieving better quality and less costly construction. Less reliance was placed on the size of a load-bearing member in favour of its "design strength" calculated by theoretical analysis of structural members' interaction and the application of factors of safety to material strengths and expected loading combinations. Ancient building techniques, on the other hand, despite a limited dependence on "scientific" theories, were more conservative and generally concentrated on the need to ensure structural safety before all else. Larger sized members and stronger building material than actually required were

often used as a result. The most distinctive feature of Old City construction is the envelope of stonework that completely engulfs the outermost surface of all sides and roofs of buildings. Stone was the basic material of construction, not the structural steel and reinforced concrete used today.

### ***Stonework***

Stonework was for many centuries the most popular building material. Sedimentary rocks are abundant and relatively cheap to extract and cut to shape. Hundreds of stone quarries and cutters are currently operating in mountainous regions of the country. In Old City construction, stonework was used in various forms for many purposes, for strength and beauty. Stone's favourable natural properties, namely its high bearing capacity, workability, durability and water seepage resistance, have all contributed to its popularity.

### ***Load-bearing capacity***

Old City structural walls generally consist of two stone surfaces held together by a rough rubble core fill. While the innermost surface is protected by plaster in most cases, and managed to remain intact over the years, the outermost exposed surface usually exhibits varying levels of erosion. The sheer size of individual blocks (typically up to 30cm thick) continues to hold together the old buildings preventing failure and collapse. Field observations reveal the unhealthy state of stone blocks, with large holes, dents and eroded surfaces. Many incidents are reported of falling chunks and even whole blocks as a result of loss of bonding among other factors. The direct consequences include local loss of bearing strength; reduction in safety standards; and the disagreeable look of eroded profiles.

### ***Decoration: floor and roof tiling***

Almost all roofs, whether domed or flat, of Old City buildings were at one time covered with stone tiles of various shapes and sizes. In addition to their strength and elegant look, stone tiles provide weather protection and safe rough surfaces. Today, the erosion and loss of bonding between individual tiles has become the source of much inconvenience and discomfort to residents who complain of leaking roofs and floors and unsafe slippery surfaces. What remains, however, despite excessive erosion, is the traditional elegant sight of the closely and perfectly placed tiles of roof and floor surfaces.

### ***Structural steelwork***

Field observations have established that composite steel and concrete construction, a technique widely used during the late Ottoman-early British period exhibits signs of deterioration and fatigue not consistent with its age. In general, I-section steel beams were placed at approximately 1 to 1.5-metre intervals across the shorter length of the covered slab area. The poor quality of construction and the influence of local factors such

as humidity and age combine to produce the deterioration in concrete and steel slabs evident today. In addition to safety concerns, residents complain of rust and concrete dropping from ceilings. Humidity and water seepage and the lack of interaction between the un-reinforced, relatively soft mix of concrete and rusty steel beams also contribute to the deterioration of building material. This deterioration poses a threat to the survival of similar forms of construction in the City.

### ***Timber and brickwork***

More recent construction in the Old City utilized combined timber and brickwork for small load-bearing walls and timber and red tiles on roofs. Use of the former was limited to single-storeyed, short-span structures, at most 4 x 4 metre slabs, of not greater than 2.5 metres clear height. Even with such small loading, the deterioration in timber had caused the collapse of many structural elements leaving only very few such in the Old City today. Timber/brickwork or clay grout construction is analogous to composite steelwork/concrete, only in the vertical plane. The use of timber beams at vertical one metre intervals aimed to support thin separate brick-clay elements and provide continuity. Another main cause for the loss of bearing strength is the loss of bonding and long-term loosening of clay particles as a result of material deterioration.

A different effect is observed in Spanish-style sloping roofs. Instead of being used to cover a solid slab, Old City buildings with sloping red-tiled roofs directly cover living space, with only thin timber planks used as slabs on occasions. Mainly as a result of inadequate drainage, both timber and tiles have suffered severe deterioration. Unpleasant consequences are observed in rainy weather when streams of water pour directly into living space.

## **Structural Stability**

Stability and safety of Old City structures had been touched upon earlier as a side effect of other undesirable phenomena. Maintaining stability without jeopardising or interfering with the traditional style of architecture presents a major challenge to engineers, architects and archaeologists involved in maintenance and restoration work. Effective and successful execution of these operations requires collective supervision and cooperation between all professional parties in order to preserve the City's unique quality and style and its continued future habitation.

### ***Cracking***

Cracking generally occurs when local tensile forces exceed the tensile capacity at any position in a load-bearing member. A crack's width, direction, length, position and rate of expansion provide some indication as to its severity and allow predictions to be made of its future behaviour. Regrettably, Old City construction relied completely on the use of building material that possessed little or no tensile strength, mostly natural rock and

clay products. As a result, almost no building is free from cracks. The safety of structures and their occupants has become a growing concern.

More and more complaints are received from residents who have either evacuated their homes or are threatening to do so unless immediate action is taken to deal with serious cracking evident in their dwellings. Watching a crack expand by the day, without being able to take counter-measures, precipitates an understandable fear.

### ***Settlement and ground movement***

Cracking usually occurs as a result of local ground movement and/or differential settlement between members of the same structure. Diagonal and vertical cracks develop along scattered paths in plastering, *kuhla* and thick stone cross-sections, depending on the abruptness of ground movements and position of the weakest sections. The absence of reliable structural foundations magnifies the effect of the slightest displacement, enhancing immediate settlement and thus cracking in the supported structure.

In the Old City, archaeological or other excavations have been blamed for all cracking-related damage. The occurrence of cracking in a particular structure does have its benefits, however, as structural engineers point out. Almost exact predictions of the expected structural behaviour of a cracked element can be forecast through close monitoring of a crack's development, giving early warning of possible collapse.

Observations have allowed the formulation of a few general rules regarding the relation between ground settlement and collapse in Old City structures. Despite the absence of stable foundations, because most of the ground is rocky, the sheer size of a typical load-bearing wall compensates.

In the absence of additional factors, cracking that results from small scale local excavations such as sewage or water mains has a limited effect and does not seriously threaten the overall stability of a particular structure. The same applies to excavation operations not directly underneath the structure in question. Diagonal and vertical cracks develop almost immediately after depths in excess of one metre are reached, but cease to expand when settlement of the structure had been completed. Remedial work can be provided through regular maintenance operations.

Consequences of large scale excavations are far more serious. Soon after the 1967 war, the local authority initiated large scale excavations and underground tunneling in many areas of the Old City. At all such locations, widescale structural damage was observed. Were it not for intensive efforts by concerned parties and individuals in exposing the real intentions of the Israeli authorities, the relatively small number of families forced to abandon their dwellings would have been much greater. At a typical excavation site, just inside Bab-alhadid neighbourhood on the western Haram border, archaeological search operations immediately stopped after surrounding buildings, housing eight families, exhibited signs of near collapse indicated by rapidly spreading cracks at critical locations. All inhabitants were temporarily evicted until remedial action

was taken to prevent failure. In the event, alternative permanent support was provided at all affected zones. The local authority bore all expenses.

***Loading, shrinkage and sheer effects***

Other less influential factors known to induce flexural cracking include shrinkage, building material defects, locally acting sheer forces, and irregular loading combinations. The extent of damage is generally restricted to minor local cracking that can be treated by merely replacing the affected zones, plaster or stone. However, the average Old City resident is unable to differentiate between serious and relatively harmless structural defects, both indicated by cracking.

Other forms of cracking occur as a result of faulty maintenance work. Most common are the horizontal cracks that develop in hollow block construction without self-weight support. In walls over two metres high, failure to provide concrete or steel beams at the two metre level initiates horizontal cracks that can develop further if subjected to excessive loading. Surface wall cracks, especially in plastering, are also very common. Such defects result from shrinkage, improper use of material mixes or from the thickness of the plaster layer applied.

***Structural failure***

So far, no human loss has resulted from structural collapse incidents in the Old City. However, a number of people have received serious injuries as a result of similar accidents over the years. In Alwad road, a sixty year-old man sustained severe leg injuries when the floor slab of his second storey home collapsed beneath his feet without warning. Other common occurrences include the dropping of single stone blocks as a result of displacement forced by the loss of bonding with adjacent blocks. A number of load-bearing and retaining walls suffering from material deterioration or large stress concentrations have collapsed causing only slight material damage. The majority of such incidents take place either during or immediately after heavy rainfall or local ground movement.

In almost all structural failure incidents, the action is sudden and unexpected, unlike cases where early warning signs are perceived in the form of cracking or slow gradual failure. There are many examples of structural members, load-bearing or self-supporting, which have seemed close to collapse for many years but have long remained intact probably due to their large size and the effective interlocking forces on the other. A typical example was the recently restored exterior wall of the Madrassa Alkarimiyya in Bab-Hutta. The wall profile consisted of large stone blocks 100 x 70 cm in surface area. The alarming appearance of the wall's dipping, tilting upper half, often led regular users of the busy road to the other side, for fear of its imminent collapse. Luckily, the wall held for many years until funds were provided for its restoration. The displaced stone blocks were each carefully removed, labelled and later replaced in their original positions. This operation consumed the better part of two weeks including the removal



of over ten cubic metres of earth matter, the cleaning and shaping of each block, and the application of white cement-sand bonding mixture.

Another extraordinary incident was the free-standing ten-meter long, six-meter high double-faced stone wall at the entrance of an elementary school in the Moslem Quarter. Unlike the previous example, this wall had exhibited signs of extensive buckling at mid-height with the outermost stone blocks pushed out over 50 cm away from the vertical wall plane. An unrelated dispute between the owners of the building and the school administration prevented the execution of any repairs in spite of the clear threat to children and teaching staff. It was not until the local authority issued a stern warning to both parties that the wall was completely demolished and a new reinforced concrete replacement erected. The costs were shared by the two parties and neighbours.

#### ***Clay soil material of construction***

Examples in the preceding paragraphs indicate the importance of stability-related issues in the daily lives of the City's inhabitants. A common feature is the effect of using clay soil as a building material in stonework construction, as a bonding agent, and in a load-bearing capacity in slab construction. Tests and investigations have allowed a number of observations regarding the long term damage caused by the use of clay boulders in old Moslem construction. It must be stressed, however, that a well planned investigation is urgently needed to reach a better understanding of the structural behaviour of Old City buildings, making use of available research findings with field observation and testing.

#### ***Load-bearing and self-supporting walls***

Regarding the structural behaviour, durability and bearing capacity of loaded members, it suffices to consider briefly the effect of bonding mixtures on the durability, strength and stability of individual elements, excluding the effect of material deterioration discussed earlier. Observations at many locations prove that the inevitable seepage of water through a member's thickness is the major cause behind the start and progress of structural damage and material deterioration in Old City structures.

Common related features at collapse/failure locations include the following. Over 80% of the total volume of the intermediate layer between the two stone faces of any wall consisted of fine clay, the remaining 20% being a mixture of large gravel particles. No traces were evident of any presence of bonding material such as gypsum or other mortar mixes. All clays were completely saturated with water. In cases of structural buckling, only limited collapse occurred, normally at mid-height, whereas more severe damage was caused by overturning failure. In both cases, however, as in other observed forms of failure, no systematic collapse mode was observed, with only limited areas affected. Failure generally occurred at one face of a particular wall only; the other remaining wholly intact. This feature indicated the non-symmetrical structural behaviour of double-

faced wall sections. Failure occurred with similar frequency at exposed as well as non-exposed surfaces as in inner and outermost faces of double-faced walls.

### ***Vaulted and domed slabs***

One of the most serious obstacles facing maintenance and restoration workers is the presence of large quantities of clay boulders and small gravel particles in roof and floor slabs of buildings. In order to maintain the original style of buildings, it is essential not to alter the shapes of individual structural components, confining operations to strengthening the weaker sections or reducing loading wherever possible. The reduction in loading could be easily achieved by the removal of all or part of the thick clay layer, whose self-weight often exceeded any other likely combination of dead and live (imposed) loading the member was likely to be subjected to throughout its design life. Restraints do, however, exist on such a procedure, for technical as well as economic considerations. The relatively high cost of waste material disposal is a very important issue. As explained earlier, restricted access inside the Old City has led to inflated transportation costs. Moreover, soils in general exhibit an appreciable increase in volume when transforming from dense to loose states, typically between 30-50% of the original volume in Old City construction.

As for technical considerations, there are several restraints. The removal of the clay-boulder layer in its load-bearing role implies the need for its replacement by alternative material in order to maintain general member stability. The procedure followed at a few locations was replacing the original thick slab by a new flat reinforced concrete member. The disadvantages of similar operations are risky execution, high cost and change of traditional form.

### ***Unsafe construction and maintenance work***

Less visible and less serious than cracking are many construction defects in Old City buildings today resulting from faulty construction of one form or another. Typical examples include cantilevered verandas supported by steel beams and roof parapet walls. In addition, many incidents have been recorded where unstable conditions, even collapse, have developed as a result of faulty repairs or maintenance. On most such occasions, damage resulted from a lack of understanding of Old City construction on the part of residents, non-expert labourers and building contractors. Commonly occurring incidents involved the removal of load-bearing members without providing alternative support, and the incorrect execution of routine maintenance operations such as surface treatment of seriously damaged sections.

## **Sewage disposal**

A modern effective sewage disposal network did not exist in the Moslem Sector of the City until a few years ago when the local Israeli authority commenced provision for all

neighbourhoods of the City, a plan faced with numerous obstacles. Before detailing, it is worth pointing out a few issues of particular significance.

During routine maintenance operations carried out in the Old City, what the locals refer to as old Turkish canals were found below ground level at many locations. The majority were clay pipes, totally unfit for use, except for a few that had somehow remained partially intact but nevertheless continue to cause structural and architectural damage to buildings, often pouring into nearby sedimentation pits or in some cases into the abandoned basements of the structure.

At the time such systems were first installed, close to 100 years ago, the process was regarded as an advanced achievement. Unfortunately, the mere replacement of those pipes by modern equivalents did not solve sewage problems inside the City, due to the non-inclusion of many of the City's sectors in the old layout, and the unsatisfactory operation of the old system in the serviced areas.

The sewage disposal problem is not restricted to the Old City, but found in many Arab neighbourhoods outside the Walls. Until today, the majority of new residential neighbourhoods are not connected to a public sewage network. The inhabitants rely in general on the use of sedimentation pits normally constructed from reinforced concrete.

#### ***Hazards and inconveniences***

In modern communities the world over, sewage disposal systems are regarded with the same importance as water and electricity mains. Unfortunately, in this part of the world, the public's awareness of such basic issues is minimal. The following account of hazards and inconveniences provides a realistic insight into the resulting hardships of Old City residents.

#### ***Public health and hygiene***

A common sight in Moslem Quarter neighbourhoods is a flooded sedimentary pit or manhole covered with flowing sludge and swarms of insects. However, there is a general lack of concern among much of the population and disregard of the dangers. Instead of acting to rid their community of such harmful conditions, they have grown accustomed to them, although low standards of public health have been blamed for the higher rates of deaths and serious disease among Old City children in comparison with other sectors of Arab Jerusalem.

#### ***Physical and financial burden***

For Old City dwellers, the need for regular pumping out of sedimentation pits is both a financial and physical burden. The most efficient and least-used of pits requires sludge suction on two-monthly basis on average. Some home-owners allow pits to overflow, or empty as much as they can manually into the nearest public space, normally the nearest alley or deserted yard.

***Structural and architectural damage***

Inspections of operational sewage systems in various neighbourhoods of the Moslem Quarter indicate that the majority do not function satisfactorily in terms of effective transportation of sludge and liquid sewerage. In all inspected systems, it was noticed that all manholes and to some extent pipes were either easily blocked or leaky. All Turkish, British and Jordanian systems required extensive repair or complete replacement. Residents of lower storeys regularly complained of leaking sewage pipes and manholes. Greenish patches in walls and ceilings, peeling floor tiles, dripping ceilings and building material deterioration are the undesirable consequences.

In general, the influence of the larger sedimentation pits was more serious, causing severe structural damage at many locations. Several incidents were reported of floor slabs at ground level which collapsed to reveal underlying pits. One such pit was still operational without the inhabitants realising. At other locations, evidence of structural damage at known pit sites forced residents to undertake costly maintenance in order to avoid disaster.

***Restraints on modifications***

Having given a brief insight into the inconveniences and hazards of the existing sewage disposal network servicing the Moslem Quarter of the Old City, it should be made clear that any future plans for changing or merely improving on the present situation face major obstacles.

***Topography*** Water and sewage networks are analogous in many ways to roads and alleys, except that pedestrian and vehicle traffic can ascend hills with relative ease whereas water and sewerage must be mechanically transported to higher elevations. As pointed out earlier, terrain and topography limit possible improvements to the existing road network. Similar restrictions apply to the local sewage service. Including all of the City's inhabited areas in one system or network faces enormous technical difficulties and very high costs. The only advantageous feature is the City's favourable geographic position, i.e. on high ground surrounded from almost all sides by lower ground. In theory, it would be possible for sewerage to flow naturally away from any position in the Old City into adjacent valleys.

***Non-uniform distribution of residential buildings*** When the City's existing residential buildings were first built, very few excavations were carried out, as the majority of structures were erected in compatibility with the local natural ground datum levels. As a result of the topography and the lack of unbuilt space inside the City, the general distribution of residential space was far from ideal. The inhabitants of basement and occasionally ground floor homes were left out when new sewage pipelines were installed if at lower levels than the lowest position along the new system. In rare cases, residents of third floor homes are forced to put up with problematic sewage and rainwater disposal

by non-cooperative neighbours who refuse the passage of any system through their property. Any future improvement on present conditions requires the installation of a separate system at each location, no matter how costly and impractical that might prove to be. Otherwise, continued reliance on sedimentary pits remains the only alternative.

***Technical restraints*** Pipelaying is a technically complex operation even in ideal circumstances. Specialist teams of workers ensure the effective operation of the newly installed system. Any defects left undetected in the early stages are likely to cause enormous losses. Location of a defect position is a very laborious and technically difficult process.

***Excavations*** Earthworks inside the Old City demand special attention from pipelaying contractors who are forced to deal with the confined space and difficult terrain. The most risky aspect of the process is the hazardous effect of excavations on the stability of adjacent structures. Due to the high density of construction inside the City, choices of possible sewage pipeline paths are very limited, especially in the more crowded sectors. The following notes are based on observations made at a number of locations where the local Jerusalem authority has executed new sewage pipe-laying projects.

***Ground settlement and structural damage*** The extent of the resultant structural damage in buildings adjacent to excavation sites varies between the start of limited cracking in the least affected areas, to total failure. The degree of harm inflicted depends among other factors on the size of both the excavations and the building foundations, the natural ground conditions, and the position of adjacent structures relative to that of excavated areas. We note that failure of soil elements occurs on sloping planes where local angles of friction have been exceeded. Subsequently, overlying structures settle into the ground as a result of the downward vertical displacement of foundations. Extra tensile and other forces then develop, due to the differential settlement across the structure causing cracking or total failure in affected areas.

***Access*** Confined space inside the Old City restricts the smooth execution and leads to higher costs compared to similar operations at other sites. Inflated costs are largely the result of the relatively higher cost of transportation, and the need to keep streets accessible at excavation sites, at least for pedestrian traffic. Very often, the scale of excavations requires the whole road width, forcing contractors to work at odd hours and to provide temporary alternative passages, especially for nearby home-owners. Using heavy plant or machinery is out of the question in almost all parts of the Moslem Quarter. Excavation tools are generally limited to manual shovels, picks and, where possible, low power compressors. As a result, work time is much greater than for identical activities outside the City Walls.

**Other factors** Other factors that influence the operation of new sewage systems within the City's perimeter include steep slopes, crooked paths, tight corners, and flights of steps. Most limiting are the steep courses of newly-laid pipes which encourage the precipitation of solid sludge. In such cases, where no alternative routes are available, cleaning out operations are carried out frequently. Confined space, as discussed earlier, induces design limitations: manholes shallower than required and smaller diameter pipelines are used as a result.

Also of significance is the fact that the confined space is certain to create limitations on any future plans for the provision of telephone and electricity lines in the many of the City's Moslem Quarter neighbourhoods which still require these.

## **Dampness**

Excess humidity or dampness is the phenomenon most consistently complained about by residents of the Old City, particularly the Moslem Quarter. All Old City buildings of whatever use suffer from it, with the resulting damage to health. As the City's residents and frequent visitors often complain, the local climate, both in summer and winter varies drastically between the inside and outside of buildings, with a difference between outside and inside the Walls. Discoloured patches appear on newly plastered walls and ceilings within hours of completing the work. With the majority of homes painted in light colours, the green and black patches stand out most unpleasantly.

With higher levels of dampness, the outermost layer of paint peels off, followed by the more adhesive plaster layer. If left unrepaired, affected zones exhibit further deterioration and subsequent erosion of material constituents of load bearing members. In many homes, large buckets are positioned to collect clay and rubble from walls and ceilings. In places where stone is the outermost surface, the effect of dampness takes longer to become apparent than on plaster or paint. However, green-black patches eventually develop as in other material. Observation reveals that the predominantly limestone blocks start to lose thin slices from their surface relatively quickly.

At one particular site, a three by three metre chamber, abandoned for many years, exhibited beautifully patterned limestone inner walls that were completely saturated with moisture. Simple manual experiments showed that it was possible to scrape almost one inch off some stones. Using a hammer and nail, it was possible with little effort to dig one inch diameter holes to a depth of almost four inches into the soft stone without any evidence of fracture. Stone surfaces can become like sponges. Physically undetectable indications of dampness in Old City buildings include the distinctive odour of rot and decay.

## **Hazards**

### ***Health***

It is common knowledge that prolonged exposure to a damp environment can seriously damage one's health. Many residents, young as well as old, suffer from arthritis and similar diseases as a result of living in Old City homes for long periods. Some individuals have followed the advice of physicians and moved out of the City altogether.

### ***Deterioration of building material***

Dampness has a very destructive long term effect on the strength and durability of material used in construction and, consequently, on the general overall stability of Old City structures. It is widely accepted that even the most durable and most protected members suffer drastic deterioration. However, short term effects of dampness are not damaging to strength and durability of structural components, inflicting only limited architectural damage. Field observations and testing have indicated that despite being treated with an anti-corrosion paint layer, structural steel members exhibit severe deterioration at almost all inspected sites; in particular, beam flanges totally ineffective in load-bearing only a few years after installation. Were it not for the fact that sections used were originally oversized and oversized for their expected load, the effect of peeling of the outermost rusty layers would be much more drastic. In timber-brickwork construction, the least common form in the Old City today, the effect is even more drastic. Due to a large number of near-collapse incidents over the last few years, most structures so constructed originally were demolished and wholly rebuilt to avoid imminent failure. A similar consideration applied to timber-Spanish-tiled roof construction, except that on the whole there was less danger of collapse. Other limitations, such as high costs and authority permits, forced occupants of similar structures to accommodate to dripping roofs and rotting timber ceilings.

Stonework construction, being the most popular form in the Old City, deserves more consideration. Also worthy of attention is the effect of dampness on the traditional vaulted and domed slabs of Old City homes. These include rubble and clay components known for their extreme sensitivity to moisture.

Unfortunately, building techniques and material used in the Old City are ideal for damp. In load-bearing stone walls, as explained earlier, collapse occurs either in overturning or buckling modes, mode of failure being determined by vertical and lateral loading combinations. In both cases, saturation of the intermediate clay-rubble layer induced extra stresses as a result of pore water pressure. Failure occurs more frequently at the exterior stone surface since the inner side had more fixity, provided partly by floor and roof slabs and partly by the extra strength and continuity provided by wall plaster.

Many incidents of local collapse, usually of several adjacent stone blocks, were a result of loss of bonding between connected blocks and the mortar mix. More often than not, the action came about through material deterioration and weathering. Changes

in volume, shrinkage or expansion within the clay-rubble layer might also cause limited failure.

In floor and roof slabs, a thick layer of soil, especially towards the edges, tops the load-bearing components (a mixture of rubble and large gravel particles). Old Moslem architecture generally resorted to the use of vaulted or domed slabs, in which large rectangular columns at four corners supported arched converging beams that formed the roof slab. In order to overcome the difference in elevation between the centre and edges of slabs, natural soil or rubble were used as fill material. In addition to its excessive self weight, the soil layer can cause severe damage, possibly failure, when saturated with moisture, an inevitability unless regular maintenance work is performed to the roof surface stone tiles or some other form of protectant.

Once water is admitted into the soil/rubble layer, extra stresses are induced within the soil structure. More damage results from water seepage through the load-bearing component of the slab. Due to the lack of ventilation and other factors it becomes wholly saturated with water. Dampness develops very rapidly inside confined areas as the water evaporates, in addition to the loss in strength and load-bearing capacity of the slab.

The long term influence of such conditions usually leads to building material deterioration, changes in volume and the development of internal stresses that seriously affect structural behaviour and durability of members.

Regarding stone, it is in general relatively impermeable to water except along fissure lines. A combination of physical and chemical action assist the speedy deterioration of stone blocks and consequently reduce their water resistant properties. The stone layer can no longer be counted on as a protective barrier in spite of its thickness, typically 30-50 cm compared to 7-10 cm for building stone today.

It is evident to the untrained observer that nearly all exterior stone wall profiles in the Old City today exhibit holes and dents as well as scraped or peeled off surfaces resulting from old age and long exposure to the excessively humid environment. Interior stone surfaces, generally protected by plastering, become softer and more permeable with age, but do not exhibit any change in size as in the exterior stone faces.

Finally, it must be stressed that further laboratory and in-situ tests are required in order to reach better understanding of the physio-chemical behaviour and natural properties of typical Old City materials in relation to moisture, dampness and changes in climatic conditions. Solutions must be found to counteract the unpleasant effect of dampness.

#### ***Additional costs***

In addition to the financial burden imposed upon the City's residents by regular maintenance work, the treatment of dampness requires its own separate budget. Operations such as the application of asphalt layers to leaky roofs, the construction of substitute hollow block walls, the regular application of impermeable moisture resistant



material, the frequent replacement of wall paint and so on, are undertaken by homeowners to help reduce the effect of dampness inside their homes.

In the same way as building material, house furniture, windows and doors are often damaged as a direct consequence of dampness. In particular, electrical appliances are most sensitive to such conditions. Television sets, video tape recorders and washing machines have been known to stop functioning or sustain permanent damage as a result of damp-induced electrical faults. Damage is also reported to furniture and other house appliances from peeling or falling material such as plaster and wall paint.

#### ***Social inconvenience***

Excessive dampness inside residential quarters is a source of trouble to Old City families. Homeowners confess to its playing a destructive role by reducing the sense of belonging and pride one should feel for one's home. Just as homeowners feel bitter and resentful towards their own homes, they feel shame when receiving visitors. This is considered a cause of lack of social intercourse between the Old City community and the outside world.

#### ***Causes and Catalysts***

Dampness is not only restricted to the Old City as might be inferred. Its presence is dependent on numerous factors, not exclusive to the Old City environment. Dampness is likely to develop at any location. Reference should be made to analogous situations outside the City's boundaries in considering each factor.

#### ***Lack of ventilation and natural light***

The interior design and distribution of Old City homes is extremely inconvenient in many respects. The lack of adequate ventilation and natural light in living space are two of the most influential factors that encourage dampness. Restricted air circulation aids the fast saturation of the local atmosphere with water vapour that in turn originates from the internal wall and ceiling surfaces as a result of changes in temperature. In addition, the deficiency in openings and the high density of buildings inside the City severely limit the entry of natural light into living areas, again aiding the development and rapid expansion of dampness inside such dwellings. The lack of sunshine also contributes towards increasing domestic heating and electricity consumption.

#### ***Material of construction***

Natural properties of building material widely used in Old City construction are extremely disadvantageous in relation to water absorption and permeability. Clay, rubble and other similar material retain water that seeps through the harder outer surfaces of buildings either as a result of material deterioration or other local defects. All such materials, whether separate or mixtures, actively influence the growth of dampness in structural members. Upon close examination of constituent material of structural

components, the lack of bonding suffered with age is clearly visible. Water reaching the inner layers thus finds little difficulty in passing through the mixture of large gravel particles, clay and rubble. Clay, which has the lowest permeability, does not adhere as closely as when it was first mixed with larger more solid particles. Rubble quickly becomes saturated with water and does not dry out at the same rate.

#### ***Vegetation growth***

Vegetation growth and dampness develop as a result of each other. Attempts by homeowners to uproot unwanted vegetation are unsuccessful on most occasions even with the use of chemicals. Vegetation growth within structural members can cause serious damage to building material in addition to increasing dampness. Large stone blocks have suffered sizeable displacement or even fracture by growing plants at many locations in the Old City.

In the same context, the presence of flowerbeds in many Old City homes had been regarded as a major source of moisture and, therefore of dampness within walls, floors and roofs. Residents of the City, because of the lack of space, have used small flowerbeds as garden substitutes. Such formations are normally poorly constructed and lack suitable drainage outlets. Especially in the upper floors of residential buildings, flowerbeds only serve as leaky water tanks causing more trouble than benefit.

#### ***Leaky water and sewage lines***

Dampness exists in many locations as a result of leaky plumbing connections in Old City buildings. As had been reported earlier, water and sewage networks currently operational in the City are extremely inefficient and unusable in places. The main reason for this lies in the low standard of workmanship on the part of craftsmen, designers or planners. Poor economic conditions also contribute, discouraging residents from carrying out regular repairs or improving existing systems. Extreme cases where leaky sewage or water lines cause severe structural damage and weathering of material are common.

#### ***Drainage provision***

Insufficient and ineffective drainage outlets in roofs and inner yards of Old City buildings encourage the formation of surface water puddles that ultimately lead to intensified seepage through inner layers of walls and slabs. In spite of the ideally shaped domed roofs, rainwater is very rarely disposed of efficiently mainly due to the presence of local settled tile patches and non-uniform surfaces. Drainage pipes and outlets, where installed, are frequently blocked by solid dirt leaving no alternative for the water but to seep through roof slabs. In some confined areas, it is almost impossible to install any form of drainage outlet without inconveniencing neighbours or nearby pedestrians.

### ***Treatment***

For many years, scientists have conducted intensive investigations on dampness, its undesirable effects, hazards and possible treatment methods, without much success. Physio-chemists have conducted tests on samples from Old City buildings to investigate the long term influence of dampness on building material used in the City. Awaiting the findings of research, methods of dealing with the phenomenon are restricted to practical physical solutions rather than chemical treatment aimed at either reducing or counteracting its effects.

### ***Ventilation***

Unventilated confined areas with inadequate air circulation create ideal conditions for the growth and expansion of dampness. Efforts directed towards the reversal of such conditions thus assist the slowing down of its expansion. During the last few years, residents of the Old City have taken steps towards enhancing ventilation inside their homes by encouraging local building contractors, while performing regular maintenance operations, to construct additional door or window openings. It must be remembered, however, that such operations involve high risks if not carried out with the utmost care. Chosen positions for such openings are at opposite sides of closed areas whenever possible. In confined areas, inhabitants use electric fans during hot weather and suitable heating appliances in cold weather. In some homes and public areas, ventilation and lighting are only provided through tiny openings in roofs and ceilings. In such situations, occupants are forced to cope with numerous problems such as rainfall, dirt, garbage accumulation and lack of privacy.

### ***Regular maintenance and home improvements***

Maintenance work in Old City buildings, if performed with professionalism and skill, produces highly beneficial long term results in regards to reducing dampness levels. Such operations are normally aimed at replacing the affected layers by new more durable substitutes as well as continuously maintaining strong external protection. Usually, residents resort to replacement of internal wall plastering at the first signs of dampness. It must be emphasized that affected layers must be totally removed as a first step, then the exposed inner wall section (usually the stone face) should be left for a breathing period of a few days. A new plaster layer is then applied in three stages; rough, coarse, and finally a smooth outer surface. No less important is the need for the regular replacement of *kuhla*, the bonding cement and mortar mixture that fills the gaps between separate stone blocks. With strong, impermeable *kuhla* and relatively undamaged stone, water seepage becomes very unlikely and, consequently, dampness does not develop through the exterior surfaces.

Similarly, the replacement of roof surfaces when required contributes towards increasing the protection of the covered areas against dampness and other unwanted external effects.

Other operations that residents resort to in extreme situations include the erection of substitute hollow cement block walls of brick at 5-10 cm from the original wall plane. The process does not rid the walls of dampness as such, but aims to prolong the period before it reaches the new wall. Local building contractors specialized in Old City maintenance and repair work were always encouraged to remove the largest possible amount of rubble-clay from walls and roofs during routine operations. Despite being very costly and laborious, the action helped tremendously in reducing both dampness levels and unnecessary loading.

Homeowners were also encouraged to remove all flower beds and small planted terraces in top floors as well as using suitable chemicals continuously to get rid of unwanted vegetation growth in walls and on roofs of buildings. Favourable results were also achieved in places where residents dismantled damaged sewage and water lines or had them fixed permanently.

### ***Improved drainage***

It is of great concern that the City's residents do not pay sufficient attention to drainage provision in their homes except after it is too late. This is largely due to the ignorance of homeowners and, at times, the dishonesty of building contractors. Together with regular and effective maintenance work to walls and roofs, the provision of effective drainage routes contributes to limiting and eliminating dampness. Homeowners have been encouraged to make sure that sufficient drainage outlets were installed at likely zones for accumulation of rainwater. Such action is relatively inexpensive but depends to a large extent on the willingness of the inhabitants to ensure its efficient operation.

Such brief advice for dealing with excessive dampness provides no more than practical, easy actions that contribute to reducing effects rather than solving the problem. In order to preserve the City's outstanding architecture, and simultaneously improve on the current unbearable conditions, it is essential to encourage research as applicable to the local environment. Hopefully, solutions will ultimately be reached through some form of chemical treatment, or possibly through the introduction of modified construction techniques.

## **Public services and facilities**

Public services and facilities inside the Old City's Moslem Quarter are scandalously lacking. Unfortunately, the City's inhabitants themselves are wholly ignorant of their misfortune. Residents have become accustomed to the miserable conditions and adjust their own needs accordingly. Social and cultural prosperity in the Old City has been hampered by the shortage in basic public services. Improvements could be made if dedicated efforts were directed towards the collective realisation of those goals. In other fields, several factors, most notably the limited unbuilt space inside the City, could prove to be unsolvable obstacles in the way of future improvements.

### ***Public facilities***

The Moslem Quarter of the City is so heavily built-up that almost no free space could be transformed into public areas such as family parks, children's playgrounds or sports facilities. It is not surprising, therefore, that its streets and alleys have turned into playgrounds where the City's young and older people get together in their leisure time. This has serious cultural and educational drawbacks. The harsh, unpleasant environment has left its negative stamp firmly on one generation after the other, indirectly assisting in further widening of the existing social gap between the two Arab communities on either side of the City Walls.

### ***Household services***

Until only a few years ago, basic public services did not exist in the Old City. Today, after intensified efforts towards improvements in that direction, the standard and extent of provision of such services is still incomparable with other sectors of Jerusalem outside the Walls. Garbage disposal, water and sewage systems, electricity and telephone lines have until recently been very rare luxuries. Improvements have been very slow, and in places ineffective, due to economic and political factors. The public garbage disposal service provides one of the most typical examples where the lack of awareness on the residents part, and the insincerity of the local authority on the other, have combined to prevent its efficient operation. While the latter were guilty of being more concerned with those sectors of the Moslem Quarter frequented by tourists, largely neglecting the densely populated areas, the former are blamed for their lack of cooperation with garbage collectors and municipality staff. In other words, the non-commitment of either party towards the successful, continued operation of the service has contributed to the common sight of heaps of filthy garbage on street corners throughout the City. It should be stressed that only the close cooperation between the inhabitants on one side and the local authority on the other is likely to produce the desired results of improving the standard of public services.

### ***Transportation***

Reference was made above to the major problem that faces car-owning residents of the Old City in relation to parking and safety of their property. With only one car park at the Eastern entrance of the City, at St. Stephens Gate, car owners have no alternative but to leave their vehicles and walk the remaining distance. Motorists who break the law which prohibits entry beyond the car park worry not only about traffic tickets or the towing away of their vehicle, but also for its safety.

## **Socio-political drawbacks of Old City residence**

In the next few pages, the reader must bear in mind the events in and around Jerusalem over the last hundred years or so. The socio-political climate prevailing in the City today is a direct result of the latest power struggle in the region during the second half of the century. Palestinian and other authors have been extremely generous in their writings about the political and social oppression the local Arab residents have been subjected to over the years of occupation and strict military rule. All information and analysis presented below is based on field observations and close contact with residents, whose complaints regarding structural and architectural deficiencies in their dwellings could not be separated from their social, economic and political hardships.

For convenience, the following account of social and political drawbacks of Old City life is divided into two categories; firstly the Israeli role and, secondly, the social and inter-community relations.

### ***Israeli policy***

In general terms, the local Israeli government's policy towards the Old City and its non-Jewish residents could be described as having one purpose, that being to serve the goals of Zionism. Palestinians see that movement as the major force behind Israeli attempts to judaise all of the land of Palestine. Israeli policy towards the Old City of Jerusalem had not been any different from that employed in the remainder of occupied Arab territory.

Al-Haram Al-Sharif, the holiest Moslem shrine in Palestine, together with the Old City, has been a target for extremist Jewish groups ever since the Israeli army forcibly took over the City in June 1967. Unfortunately, official government policy does not discourage the activities of such factions; on the contrary, it excels in providing cover for their unlawful practices. Due to its highly privileged status in both the Moslem and Arab worlds, Zionist policymakers decided against the outright eviction of the City's non-Jewish population for fear of creating unwanted bad publicity, but adopted indirect methods for the gradual realisation of Zionist goals.

Court action was one of the cleanest, and most direct, tactics employed by official government bodies to evict Arab residents from their Old City homes. Such actions seem fair and just to the observer since the other party, the inhabitants, appear to be given the chance to put forward their defense in a court of law. Unfortunately, the unlucky homeowner who stood to lose his or her property never had a real chance to win the battle, because of so-called "security" considerations for example.

When no other excuse could be presented in court for the government's intention to take over a certain property, eviction or confiscation orders were immediately issued, on more often than not, security grounds. Israeli officials used emergency rules that were in effect during the British Mandate. In some cases, homeowners were offered trivial compensation, which most refused on patriotic grounds. Many examples can be found

of such practices, especially in the older sectors of the Moslem Quarter of the City such as Alwad and Bab Alsilsieh roads.

Less direct practices that both the legal authority and other independent Zionist bodies frequently resorted to included the harassment of non-Jewish homeowners, in order to force them to abandon their property. On the part of the authority, among their best known practices were the imposition of heavy fines on homeowners as punishment for minor irregularities. Just as common were warnings regularly issued to residents demanding unnecessary and costly repairs within a limited period. Failure to meet those requirements often resulted in immediate eviction by the authority.

Zionist bodies and individuals who managed to gain possession of some property in the Moslem Quarter of the City in the last two decades harassed non-Jewish neighbours in a less civilised way. Many incidents were reported of Jewish settlers physically assaulting Arab residents, throwing dirt and dangerous objects into their homes, blocking entrances to their dwellings, disconnecting water and electricity supplies and blocking sewage lines.

On one occasion, and in an attempt to counteract repeated attacks by the Israeli police and a neighbouring Jewish settler, the residents of a small alley (Aquabat Albustami) in the Harat Alsaadiya neighbourhood of the Moslem Quarter of the City, took upon themselves to install an iron gate at the entrance to the alley after being refused a legal permit by the local authority. Only hours after the completion of work, the settler, armed with his machine gun, and escorted by armed police and municipality officials, demolished the newly erected gate without warning. Protests by the residents and Islamic Waqf Officials were met with pointed guns and threats of physical violence and arrest. It was probably the only place in the world where a municipality engineer used a gun to enforce his technical opinion. In that particular incident, at a time when Arab/Israeli tensions were at a high in the City, the Israeli civil servants took matters into their own hands knowing very well that their actions would go unpunished.

In June 1967, Jewish presence in the Old City was almost non-existent. That soon changed in the aftermath of the Six-Day War when the Israeli authorities immediately issued eviction orders to the Arab inhabitants of the Jewish Quarter and other nearby neighbourhoods. Once that was completed, a large scale reconstruction and restoration project was initiated in the area, to make room for the new Jewish residents invited to replace the Arab population. Subsequently, independent Jewish and Zionist organisations began a systematic process of purchasing primarily Moslem-owned property in various sectors of the Old City. The majority of newly acquired property were transformed into what are labelled as Religious Jewish Teaching Institutions. It has to be said that many of those acquisitions were Jewish owned in an earlier period. In general, such property would have been legally leased to Arab inhabitants, who made rent payments through a Jordanian government department which acted as a caretaker or guardian of absentees' possessions in the country. Despite the local law being against the forced eviction of

long-term tenants, residents were completely denied that right. They were however offered trivial financial compensation.

Today, in order to increase the rate and size of Jewish occupancy in the Old City, Zionist organisations resort to more devious means to extract questionable purchase contracts from Arab residents. On many occasions, property was "purchased" from tenants rather than from the unknowing rightful owners who were forced into costly and lengthy law suits in order to reclaim their lost possession. More often than not, they ended up losers despite their very clear right. However, as the saying goes in Arabic, "If the judge is your enemy, who can you protest to". The Arab population of the City in particular, and the country in general, looked with great concern at such practices which they saw as unfair temptation or blackmail of the ignorant. Other popular tactics included forgery and the acquisition of signatures on sales contracts from Arab landlords while the latter were under the influence of drugs or alcohol.

### *Social strains*

Like any other, the local Arab community has its fair share of internal strife, although it is unique in its extraordinary circumstances. The lack of trust and faith in each other's intentions contribute to maintaining the relative stalemate in regards to any form of improvement by either party, Arab or Israeli. Inter-community relations within the Arab population of the City are not ideal. A feeling of social inferiority in comparison with fellow townspeople living outside the Old City Walls precipitated jealousy and hatred amongst friends and family. To those living in the new East Jerusalem suburbs, Arab neighbourhoods of the Old City are pictured as dirty and unsafe. It should be admitted that both parties are as much to blame for this situation. However, without the presence of a body capable of directing the population towards improved public awareness and maturity, the unhealthy conditions currently dominating people's lives continue to prevail.

## **Conclusion**

At this stage, a brief comment regarding the undesirable features of Old City residence is due. The preceding detailed account is intended to clarify the true living conditions of the Arab population. Its most urgent purpose is to bring to the attention of the outside world the daily hardships, hoping it may provoke the urgently needed support. It is hoped that more effective action can be taken by individuals and organisations throughout the world in that direction. This report is also intended to serve an equally important purpose on the local level. Firstly, on the inhabitants' side, it aims to convey assurances that others are aware of their suffering, and may be willing to supply support. Secondly, it is hoped that the remainder of the Arab population also develop greater interest in the affairs of their less fortunate, enduring compatriots.



### **III. Maintenance and Restoration Work in the Old City**

#### **Introduction**

All budgets for construction projects include allowance for maintenance. Normally, that would be in the form of a percentage of the total capital committed during a specified period. Similarly, all forms of public and private institutions such as schools, hospitals, allocate an annual budget for routine maintenance and emergency repairs. Naturally, the older the product, the greater the frequency and scale of maintenance required for its continued use. It is not surprising that the Old City of Jerusalem with its buildings, roads, public services and other features of its operational life, demands enormous material and human effort in order to ensure its continued fitness for use, especially when the majority of its existing structures are over three centuries old.

Turbulent events in the City, during and before that period, only made matters worse in regard to structural stability and safety of construction. Many buildings were left unattended for years while many others suffered serious damage by either deliberate sabotage or as a result of improper use. Other factors explained earlier resulted in severe problems, which either hindered or totally prevented new maintenance work in some areas.

In the next few pages is an attempt to provide an overall insight into restoration work carried out inside the Old City today. The size of operations and their influence on society (not only the Old City's), whether that be economic, social or political, shall be touched upon. The bulk of the text however, shall be dedicated to a detailed account of technical operations carried out by the various bodies involved.

#### **Special features of Old City construction**

##### ***Specialized knowledge***

The execution and supervision of maintenance and restoration work in the Old City requires the combined skills of various expert groups in order for favourable results to be achieved. As for supervision and design where required, it is necessary for the assigned team to include engineers, architects, archaeologists, technical assistants such as draughtsmen and foremen. All those involved should have received the necessary basic field training in order to have a "feel" for the unusual style of construction in the City. Structural engineers are generally assigned to deal with structure and strength of material of construction while architects primarily base their concerns on the "artistic" value and style. The two parties, in addition to having to work out compromise solutions for their interrelated issues, must also function within guidelines specified by the archaeologist in

charge. The latter's primary concern is to ensure the preservation of the historical and traditional form of the structure in question. It is a must for all parties to command a minimum knowledge of the various techniques and material used in Old City construction. It must also be emphasized that the actual supervision and design procedures are too demanding and complex to be taken lightly or left to inexperienced personnel. As for the executors of work, the labour force, only highly specialised teams and individuals should be called upon. To a large extent, equivalent individual jobs in modern construction or maintenance bear little resemblance to Old City work.

#### ***Frequency and cost of work***

With reference to the preceding, many obstacles face the inhabitants and regular users of the Old City in regards to construction, repairs and maintenance. Such undesirable features as dampness, fast material decay and deterioration contribute to the frequency of maintenance requirements. It is common for homeowners to replace the interior wall plaster on a two yearly basis in some of the older structures of the City.

As for the cost of construction work, common features such as restricted access and non-uniform wall surfaces lead to inflated costs in comparison with other locations. Both labour and building material costs are much higher in building sites outside the City Walls, and material consumption is much higher.

#### ***Restrictions and limitations***

Points made in this section do not generally apply to maintenance operations conducted by the Israeli authorities or other affiliated bodies, but are widely applicable to Moslem Quarter restoration work. Despite the presence of many other restraints that face supervisors and workers alike in restoration jobs within the Moslem Quarter of the City, only those of most influence shall be discussed. Limitations and conditions shall be listed according to the extent of their influence in hindering or preventing the execution of maintenance work.

#### ***Insufficient funds***

Circumstances directly related to the political situation are mostly to blame for the shortage in funds for restoration projects inside the City. It is beyond the scope of this text to specify factors that prevent possible funding sources from assuming an active role. However, it would suffice to point out that the absence of a responsible legal authority on the one hand, and Israeli government restraints on the other, are mostly to blame.

With active Jewish settler groups enjoying almost unlimited financial support from non-Israeli Jewry throughout the world, the Arab population must rely on its own resources or await financial assistance from the Administration of Waqf and Islamic Affairs whose own sources, largely the government of Jordan, are also very limited. The wide gap between the two, Jewish and Arab, sides in that respect, is indicated by the fact that the Israeli authority spent close to half a million dollars on a mere catalogue about

restoration work in the Jewish Quarter of the Old City in comparison with less than one third of that sum being annually allocated for restoration and maintenance work in Moslem owned property in the City. Shortage of funds is the most serious drawback facing those involved in Moslem Quarter restoration work. As for maintenance, those who pay the price are the inhabitants, whose own earnings do not even provide for an acceptable standard of living, let alone costly maintenance of their homes. The almost total reliance on either the local authority or the Waqf Administration is thus understandable. However, many homeowners receive assistance only after much damage had already been inflicted.

As to restoration and conservation of ancient structures inside the Old City, the quality of work is affected negatively by the shortage of funds. Supervision staff, archaeologists and architects in particular, have to accept compromise solutions in many cases. Many structures of great historical value have been left unrepaired and totally neglected for long periods as a result of the lack of funding. In sum, the shortage in funds allocated for maintenance of residential buildings and restoration of archaeologically significant sites inside the Old City affects, more than anything, the quality of work.

#### ***Limitations on change***

This concept is best clarified through a number of case studies. At this stage, it is sufficient to stress the handicaps presented by the unusual style of Old City construction and related technical considerations. In particular, structural engineers face critical situations which demand the provision of support where existing forms of construction prevent the execution of relatively low-cost and simple solutions. In general, the limitations that exist on change, together with the desire to maintain the traditional style of construction, present a major obstacle to technical teams.

#### ***Authority restraints***

The local Israeli authority, represented by the Municipality of Jerusalem, demands that all homeowners obtain a valid permit for planned construction work, including maintenance and restoration in their dwellings, no matter how small. The Arab population's experience with the authorities has led them to ignore this, on the grounds that permits are either too costly, or in some cases refused without any solid justification. Residents risk either being caught and penalized heavily for their illegal actions, or do not bother with execution of any work, thus leaving their homes to face further deterioration and weathering.

In many cases it was not only the beauty or elegance of a particular structural component that was put in jeopardy, but also its safety, and people's lives. In other cases, ailing roofs or load-bearing walls are left unrepaired because of inability to overcome minor technical conditions imposed by the authorities.

***Inter-community lack of cooperation***

It would not be fair to criticise the inhabitants' own practices and blame them alone for their misfortunes. However, on numerous occasions, trivial tenant/landlord disagreements prevents necessary repair work from being carried out by either side. The same could be said about uncompromising neighbours who continued to suffer as a result of their own stubbornness. It is hoped that such attitudes will decline with the establishment of an independent Arab authority to administer the affairs of the local population.

## **Nature of restoration and maintenance work**

***Goals and aims***

The allocation of funds for restoration and maintenance operations in the Old City is not only aimed at serving the local population, as the majority of homeowners naively believe. The whole issue is in fact much more complex. Decisions and steps taken are more often than not politically rather than technically motivated. Restoration and maintenance work in the Old City has been expanding steadily to become a major industry that many people's livelihood depends upon. The purposes and goals of these operations are listed here by order of importance.

***Maintaining an Arab majority in the City***

Since early times, the Old City had been recognised as a symbol of Islam, and more recently of Arab nationalism. Today, it is regarded as the urgent duty of every Arab and Moslem individual throughout the world to ensure the continuity of history in that respect. The allocation of funds for maintenance of Arab homes in the Old City is aimed before all else at encouraging those residents who are unable to live in unfit or in some cases unsafe dwellings, and cannot afford their maintenance, to remain in their present residence in the Old City, rather than to move into other neighbourhoods outside the City Walls. The most effective step that could be taken would be the uninterrupted provision of financial aid for transforming homes and the City's neighbourhoods into more pleasant places to live in.

***Conservation of traditional style***

The architecture of the Old City is not only shapes or forms of buildings. It represents a visual living proof of the way of life and tradition of the many glorious civilizations that flourished in the City in the past. Apart from very few pre-tenth century buildings, the majority of Old City structures are of post-Ayyubid (late eleventh century) age. Today, the City could be thought of as a museum containing precious samples of great historic and religious value. Conservation of these is essential to ensure their survival for many years to come so that future generations may enjoy and appreciate them.

### ***Economic value***

The construction industry provides employment for a large sector of the population not only in Jerusalem, but also in the surrounding villages and towns. Funds allocated for restoration and maintenance work in the Old City contribute to a more prosperous local economy. One million or so dollars are spent annually on one form of construction or another. The largest proportion of this goes to those directly employed in the construction sector. Tens of building contractors, who in turn employ tens of various skilled and non-skilled labourers and craftsmen, have become dependent on such projects for their livelihood. In addition, building material suppliers, tractor drivers, and administrative and technical staff stand to benefit directly from funds allocated. Finally, local shopkeepers also benefit from the presence of more people and more money spent in the City.

### ***Conservation of Moslem heritage***

In accordance with a well-planned scheme aimed at changing the traditional Moslem style of the City, the Israeli authorities have been conducting questionable restoration operations in the Moslem sector of the City. In many parts of the City, old buildings with deteriorated components receive new looks in the process. The resulting contrast with the surroundings is deplorable.

Conservation operations carried out by Arab or Islamic bodies aim to oppose such Israeli attempts to distort the Moslem and Arab character of the City. All personnel involved in such work are not only qualified but are also chosen as patriotic and conscientious individuals who deeply appreciate the unique character and rich heritage of their valued City.

### ***Training and experience***

Conservation and restoration work in the Old City provides an ideal training ground for academics who wish to acquire practical education in the fields of Art and Technology. Unfortunately, the potential importance of the City in that respect is neither fully realised nor efficiently utilized by local Arab scholars, and generally attracts broader recognition from overseas researchers. Arab academics, who admit their lack of productive and effective participation in those fields, blame the political and economic instability in the region for their slackness. This is partly true since all academic institutions in the West Bank and Gaza Strip are subjected to censorship and all forms of restraints, even arbitrary closure.

Possible applied research fields in the Old City include archaeology, architecture and engineering in relation to art and technology. Abundant material for research could be found in the fields of social studies, history and even psychology. Archaeologists in particular are the single group that could gain most benefit from the real-life laboratory. Also for engineers, the City's ancient structures, roads, sewage networks and other technical issues make possible, and indeed necessary, the conduct of research into such

fields as material of construction, structural stability, dampness, in the process providing field training for foremen, draughtsmen and engineers.

The same also applies to architects who wish to specialize in Moslem architecture, recognised throughout the world to be one of the most splendid and artistic forms of building. Architects involved in restoration work possess, at their convenient disposal, a rare situation where one could combine the existing old with new design concepts.

Finally, it is the demand of many, especially those already involved in such work, that efforts be directed towards the creation of a non-profit research facility, including among its staff representatives of all specialities referred to, for the benefit of the Arab and Moslem cause of the City. Such a formation would be guaranteed to produce very fruitful results in improving the standard of operations performed in the Old City today.

### ***Maintenance versus Restoration***

It is essential at this stage to point out the distinction between maintenance of residential structures on one hand, and the restoration of ancient buildings on the other. The two operations combine for the realisation of one common goal, that of preserving the City through ensuring the fitness for use of its structures. Maintenance work could be defined as physical repair of damaged components so that they become operational once again. It also includes the work that needs to be performed regularly in order to prevent malfunctioning of used objects. For buildings and related facilities, maintenance involves the replacement of damaged parts, or adding to them as a means of providing extra strength or preventing further damage. In the Old City, maintenance work might include new construction if the need arises, usually when residents wish to create additional space rather than actual repairs.

Other activities that could be classified as maintenance include the use of modern techniques and material, such as the replacement of old deteriorated timber windows with steel or aluminum, marble floors with more economic mosaic tiles, stone-tiled roofs with reinforced concrete slabs and topped with a water-resistant layer of asphalt and fibreglass. Also classified as maintenance operations are asbestos and tin roofs, solar heating equipment and interior sanitary installations.

Restoration work remains in agreement with maintenance so long as no form of new construction is introduced, and replaced parts are not substituted by modern incompatible ones. Restoration could, thus, be defined as bringing back an object to its original shape or form. In Old City work, it can have an extra dimension, that of bringing back to its original state, not only the form or shape of a particular structure, but also its purpose of use. Unfortunately, this would be virtually impossible under present circumstances. At this stage, besides clarifying the distinction between maintenance and restoration operations as applicable to Old City structures, we should point out the conflict in interests that faces the various teams involved in both lines of

work, to provide a complete picture that would help all sides to better understand the concerns and priorities of each other.

Over two hundred structures of historic or religious significance to Arabs in general and Moslems in particular exist today in the Moslem sector of the Old City. None of those structures were originally intended for use as family residence. The majority were teaching institutions (*Madrassas*), *Ribats*, *Khanquas* or *Zawiyas* that were established for public use. As earlier explained, such compounds are today used as residential buildings; the average sized *Madrassa* provides residence for at least three separate families.

Understandably, the transformation in the purpose of use forced the introduction of alterations on the original interior design, and partitioning of various structures. Common changes or alterations performed by the new occupants included the addition of new cement block partitions, asbestos and reinforced concrete roofs, solar heating installations, new-style doors and windows, bathroom and sanitary fittings; in some locations, complete original walls or other structural components were demolished to create extra living space.

Other less common alterations include the removal of original features of buildings at some locations, for instance decorated or patterned stone profiles.

The clash of interests that exists today between the various specialist restoration and maintenance operators is due to a combination of three major issues: the cost of alternatives; required quality of the end product; and the intended purpose of a particular structure. Other less influential issues are the strength, durability, practicality or timing of proposed operations.

Civil and structural engineers are often blamed for being more inclined to adopt the less costly solutions placing little emphasis on other issues such as the final shape, or form of the product. They are also accused of seeking easy, practical options, that take into consideration strength, safety and durability, regardless of elegance or compatibility.

This is not totally untrue. In their training, engineers are constantly reminded of such issues. On the other hand, undergraduate engineers are encouraged to work on projects in association with architects and building engineers, aimed at teaching each group something about the others' basic requirements in relation to construction projects and design work, and to seek compromise approaches that ensure the inclusion of each group's basic demands in the final product, and encouragement of mutual cooperation and joint decision making.

Architects' training generally makes sure that design skills and artistic talent are directed towards the creation of an all-round, compatible product that combines beauty and visual symmetry. Unlike engineering training, less attention is devoted to economic considerations. Further complexity is presented by the demands and wishes of archaeologists, whose work is based on discovering and conserving ancient objects of value, without much regard to other issues. In general, archaeologists are "closer" to architects than engineers as far as construction work in the Old City is concerned.

Authenticity, and the restoration of altered features of old structures to their original forms, is one of the most debatable issues that makes the archaeologist's job a lot more challenging in the Old City in comparison with other groups. This feature was particularly noticeable in inhabited buildings where residents were totally opposed to any activity in their homes that directly interfered with their comfort and needs.

The Al-karimiyya Madrassa compound, next to the Bab-hutta gate on the Haram's northern side, is currently occupied by four families, each sharing a two-room home. The external stone wall had for some time been threatening to overturn and collapse on the street side. Large stone blocks, forming a two and a half metre high arch, only held together by virtue of their size. A few years back, the then new residents of the first floor of the compound closed down the original main entrance on street level. A recent decision to repair the wall profile was initially blocked by engineer/architect/archaeologist disagreements. The engineer decided to remove the displaced stone blocks by pouring reinforced concrete and replacing the blocks in their original positions. Deteriorated stones were to be replaced by new white limestone blocks. The architect demanded that no weathered stones be replaced, but treated by hammer in order that the same form of stone surface would be maintained throughout the whole profile. The archaeologist was in complete agreement with the architect as far as keeping the original stones was concerned, but insisted on an additional re-opening of the recently blocked arched entrance which altered drastically the original features of the Madrassa building. The residents refused the request insisting that their privacy and safety were more important than the archaeological value of the structure.

Pointing out the distinction between maintenance and restoration work in the Old City primarily aims to reach all parties involved in such work, including the various specialized groups such as engineers, architects and archaeologists, to enhance their appreciation of each other's needs and difficulties. Good quality and smooth execution of operations require each group to use the knowledge and skill of the other. In cases where any one of the three parties was solely in charge of supervision, it would be advised that consultation be sought from at least one of the other two or advice sought from available literature. It is saddening that restrictions imposed by the various groups, even those standing to benefit from such work, prevent the execution of desirable courses of action.

### ***Who does the work***

Maintenance and restoration work in the Old City's Moslem Quarter is generally performed under the direct authority of one of three parties with different purposes and operational strategies: the Administration of Waqf and Islamic Affairs, the public Moslem trust authority; the Israeli local authority, the Municipality of Jerusalem; or independent property owners.

Other parties that perform construction work include the East Jerusalem Development Company (EJDC), and the various Christian churches that own property



in the Christian, Armenian and the Moslem Quarter of the City. EJDC operations were mainly concentrated in the Jewish Quarter of the City and other Jewish property wherever it existed.

It is necessary to limit the discussion to operations performed by the first three parties. Christian churches and other institutions and the EJDC shall not be discussed separately due to their minor role in Moslem Quarter work.

### ***The Administration of Waqf and Islamic Affairs (AWIA)***

The role of the Waqf administration in Palestine is not restricted to Moslem religious affairs as the title might indicate. In the aftermath of the Six-Day War in 1967, the local Arab population had to look for a stable authority that could be relied upon for protection from the aggressive Zionist regime. The Waqf administration seemed to be the only able body qualified to assume the new role of political and social leadership. Today, the Administration is regarded as the most influential Arab authority in the land, even by the Israeli government. Below, an attempt will be made to cast some light into the activities, tasks and operations the Administration has taken upon itself with respect to protecting Arab (Moslem and Christian) interests on one hand, and to stand in the face of Israeli aggression on the other. General notes in relation to the origin and nature of the Waqf concept shall be kept brief because of the abundance of relevant literature, by Moslem and other authors alike.

### ***Origin and goals***

No exact equivalent is available in the English language for the Arabic term "Al waqf", "trust" is the closest. The concept originated indirectly from the teachings of the Islamic religion, and the Holy Quran, which called on the people to preserve and glorify the Moslem heritage and tradition by every possible means. The Quran demanded that the wealthy members of the community should contribute generously to the poor and needy, and to help establish and organise non-profit institutions serving the Moslem society and protecting the welfare of its members.

In accordance with these teachings, and the general aims of the Moslem religion, the Waqf concept came into existence. The best definition so far given is that a certain property becomes entrusted under Waqf control when its original owners have given up their ownership rights for religious motives; in effect it is donated to the Moslem public, and its income spent on charitable causes and the general good of the people. In the past, the income was spent in such fields as the army, ransoms for prisoners of war, dowry for poor girls, helping the poor and elderly, health and education services.

### ***Alwaqf in Palestine***

In Moslem countries worldwide, religious affairs are administered by a special ministry of waqf and religious affairs. Its duties are generally restricted to religion-related

establishments such as courts of law, "marriage bureaus", mosques and religious teaching institutions. As far as Palestine is concerned, the country's unique current status has added a new dimension to the Administration's legal and executive status. The Alwaqf has grown in size and influence since the Ottoman era, when the former took upon itself the execution of many activities in the fields of health, education, social welfare, religious affairs and others. Until today, the Alwaqf can also boast ownership of a large amount of property in and around all the big cities in Palestine.

#### ***Alwaqf in Jerusalem***

Since the Mamluk reign over the City, Jerusalem had always gained the lion's share from Alwaqf's benefits and income. The Old City in particular continued to be a privileged centre, hosting the general administration offices as well as no less than twenty other affiliated offices and institutions. In terms of property ownership, almost 80% of all property in the Moslem Quarter are Waqf owned (either "absolute" or "family" Waqf). Even outside the Old City perimeter, the Administration is entrusted several kilometres of land, and tens of commercial and residential buildings within the Jerusalem district alone.

#### ***Status and duties***

The administration of Waqf and Islamic affairs (AWIA) office in Jerusalem is the regional West Bank headquarters; the main office being in the Jordanian capital, Amman. The AWIA is directly responsible to the Ministry of Alwaqf in the Jordanian government and all Palestinian Waqf employees are regarded as Jordanian civil servants despite the August 1988 legal and administrative separation between the West Bank and Gaza Strip and the Hashemite Kingdom of Jordan.

Following the 1967 Arab/Israeli war, the AWIA was the only surviving official institution in the occupied land. In response to heavy international pressure, amongst other considerations, an unwritten agreement of mutual, relative non-interference was reached between AWIA officials and the Israeli authorities. The former were allowed to operate locally and continue with their pre-occupation duties within a framework of relative independence. The Israelis did however specify certain guidelines within which the AWIA could operate, especially in relation to "security" considerations and local municipality regulations. The policy of non-interference was to remain in force as long as the above were abided by.

For the Waqf West Bank branch, the most important corollary of Israeli occupation and the subsequent termination of Jordanian rule, were its new duties and responsibilities. In effect the AWIA was assigned to the management of all Jordanian government affairs in the West Bank, even in such fields as agriculture, industry and commerce. The AWIA remained the only legal channel through which funds could be transferred into the occupied land from Jordanian or other sources. Finally, in relation to the status of the AWIA under Israeli rule, it is accepted that no legal contact is

established between the two sides. Waqf officials refrain from dealing with the Israeli courts. Employees are also not subject to taxation as are the remainder of the population. AWIA is currently in charge of a wide variety of institutions and organisations which operate within its framework, some under its direct authority, others on behalf of absentee authority.

***Directly affiliated bodies***

All personnel working in such organisations receive their pay directly from the Waqf, and enjoy all the rights and privileges of Jordanian civil servants. The AWIA conducts its operations from a general headquarters, situated in the Old City, Bab Almajlis, housing the general Waqf manager in the West Bank, accounting, legal affairs, administrative affairs, treasury, personnel and West Bank affairs.

Regional offices are located in Jerusalem, Ramallah, Nablus, Jenin, Tulkaram, Bethlehem and Hebron. Over 100 civil guards are assigned on a 24-hour basis in the Haram Al-Sharif, in addition to clergy and cleaners serving the Aqsa Mosque and Dome of the Rock and surrounding religious compounds. The Archaeology Department employs over 40 people in various specialities such as archaeology, architecture, engineering and technical drawing; the office also operates a fully equipped photography laboratory. Public relations, Religious affairs and the Pilgrimage department operate through separate offices at various locations within the Old City.

The Islamic Museum and Islamic library are situated in the Haram compound. Dar-Alaytam Orphanage School accommodates close to one thousand pupils in three separate buildings, one of which is situated in the Old City, the remaining two in suburbs of Jerusalem. Alaqsa Schools include elementary, preparatory and secondary boys and girls schools in and around the Haram perimeter and a kindergarten.

***Indirectly affiliated organisations***

These include health centres in Jerusalem and other cities, and schools with over 10,000 pupils in the Jerusalem district; higher education institutions, such as the College of Islamic Teaching in Jerusalem and nearby towns; and the Alaqsa Mosque Restoration Committee.

***Role of the AWIA in maintenance and restoration work in the Old City***

The preceding account regarding the nature of Alwaqf acquaints the reader with the terminology and emphasizes the extent of dependence of Old City residents in particular on the support and service of the AWIA.

In regards to maintenance and restoration, the AWIA is almost exclusively in charge of Moslem owned property inside the Old City. Apart from the Committee for the restoration of Alaqsa mosque, construction work of all forms is generally performed under the direct authority of one of two bodies: the Engineering Office at general

headquarters; or the Department of Islamic Archaeology at Bab Alhadid, about 100 yards away.

### ***The Engineering Office***

The engineering office is regarded as the executive arm of the AWIA; it is by far the most active operational system within the department. At present, the office employs just over thirty full-time professional staff and technicians, including two architects, and three structural engineers in addition to a number of draughtsmen, foremen, plumbers and electricians.

Office operations are executed according to limitations of annual budgets that allow for staff salaries, maintenance and repairs, new construction projects and a sizeable allowance for emergencies. In the last few years the office's annual budget was in the region of one million dollars. Any Waqf Sahih (Absolute) property in the West Bank is eligible for the free services of the Engineering Office in regards to maintenance and any required improvements. New construction projects, mostly schools, hospitals, commercial centres, mosques and other public buildings, are wholly designed and supervised by Engineering Office staff. Such projects are generally aimed at utilizing Waqf-owned land, creating revenue and providing public services of a non-profit nature.

### ***Old City work***

In regards to the Old City, the Engineering Office is fully in charge of conducting repairs and carrying out modifications in Waqf-owned property, such as improving the electrical installations in the Haram, and connecting new sewage lines to residential buildings. The bulk of the Office's Old City budget is allocated to regular and emergency maintenance of residential, Waqf-owned property; the remainder is spent on the maintenance of mosques, the Haram compound and other structures of religious value such as tombs. Maintenance of around ten Waqf schools in the Old City is also the responsibility of the Engineering Office. Other services that the Office provides to the local community include the production of official and non-official technical reports and other documents and consultancy services that the general public is accustomed to receive free from AWIA staff.

### ***The Department of Islamic Archaeology***

The most technically oriented department within the AWIA infrastructure, the Department of Islamic Archaeology (DIA), was initially established for pure research purposes such as the documentation of historic and religious structures in the Old City and all of Palestine. The speedy growth and development of the DIA is exemplified by the increase in the number of employees from one archaeologist almost ten years ago, to the present team of three archaeologists, two architects, one structural engineer and a number of assistant technicians.

The DIA operates through three channels, each specialised in its own field:

***archaeology department:*** assigned to the production of complete documents including general surveys and detailed architectural drawings of all sites and/or structures inside the Old City of any architectural significance;

***the Centre for Maintenance and Restoration of Archaeological Sites in Jerusalem:*** in accordance with previously prepared plans, the Centre's staff supervise the execution of complex restoration operations (structural and architectural) in structures of historical or religious value. The Centre employs, on a daily basis, various craftsmen in addition to the full-time team of an architect, archaeologist and a structural engineer;

***the Committee for Alwaqf Alzurri*** (Family Waqf) which carries out regular maintenance and repairs in Waqf property inside the Old City (amounting to over 60% of all Moslem property); through an engineer, a foreman and a clerical assistant, it supervises the execution of work in privately owned property in emergencies. Initially, it was established to provide homeowners with financial and technical aid in situations demanding urgent attention. At present, all Arab residents of the Old City are eligible for such aid. This Committee uses local building contractors for each individual job. Financial/administrative affairs are co-managed by the DIA and the AWIA. In reality, the Committee performs the majority of maintenance work in Moslem owned property all over the Old City.

#### ***Engineering Office and Archaeology Department operations in the Old City***

A detailed technical account shall be presented in relation to restoration work in the City. The presentation shall be divided into two main categories, maintenance and restoration. The analysis is based on a complex classification strategy in reference to ownership, purpose of use and history, which distinguishes between each item's technical nature. Construction techniques shall be listed for similar jobs, and reference made to material, quality, practicality and cost of each operation. It is hoped that recommendations would eventually be formulated as to the most efficient and effective restoration and maintenance techniques that would best serve the Old City's architectural and structural requirements.

#### ***Technical know-how and quality of work***

As reported earlier, all maintenance and restoration operations are designed, planned and supervised by the coordinated efforts of architects, archaeologists and engineers. All personnel involved in such operations are wholly dependent on the experience and advice of their predecessors who worked in the same field. It is not possible to obtain any academic instruction or training on Old City construction. All technical know-how put into practise by restoration teams at present is based on personal experience and field work. Despite the abundance of technical literature on old construction techniques, and Moslem architecture in general, none is of use in practice because they lack emphasis on practical specific restoration considerations.

Even within the AWIA and DIA employees are discouraged from trying out different experimental techniques, for administrative or financial reasons, and are forced to adhere to previously adopted traditional methods and materials. Especially for the new graduate engineer or architect, it would be extremely difficult to test and improve on the current standard approach to operations.

It must be emphasized at this stage that Old City architecture and general layout is unique in comparison with other similar cities in the world. The much sought after objective of many engineers and technically oriented professionals involved in restoration and maintenance work is the establishment of a research facility with relative economic and administrative flexibility and freedom specialising in Old City construction. A fully detailed recommendation in that respect shall be formulated after pointing out the many deficiencies that exist today in this field.

It is to be remembered that the currently adopted restoration and maintenance techniques are far from perfect for providing suitable solutions to the City's numerous structural and architectural problems. Many external factors are very influential in regards to the nature and efficiency of such methods. Most of all, from a technical point of view, scientifically based practical know-how is missing; thus, those teams responsible for planning and executing such operations should not be wholly blamed.

Despite all the above mentioned factors, it is recognised that the general standard of restoration and maintenance work carried out by the AWIA and other individuals at present, is quite acceptable, judging by the observed results and the current structural and architectural state of the Old City's Moslem sector.

### ***General approach***

A short preview of the general approach adopted towards construction operations shall serve as an introductory note to those readers unfamiliar with the Old City environment. Before that, however, it is necessary to provide a brief description of the general style of construction in the City as a whole, and a close look at the structural features in particular. For further information on the methods and materials used in typical Moslem architecture, the reader is advised to refer to any one or more of a number of excellent publications available; the account provided in this text shall be very brief and general.

## **Old City architecture and structural design**

The following description is purely technical, rather than sentimental as with many foreign and local authors who excelled in portraying exotic, beautiful images of the Old City. In terms of age, the majority of the City's buildings are over 200 years old; many are almost 1,000 years old and are still structurally stable and serviceable until this day. Despite the numerous alternations and modifications introduced by homeowners over the years, Old City structures remain very consistent with their original structural form. The change in the purpose of use of buildings has made interior alterations inevitable.

Another factor is the progress and development in home requirements such as ceramic bathrooms, aluminum windows and solar heating installations. An aerial picture of the City reveals the numerous stone-tiled domes of all shapes and sizes, overshadowing the flat roofs of more recently constructed buildings. A few structures are covered with red clay tiles supported on sloping timber trusses.

As far as domes are concerned, the majority are segmental arched, almost semi-circular while others are pointed arched and a few are horseshoe shaped. Also clearly evident are the inner open yards around which the dome-roofed chambers are centred, and through which steep flights of stairs between floors of multi-storey structures pass.

Most distinctive of almost all of the City's residential buildings are the exterior stonework surfaces. In addition to walls, the majority of roof surfaces are covered with stone tiles. A few roofs exhibit today the blackish-grey colour of concrete commonly used in recent years as a replacement for deteriorated tiles.

As for the general layout of the Old City, the visitor soon recognises the uninterrupted continuity of its buildings, making it seem one huge structure formed from a network of adjoined extensions. Continuity is even carried over across streets and alleys via portal frames, as in public pathways, or simply supported spans as in single-chamber dwellings. The City's buildings are rich in cantilevered balconies, projecting up to two metres into the street in most cases. The majority of balconies are not covered and are supported on I-section steel beams, popular in the first half of the century; and stone cobbles in the older structures which also support roofed balconies. A few timber verandas, both covered and uncovered, are observed in certain neighbourhoods.

As for interior and structural member design in Old City buildings, with the exception of the few more recently constructed structures that in general employed building techniques similar to today's, all currently serviceable structures consist of double-faced stone load-bearing walls that support vaulted, flat or domed roof/floor slabs. Vaults are either barrel (in rectangular space) or cross-vaulted (in square space). Support is normally provided at four opposite corners via staunch stone columns that act as sitting "benches" for vault sides. Columns only rise to approximately two thirds of the clear height between floor and roof slabs. Domes on the other hand vary considerably in size and shape. Structural support is provided for in most cases through circular drums, on some occasions eight and twelve sided.

Another common feature of interior decor in Old City buildings is the lintels and arches spanning across door and window openings. Lintels generally consist of either a single large stone, typically up to 1.2 m long or a keystone between two cantilevered blocks; all three are usually of equal size.

Foundations of Old City buildings are virtually non-existent in the forms known today. Parts of the City are supported on older, semi-demolished hidden structures; others are mounted on stone foundations not greater than half a metre in depth. From a structural point of view, such foundations only provide for vertical loading, and cannot be counted on to resist bending moments or torsion forces that the structure might be

subjected to. Such foundations are also blamed for the lack of continuity between members of the same structure.

As for material used, walls and slabs are generally filled with clay-boulder-rubble mixtures, not the concrete used today; while plasters are mainly gypsum or lime mixes.

## **Structural maintenance operations**

In response to the frequent complaints of worried residents, the AWIA has taken upon itself to perform structural maintenance operations in Moslem owned property. Technical staff in charge of work were instructed to carry out regular inspection tours in the various sectors of the City. Due to limited funds and the large number of aid applications (almost all of the City's Moslem Quarter residents have filed in applications for that purpose), it had become a general policy for AWIA, to perform only the most basic requirements of maintenance, to just ensure the continued fitness and stability of buildings. Unnecessary modifications such as ceramic bathroom tiling were ignored.

General maintenance and repair policy is directed towards providing extra strength and stability while adhering to original forms and overall style of the Old City. Work executors are encouraged to avoid all basic design alterations or modifications, unless thought absolutely vital to the future stability of any structure.

### ***The Old City Structure***

The ancient structures of the Old City have managed to remain reasonably fit for use for hundreds of years, and shall hopefully continue to do so for many more, as a result of the combined influence of a number of factors. First, the continuity and close attachment of buildings which provide extra lateral and vertical stability to individual structures. The rigid and effective horizontal continuity also reduces the consequences of ground settlement and provides resistance to overturning moments induced by lateral loading. Second, the oversized individual structural elements such as the width of wall sections (not less than 80cm in most) and depth of slabs which provides strength and durability to the structure as a whole. The excessive self weight of members also contributes to providing stability in all planes. Third, regular structural maintenance and repair operations over the years have contributed immensely to the preservation of the City's structures as they are today. Many buildings have been demolished and rebuilt by successive owners who also carried out repairs to damaged or weakened structural components. Finally, the City's pious population, including Jews, Moslems and Christians, consider that the protection of God is the main reason for its "survival" (despite its frequent destruction in the past). The third factor is the only one that can be influenced today and in future.



## **Foundations**

Structural foundations, as we know them today, do not exist in the Old City; maintenance work at foundation level generally involve the use of new material or components, rather than repairing existing members. Defects in foundation induce very serious damage to supported structures, and in soft ground, eventually lead to failure. Most common defects include:

### ***Ground settlement: collapse of soil element***

The average bearing capacity of natural soil (mostly rocky formations) in the region is relatively high in comparison, thus allowing greater loads to be supported through structural foundations. In Old City structures, even in the absence of suitable foundations, very few incidents of structural damage resulting from ground settlement were reported before the 1970's, after which such incidents became very common. The main reason behind the sudden turnaround was the excavations of the City's lower levels by the Israeli authorities. Wide scale excavations, whether for archaeological purposes, for tunneling or for the installation of utility lines, have shaken what existed of the City's foundations, causing widespread ground settlement and severe structural damage in many locations.

Where excavations were directly underneath the affected zones, immediate ground settlement was observed. But in other locations, where excavations were close to building foundations, damage was not instantaneous. It generally followed a gradual pattern and the mechanism of soil collapse was completely different. The affected soil element was composed of an inverted, almost perfectly triangular, slice with its apex at mid-width of the excavated element. The angle of divergence, and thus the size of the affected zone, depended mostly on the natural soil properties and its state (loose, dense).

Numerous examples could be provided from observations made in the Bab-Hutta neighbourhood, shortly after the commencement of work on a new local sewage network. Excavations revealed a mostly boulder clay soil in most locations, whereas in others the removed top layer (up to one metre in depth including dumped material) revealed a shocking view of an empty volume directly underneath. Street tiles were only held in place by a layer of clay/gravel mixture not greater than 30 cm deep. As one-metre depths were reached in excavations, external walls of nearby structures soon exhibited cracking and limited local displacements which developed into a frightening overturning mode in many cases.

### ***Theoretical analysis***

Keeping in mind the fact that load-bearing walls consist of two stone "leaves" on either side of a rubble/clay/mortar mixture (80 cm on average), it is expected that the displacement in all or part of the wall section, as a result of ground settlement, would depend amongst other factors on the nature of the wall's foundations, the extent of the affected soil element, and local bonding within the wall section.

Field observations have proved that in the majority of cases, the sequence of damage started with the outermost stone surface undergoing a horizontal displacement

(deflection from its original vertical plane), after which slower rates of deflection were observed as a result of additional moments induced by eccentric loading. In cases where strong inter-bonding was present, the clay/rubble mixture, and subsequently the innermost stone wall surface, automatically followed suit and settled into a new position causing substantial cracking in the process. Cracks soon developed further to reach other parts of the structure, slabs, floors etc., to relieve excessive tensile stresses. In other situations where foundations have settled into lower levels, the whole wall section had acted as one unit with severe transverse cracks developing across both sides of the wall section. Floor and roof slabs also suffered similar damage and connected adjacent walls completely separated from each other.

In general terms, structural damage resulting from ground settlement reaches gradually all members of any structure. Where only mild damage had occurred, cracks could be observed along irregular cement bonding lines, whereas in the more severe cases cracks could be detected in the stronger stone blocks themselves. In the former case, tensile stresses have chosen the weaker *kuhla* lines to be relieved along.

#### ***Treatment strategy and techniques***

In general, treatment strategy was based on the need to provide alternative stronger foundations as a first step, to be followed by the repair of the resultant damage in other parts of the structure. In situations where immediate action was essential, it was often decided to provide above ground level, alternative support, either permanent or temporary, and consequently ignore the need to repair any below ground level damage.

Approval maintenance techniques varied between locations, depending on the allocated funds, space limitations and other factors which in some cases had prevented the execution of any remedial work, leaving the structure in question abandoned for many years (no less than twenty homes in the Moslem Quarter of the City are currently unoccupied because classified as unsafe. All such dwellings had suffered severe and extensive cracking and were evacuated shortly after excavations were carried out in their vicinity. Many other structures are deserted at present in various locations within the Moslem Quarter, for other reasons).

Due to the non-uniform nature of operations in the field of maintenance and repair work, treatment techniques are best explained in relation to real-life analogous situations.

#### ***Reinforced concrete foundations***

Except where economic or technical (safety) considerations prevented it, new reinforced concrete foundations were placed in all cases where evidence of defects in foundations were observed. In Harat Alsaadiyya neighbourhood, a girls school was surrounded by a three metre high 25 metre long stone wall, above street level. A recently installed sewage pipeline less than one metre away from the wall surface caused severe cracking across the wall in many areas. The wall was also acting as a retaining wall, supporting a soil

volume almost two metres high from the school's side. Immediately after pipeline installations were completed in the area, individual stone blocks showed signs of relatively large displacements (up to three metres). Swift remedial work was decided upon. Trenches were excavated at 0.60 m width and 2.0 m depth, below street level, with the trench extending half its total width in the wall direction. Two separate reinforced concrete beams were placed on top of each other below ground level. Overall, 85 cubic metres of reinforced concrete were poured below ground level before displaced stones were re-built and *kuhla* was applied to the whole wall profile.

In a similar case in the Christian Quarter of the City, a three storey structure (owned by a Moslem family Waqf) suffered serious cracking, surface deflections (local overturning) and even falling stone blocks in some areas, also as a result of nearby recent sewage excavations. The building was situated at a street corner with both sides showing evidence of severe damage.

The first stage of the repair process included pouring reinforced concrete foundations in the form of a continuous tie beam along the whole length of the building facing the street. Trenches were later excavated and concrete poured in the whole excavated volume, after reinforcement bars were placed in both planes. Remedial work performed above ground level included the pouring of a reinforced concrete column at the structure's corner.

At a private home in Bab Hutta, a two-storey structure built in two stages, the owner had evacuated the premises upon the first signs of structural damage in the ground floor's external walls. While all members of the structure had suffered only minor cracking, the main wall extending perpendicularly into the main road direction exhibited the most serious damage. The wall outermost stone surface was deflected outward at a very steep angle, especially in the top half.

Upon considering ideal structural remedial work, the engineer in charge was faced with very restricted space, especially in that the building's main street gate was only a few inches away from the wall. In the end, it was decided to pump concrete below ground level to provide extra strength at the foundations. Timber scaffold was erected to remove out of position stone blocks and the weak clay/rubble layer after which reinforced concrete was poured and finally the stones were replaced. Finally, two tapered reinforced concrete columns were placed to provide lateral support for the main wall.

In Bab Alhadid, just outside the Western Haram border, extensive archaeological excavations carried out by the Israeli authorities in the early seventies caused extensive damage in many structures all over the neighbourhood. Most damage was observed in a simply supported structure spanning across a small alley which led into a very crowded residential complex. Since no other solution was physically or economically feasible, it was recommended that permanent, above ground level substitute support be provided. As it turned out, a composite steel truss and timber scaffold "tower" 3 m wide was erected below the damaged section of the structure. A pedestrian passage was left on either side. The steel support was composed of a repeated truss pattern, topped by thick timber

planks of various lengths, that filled the arched segment of the structure's floor. A nearby structure, also suffering similar damage, was strengthened with a 0.20 m wide, 1.20 m high plain concrete wall along the inside perimeter of the damaged area. The process provided effective lateral support to individual walls and to the structure as a whole. Steel tie-bars and similar techniques deployed in the same region shall be discussed at a later stage.

Lastly, in Bab Alsilsileh road, archaeological excavations carried out directly below a privately owned home, and throughout the whole neighbourhood, had caused the deflection of one of the walls adjacent to a steep flight of stairs which led to the second storey of the building. The latter had also exhibited severe cracks in its floor and internal walls. The other side of the one metre wide staircase was bordered by another stone wall that in turn had not suffered any sizeable damage. The wall was part of another structure that had recently been repaired.

In addition to repairing internal wall and ceiling plaster, a steel I-beam-stanchion structure was erected across the stairs to provide lateral support to the main stone wall. Steel beams were pivoted on the opposite wall while stanchions were placed at intermediate intervals to support the horizontal beams. The latter's use was extremely advantageous in that maximum benefit was obtained from the unfavourable space limitations in the closely packed housing compound. The complete new steel support did however reduce the already narrow and uncomfortable staircase. In addition to its unpleasant incompatible look, the steel tower was of no benefit in providing support at foundation level.

Other factors affecting structural foundations stability in Old City buildings include: physical displacement of foundations which might be induced by vertical and/or horizontal sheer forces or ground movements. In such cases where stone foundations had either shifted or tilted in a two-dimensional plane, the extent of damage in overlying structures was minimal and in many cases only temporary. Collapse of foundations either resulted from material decay or collapse of underlying buried structures, unknown to exist, but providing vertical support to the main structure for many years. Such cases were very rare, but were known to occur in the past, and resulted in immediate collapse of the supported structure.

### ***Summary***

In conclusion, it is estimated that over 90% of cases where foundation-related defects were detected in Old City structures, damage had originally resulted from natural ground settlement or movement which in turn was induced through nearby excavations, the remainder caused by other less common factors. All techniques used at present for solving foundation-related problems are only partly effective. It would be extremely difficult for technical professionals in charge of such operations to achieve more favourable results without being provided with the chance to conduct experimental techniques. Under the present circumstances, this would be most unlikely to change, for

many reasons most of which have been referred to earlier. The most serious restraint is the high risk involved when one is dealing with the unstable lower levels of the City. It would involve equal risk to try out experimental techniques which might prove inappropriate, and would either result in serious damage or could not be reversed. It would seem unadvisable to resort to such action at present in order to avoid jeopardising the overall stability of the City.

Finally, it is hoped that the future shall bring about better prospects for solving these and other problems that threaten the stable existence of the Old City. All the preceding methods were not presented as ideal solutions but were merely reported in this context precisely as they were executed by the respective operators.

### **Load-bearing, self-supporting and retaining walls**

A common feature of almost every winter in the City is at least one structural collapse incident. Modes of failure vary widely between respective locations, being only local in some cases and total in others. In incidents of local failure, only minor damage was reported, whereas total collapse incidents often caused extensive material losses and human injury at times. Only remedial repair operations shall be discussed at this stage. As in the case of structural foundations in Old City buildings, most benefit shall be gained from direct reference to real-life incidents that occurred within the last few years.

Maintenance work carried out after collapse had occurred shall be discussed separately from pre-emptive operations that were performed on damaged parts to ensure their future stability and durability. Field observations obtained in the last few years have allowed the formulation of a general collapse theory in relation to load-bearing, self-supporting and retaining walls in the Old City.

Firstly, local buckling, with relatively minor damage, occurred in load-bearing walls at approximately mid-height and covered less than one third of the total clear height of the wall. Secondly, self-supporting and retaining walls that supported earth fill generally collapsed in an overturning mode, with almost all of the wall external stone surface being pushed out of place, along with a sizeable thickness of the intermediate clay/rubble layer, causing substantial damage in the process. In the more severe cases, notably after heavy rain or snowfall, the extra pressure induced within the intermediate clay/rubble layer had initiated failure (overturning) in both stone faces of the double-leafed self-supporting walls. Theoretically, each stone face had acted as a separate retaining wall, supporting half the thickness of the intermediate layer, and had collapsed as a result of not being able to resist active forces within it.

#### ***Restoration of collapsed members***

It is recommended that collapsed structural members be rebuilt without delay, and in as close a form as possible to the original pre-collapse state. Speed of the reconstruction process is essential for both technical as well as administrative considerations; the latter

being concerned with the local authority's requirement that permits be obtained if reconstruction work was delayed.

### ***Typical incidents***

In December 1983, a heavy snowstorm resulted in serious damage to many buildings all over the City. In particular, two incidents were reported where complete wall profiles collapsed shortly after the storm had ended. At a privately owned home in the Christian Quarter of the City, the one-storey outermost stone wall, which partly supported a reinforced concrete roof slab, completely collapsed without warning, with all the rubble falling into the adjacent busy street. The building contractor began by clearing out the rubble that almost blocked the public passage. Following that, support jacks were placed underneath the surprisingly still intact, but cracked, roof slab in order to prevent further collapse. Next, and upon the request of the homeowner, more interested in saving money than in finding an ideal acceptable solution, the contractor erected two reinforced concrete columns at both ends of the collapsed wall profile and used 10-cm thick hollow cement blocks to fill the intermediate distance.

Finally, a cement plaster layer was applied to the hollow block surface. The end product seemed acceptable from a structural point of view since no appreciable loading was expected in future. However, the new construction was rejected by everyone who saw it except the homeowner. The rectangular patch of cement surface looked out of place in the continuous stone profile. As it turned out, cracks appeared very rapidly across the new brick wall and in the roof slab, especially along the joining line between the two. Regrettably, the residents could do nothing about the incorrect repairs.

At a small alley off the Via Dolorosa, and within a few days of the first incident, a 4m high, 8m long, double faced stone wall partially collapsed without warning. The wall, bordering the Afghan compound in Jerusalem from the west side, supported a 2.5 m deep earth fill layer from the compound's side. The Waqf engineer instructed the contractor to dismantle the undemolished one metre or so (four successive horizontal stone patterns) and immediately start work on the formwork for a new concrete wall, 30 m thick, in the same position. The concrete wall was to support the fill layer and was thus provided with drainage outlets, at regular spacings.

Since funds were allocated according to the engineer's request, the same old stone blocks were rebuilt against the concrete wall, allowing for the positions of the drainage outlets. Finally, *kuhla* was applied and a thin 2 cm thick concrete "mini-slab" was placed on the top surface to prevent vertical rainwater drainage through the new wall, as well as to provide a smooth uppermost surface finish.

### ***Near collapse incidents***

A random inspection tour of Old City residential buildings would reveal shocking findings in relation to near-collapse situations. The unfortunate homeowners faced with such prospects generally adopted one of four courses of action: evacuating their

dwellings; carrying out minor repairs independently; applying for outside help (the AWIA mostly); doing nothing, and waiting for God's mercy. While awaiting their turn in the AWIA's long waiting list, most residents decide to carry out some action on their own. Such action, however, resulted in more damage than good at times.

In many situations where severe structural damage was threatening the stability of a particular structure, residents were known to naively carry out minor surface repairs, such as plastering and *kuhla*; either as a result of ignorance or lack of funds.

The following situations where pre-emptive action was taken provide a general insight into the commonly adopted approaches in relation to structural maintenance in the Old City today.

At the intersection of Aquabat Alkhalidiyya and Aquabat Alsarayya, in the residential sector of the Moslem Quarter, the proprietors of a one-storey structure, currently a spacious carpentry workshop, constantly complained from multiple defects, varying in severity, and ranging between lumpy floors, eroded interior wall and ceiling plaster, deteriorated stone partitions and, most important of all, an external corner wall at the two streets' intersection. The four metre high stone wall consisted mainly of large blocks. The general wall profile was tilted outward in an alarming manner, at a very steep angle to the vertical plane. Many regular users of the two streets went out of their way to avoid passing the unsafe structure. The overall depth of the double-faced wall was well over 1.5m in most areas, but far greater at the corner where exact measurement was not possible (and not necessary either). Since no signs of damage were evident on the interior walls, it was decided that only the exterior be repaired, especially because funds were limited.

Initially, it was necessary to remove all the stone blocks on either side of the corner. A scaffold tower was erected at full height 4 m from both sides. The first problem the contractor had to deal with was to avoid the obstruction of pedestrian traffic in both roads. With his limited resources, the contractor was eventually forced to use twice the amount of timber originally planned for the job. The scaffolding had to span the whole width of both roads to maintain free access. The stone dismantling process was then started at the top row; the builder found enormous difficulty in mastering the large size and weight of individual blocks. After accidentally dropping a large block from three metres and only causing damage to the street tiles, the builder improved his performance. Another mistake, for which he had to pay heavily later on, was of not labelling individual blocks on removing them. In any case, a reinforced concrete wall, 0.25 m thick on average, was poured into the whole 4 m height, using steel bars in both directions. The builder then began preparations for rebuilding the stone profile.

The first few horizontal rows were easy enough to fix, after which the first signs of trouble appeared. The builder, who was more accustomed to modern construction, which generally uses 25cm wide, 8cm thick blocks, repeatedly attempted to re-position each row of blocks without success. A few days later, the main contractor had to bring in a specialized stone layer, who was asked to cut blocks to size. With most of the

originally removed blocks used up in that process, the contractor was left with a large quantity of useless pieces, and had to search for new stones of compatible shape and type in other parts of the City. The fact that most blocks were severely deteriorated and relatively soft added to the overall wasted material and made the stone cutter's job much more demanding than originally anticipated. Once all stones were fixed, and the wall profile was completed, white *kuhla* was applied.

On the whole, the supposedly profitable job not only required three times the originally planned duration, but cost the contractor a sizeable personal loss that made him reconsider his venturing into Old City construction work in the future.

It must be pointed out that in 80% of similar situations, an identical procedure is adopted, particularly for walls overlooking public roads. In the remaining 20%, especially where interior partitions or load bearing walls are concerned, it is customary to demolish existing structurally weak members in favour of substitute concrete walls which are advantageous in view of their reduced thickness, creating additional floor space.

In situations where insufficient funds were allocated, an even less costly procedure was generally adopted, where demolition costs were saved by pouring the concrete directly into the eroded surface.

## **Floor and roof slabs**

Quite a few incidents of total roof or floor collapse have been reported in the Old City during the last decade or two. This is both surprising in some respects, and understandable in others, especially in view of the local unusual environmental circumstances. It would be expected by anyone who comes across numerous locations where 2 cm cracks could be seen extending across a 1 m thick slab or wide ditches of settled floor tiles, that collapse incidents were very common in the Old City. It would be surprising, however, when one takes into account the large thicknesses of slabs and their stable and durable construction.

Having already established relevant theoretical aspects of Old City slab construction, it would be sufficient to mention a few examples where actual failure (partial or total) had occurred, and a few others where repairs have been performed in time to avoid possible failure.

### ***Collapse incidents***

During the past 12 months (1987-1988), at least seven partial and total collapse incidents were recorded in various parts of the City. Luckily no fatal or serious injuries were caused. None of those incidents bore any resemblance to the others, in regards to features, modes of failure and treatment techniques adopted in each case.

In the first incident, which was referred to earlier in the theoretical analysis of slab design, only partial collapse occurred in a 1 x 2 m patch at the corner of a bedroom



ceiling roof slab. It was noticeable that failure was totally unexpected; a birthday celebration had barely ended inside the same room. Also noticeable was the fact that other parts of the slab remained intact, without the slightest evidence of structural damage as might be expected. The homeowner, a low-income employee, was mainly concerned with his family's safety. He was more inclined towards adopting a basic solution that would include the removal of the old slab and replacing it with a new reinforced concrete substitute. Two major obstacles had forced him to abandon his initial plans. Firstly, the cost of work, secondly, the upper floor occupants' outright refusal of cooperation, particularly in providing access to labourers, and sharing in part of the costs. The latter's condition for cooperation, and only in regards to providing access to the workers, was that since they did not (in their own opinion) suffer the neighbours' misfortune, they would expect the installation of new marble floor tiles for their home, without contributing anything towards its cost.

Eventually, the homeowner, who could not afford the maintenance costs of his own home, had to be content with the services of a local building contractor to carry out minor repairs. The latter had again tried to convince occupants of the upper floor to allow him the use of an opening in their floor area for pouring concrete and then repairing the resultant damages. Upon their rejecting his proposal, he had to perform a patchy repair job that involved placing a timber scaffold underneath the whole slab area, for temporary support. He used a concrete gravel mix to fill the opening, a largely ineffective operation, carried through with great difficulty.

A few days later, the scaffolding was dismantled and new wall and ceiling plaster applied. To the homeowner's distress, a crack across the dividing line between the old and new surfaces developed less than three weeks after work was completed.

In the second incident, at a privately owned home in Harat Alsaadiyya neighbourhood, the first floor of a two-storey building caught fire and was immediately evacuated. Firemen were aided by a large number of volunteers from all over the neighbourhood. As the last fireman was leaving the premises, the floor slab at the building's entrance, a 4 x 2.8 m rectangular strip, collapsed suddenly causing minor injuries to the fireman and another. Both had fallen through a sedimentation pit, previously unknown, at two metres below the landing level.

A brief site investigation revealed a much older structure below ground level. It had been transformed at some time into a sewage pit for the above-ground structure. This conclusion was reached after 4" clay pipes were observed on the side wall, passing through the collapsed floor. Another indication was the beautiful arched stone construction in the lower level, which meant that the pit was previously an inhabited chamber.

A building contractor was brought in and immediately filled the half emptied hole with rubble and stones up to 30 cm below the original ground level. A new sewage pipe was then placed with two manholes at convenient positions, before a reinforced concrete slab was poured on top; steel reinforcement was fixed in both directions.

At another location in Alwad road, a homeowner wished to replace the eroded stone tiles of his second storey home with new mosaic substitutes. The building contractor summoned advised him to do something about the leaky roof of his bedroom, which consisted of weathered timber planks covered with a sloping red-tiled roof, erected almost 100 years ago. Encouraged by the contractor's good reputation and his willingness to accept monthly installments for his work, the homeowner finally agreed. The contractor soon started to remove the old tiles, and erected steel scaffolding for the ceiling and roof, which were to be completely dismantled and replaced by a new reinforced concrete solid slab. Once the roof was cleared out and formwork was set for the new slab, steel reinforcement was fixed for the edge beams and the slab area. Only hours before concrete was due to be poured, and while the sixty year old homeowner was inspecting the formwork on the floor level, he felt a sudden vibration and, before he knew it, found himself falling through a large hole into the public cafe directly underneath. Steel jacks accompanied him on the short trip through the two-metre wide hole. Luckily, the jacks did not fall onto the old man who, in addition to a fractured leg, had to put up with the extra expense of another reinforced concrete slab. The cafe owner was kind enough to relieve the homeowner of any compensation for damages to his property.

As for the subsequent repair process, the experienced contractor took upon himself the design of required steel reinforcement, concrete section sizes and the general job strategy. Cleverly, he made use of the extra wall thickness at the sides, which was utilized as a continuous bench for the edge beams. Otherwise, he relied on using excessive reinforcement and oversized concrete sections in his design.

### ***Pre-emptive work***

Pre-emptive structural repair work undertaken by homeowners in damaged Old City buildings varied in nature and style according to the wishes of individuals and his/her financial capabilities more than anything else. Such issues are best illustrated by the following cases which also cast some light on other related considerations such as access, location.

In terms of structural requirements, it is typical to demolish severely damaged members in favour of new, durable replacements. Such procedure could not be always followed in the Old City where the need to maintain and preserve the original form overcomes practical considerations whenever possible.

At numerous locations, particularly where flat or slightly domed roofs were covered with deteriorated stone tiles or suffered minor cracking, homeowners chose to remove unfit, damaged surfaces along with as much as safely possible from the underlying earth fill, typically up to 40 cm, and pour a new plain or reinforced concrete slab, up to 15 cm thick, topped with a final smooth finish; white quartz powder is usual. The wide popular use of this technique accounts for the noticeable increase in concrete roof surfaces observed today in the Old City. At other locations, where sufficient funds

were available, either the original stone tiles or new replacements were placed on the concrete to maintain a compatible style of construction.

The technique described above has so far produced favourable results in terms of reducing seepage of rainwater as well as improving the strength and durability of structures. In addition, the removal of the fill layer contributes to the lengthening of the design lives of treated structures. It must be remembered, however, that the effectiveness of concrete-clay-rubble interaction has not been tested long enough to allow any generalisations in that respect.

In one rare incident, a relatively well-off homeowner, aided by his two relatively experienced builder sons, became fed up with his home's damp walls and irregular vaulted ceiling which prevented modern furniture from being brought in, so had decided to reshape the basic structure of his old home. At first, a new reinforced concrete solid slab was poured on top of the one-storey structure roof area, composed of two adjacent rooms of four by four metres, on either side of an open courtyard equal in size to both rooms. Reinforced concrete beams were placed at four metre intervals in the shorter direction in addition to an L-shaped edge beam on the perimeter. One week later, workers began the demolition of the old vaulted roofs and the removal of the huge quantities of resulting rubble, which amounted to 100 cubic metres and required the better part of a whole week to be completely cleared out.

Shortly afterwards, work started on demolishing the thick dividing and surrounding walls which were to support the reinforced concrete slab recently erected. The operation was carried out in short stages. Plain concrete walls, 30m thick were poured in place of the removed wall portions. Reinforced concrete columns were also placed at the corners, using steel bars.

Another 55 cubic metres of waste material was disposed of during the two weeks it took to complete the job. The delighted homeowner was finally left with four rectangular rooms with plain concrete surfaces that nicely suited his plans for modernising the house furniture. This work procedure was ideal only to the homeowner and contractors. The job was extremely difficult throughout all stages of work and could have easily been executed in a more direct, efficient, and less costly procedure. The homeowner and contractors defended their action on the basis of not being able to obtain an authority license for the job, and thus the need for discretion.

Reinforced concrete slabs have been the most popular choice for structurally damaged domes of all shapes in the Old City. This discussion emphasizes the restraints and obstacles that obstruct the execution of construction work in such surroundings, rather than analysing the technique itself. Restoration and maintenance of domed structures is one of the most challenging tasks facing architects and engineers in the City. In general terms, all adopted treatment techniques so far have provided a temporary, with respect to structural stability, as well as the conservation of authentic features. Recommended operations are generally decided by economic considerations. In conservation, archaeologists and a large proportion of architects advocate very strongly

the preservation of authentic material and features of existing construction, engineers are more often than not forced to alter shapes or introduce additions to instable original members.

As professionals involved in maintenance and restoration work ascertain, the structural behaviour of domed sections is on the whole unpredictable. Surface inspections have often proved to be deceiving and provided misleading evidence, especially while construction work was taking place. Engineers, therefore, recommend the swift application of suitable reinforcement and the provision of adequate support throughout the duration of work.

Reference shall be made to this particular phenomenon in more detail shortly with the aid of analogous recent incidents in which two domed slabs had partially collapsed without prior warning. As mentioned earlier, the "perfect" procedure adopted in recent years for the repair of structurally damaged or deteriorated domed slabs in the Old City, involved the total removal of surface tiles, to be followed by pouring reinforced concrete, and a final thin film of asphalt for water-proofing.

Ideally, it would be desirable to re-apply the original surface tiles or bring in identical substitutes, as the exact re-application of the original tiles is not always possible even by the most skilled and experienced craftsmen. This is the best procedure so far. Unfortunately, as with all good things, the procedure does have its drawbacks. First is the relatively high cost of the operation, up to ten times that of alternatives. Some homeowners choose to apply *kuhla* (pointing) to the deteriorated tiles, an operation that costs in the region of five dollars per square metre; whereas the above mentioned process could cost up to 50 dollars per square metre.

Other drawbacks include the excess weight of concrete poured in, and the practical difficulty of execution. The most clear advantage in addition to providing extra strength to the domed structure is the preservation of the original form of construction. In the same context, and before moving on to examples, it is worth noting that other typical procedures adopted by homeowners included the double treatment of external *kuhla* to the stone tiles, together with the application of new ceiling plaster to the internal surface. This form of treatment depends for its success on the skill of specialised craftsmen in *kuhla* and plastering as well as the time of execution of both operations (with maximum benefit if work is performed during spring and summer).

#### *Analogous situations and restraints*

The two domed structures referred to earlier provide typical examples of the extent of deceit surface conditions may present. In the first incident, at a private home in Harat Alsaadiyya, and while builders were attempting to remove the eroded surface tiles to prepare it for a new reinforced concrete slab, one of the workers fell through a one metre diameter hole that literally punctured the slab thickness.

Inspection of the interior ceiling plaster had previously shown evidence of local failure as did the roof surface which only included a small number of deteriorated tiles.

In fact, the internal ceiling plastering was renewed in the early stages of the maintenance operation, only a few days before the accident.

As was later discovered, the slab cross-section consisted largely of loosely assembled 2" diameter, 20-30 cm long clay pipes, placed at right angles to the curved surface of the dome, and surrounded by a clay/rubble mixture in typical fashion. The eventually demolished 4.50 x 5.20 m rectangular slab produced twenty cubic metres of rubble that were disposed of in 25 tractor journeys. As the builder commenced the erection of formwork for the new slab, his main obstacle was the non-uniform, irregular state of the surface perimeter which was to support the edge beams, and thus the whole slab area. In the end, the builder had to carry out minor repairs such as levelling of the uppermost surface (using a plaster mortar mix), and rebuilding the eroded parts of the surrounding walls.

In the second incident in the Bab Hutta neighbourhood, and in the same manner as the previous case, a 1.50 m thick rubble/gravel slab cross-section had also collapsed suddenly at one corner. The builder immediately observed new cracks developing in the walls and other parts of the slab that had not collapsed.

Initially, the homeowner had agreed to demolish the whole slab completely, and replace it by a flat concrete substitute. However, as preparations were under way for the new construction, cracks began to expand at an alarming rate, especially along the supposedly load-bearing walls. The desperate homeowner gave his approval for a complete demolition that would include bringing down all the surrounding walls and their reconstruction from ground level. The homeowners' initial budget was now multiplied at least ten times, and he had to look for other sources of funding. His request was partially granted by the Waqf Administration which also assigned an engineer to carry on with the supervision of work.

In this particular incident not the slightest evidence of structural damage was previously evident, and only when workers began the peeling of old plaster in the interior walls and ceiling did the hole suddenly develop in the slab. It was not unknown for homeowners who secretly wished to get rid of their domed roofs to deceive the Waqf engineer during maintenance work by intentionally bringing down the roof slabs of their homes in his absence. In such situations, the unknowing engineer would agree on the construction of new reinforced concrete slabs on behalf of the Waqf. Such incidents have become uncommon, however, as the Waqf Administrations's financial resources had diminished in the recent years and homeowners were forced to contribute towards the additional costs.

### ***Restraints and limitations***

All construction work inside the Old City of Jerusalem is laborious and unpleasant. In addition to all its undesirable environmental features, construction operations prove very hazardous particularly when dealing with high altitudes. Domed surfaces represent a

typical example of such restraints associated with reinforced concrete pouring in such conditions including:

***Concrete pouring and steel fixing***

Especially in point-arched domes, steel fixing and concrete pouring have proved to be extremely treacherous. Construction workers have experienced great difficulty in fixing steel reinforcement bars at equal spacings or at ideally required positions. On many occasions, it was only possible to literally throw bars in the longitudinal and transverse directions without much accuracy. The more skilled and patient steel fixers however took special care in placing bars along pre-specified looped patterns in the horizontal plane, and convergent patterns at equal spacings in the vertical plane. As for the concrete pouring, the process often proved to be even more demanding, with particular difficulty experienced in maintaining a uniform thickness throughout the curved dome surface. Adding to the imperfection of the end product was the unwillingness of most builders and contractors to spend more time in the process, restricting themselves to using primitive techniques in spite of the emphasis on standard and quality of work under such conditions. Workers were content with preparing site mixed hard concrete that would be easier to control on the curved surfaces. On many occasions, the use of liquid concrete mixes was very disadvantageous, especially as the concrete continued to spill over the side walls and could not be controlled as desired.

***Safety and local access***

The most serious restraint facing workers during domed-surface repairs is the lack of surrounding space, a severe threat to operators and pedestrians alike. This feature is mostly experienced in small sized domes (not greater than 2 x 2 m) with very little or no adjacent flat space for comfortable maneuvering. Two locations immediately spring to mind, when workers could not even place their feet on half the area of the dome nearer the street side. Both domes were situated at the top of three-storey structures that overlooked Alwad road, one of the busiest in the City. A number of labourers brought in for the concreting of the domed surface refused to take part in the operation, understandably fearing for their safety.

Eventually, the contractors had to make do with low-rate workers who were tied with ropes and allowed to move to the edges of the tricky surfaces of the respective domes. Their continuous slipping was mostly to blame for the poor quality of the final product. There were frequent complaints from shopkeepers and pedestrians who were more than inconvenienced by the dropping building material that in some cases caused damage to underlying shop signs and windows.

## **Architectural Restoration and Maintenance**

It would be extremely difficult to separate engineering and architecture in relation to maintenance and restoration work in the Old City. This categorisation was mainly followed for clarification of individual items of work. Many of the items discussed below have also been performed in a structural capacity. It must be remembered that the discussion is generally based on operations carried out wholly or partly on behalf of AWIA affiliated bodies in charge of maintenance of residential buildings in the Old City. Most operations have been performed upon requests of homeowners, either tenants or landlords.

### ***Plastering***

By far the most common single item of work, wall and ceiling plaster accounts for almost two thirds of the total spent on maintenance of Moslem owned property inside the Old City. In addition to its architectural value and significance, plastering is utilized on many occasions in structural support roles, where other alternative procedures were either too laborious or costly. Only experienced and highly skilled plasterers have proved able to handle Old City plasterwork and achieve an acceptable standard, especially in that most walls and ceilings are rarely formed from uniform rectangular surfaces, as is the case in new construction.

A typical Old City room includes three to five recessed wall cupboards with arched boundaries that require the utmost care and the greatest of skill to finish smoothly. Ceilings, especially moulded and patterned surfaces, are the most difficult to complete, with craftsmen having to balance themselves on primitive scaffolding while attempting to produce the perfect finish. It could be said with certainty that the skill and experience of individual plasterers plays a major role in determining the final form and shape of interior walls and ceilings.

Dampness plays an equally important role during and after the application of a new layer of plaster. With many locations suffering from severe dampness and inadequate, unhealthy ventilation levels, plasterers are often faced with working on wet surfaces that consume a lot more material than under normal circumstances. Applied mortar generally takes longer to dry out, and continues to fall off, especially in ceiling plaster, as applied. It is very unusual to obtain an acceptable quality of work under such circumstances.

It has been common for each of the three layers of plaster to be separated by periods as long as two weeks before work commenced on the next stage. As mentioned earlier, in many cases, plasterwork had been used in a structural capacity, providing extra strength or bonding at exposed weak sections. The most common use in that capacity was the treatment of small and medium sized cracks in walls and ceilings. Local engineers encourage the use of 20-30 cm wide wire mesh rolls along cracked lines. The mesh is fixed between layers one and two of plaster, for maximum efficiency. In the case of large

cracks, small chunks of stone/gravel are used together with a strong mortar mix to fill in the cracks, before the normal procedure began. In some cases, where cracks developed across critical sections, it was typical to make 10 cm wide openings up to 10 cm deep, before filling the opened crack with a strong mortar mix, then using the wire mesh as before.

In walls that exhibited a high level of non-uniformity, measured as that requiring over 10 cm of plaster for an acceptable compatible surface, it has been common to use hollow cement blocks to fill where appropriate. In the more extreme cases, a whole new brick wall was erected for practical considerations.

The frequency of replacement of wall and ceiling plaster in Old City buildings varied widely from one location to another. In general terms, new plaster would need to be replaced every three to five years in damp locations, and up to every ten years in average environments.

### ***Kuhla - pointing***

*Kuhla* is the Arabic term for the bonding filler, mortar mix, that is applied between stone blocks. The process has many uses and variations, all requiring skillful operators and special hand tools; electrically powered tools are used on certain occasions. *Kuhla* operations in Old City structures generally consume two to three times the quantity of material required in modern buildings as a result of the deteriorated nature of stone blocks. *Kuhla* lines are generally wider in Old City buildings, reaching up to 5cm in some locations, compared to a typical width of 1cm in new construction. In cases where deterioration of stones was excessive, it had been common to apply plaster instead. Uses of *kuhla* in Old City construction include:

Beauty and elegance: skillful application of *kuhla* creates a more pleasant sight on stone profiles, adding a feeling of visual uniformity and symmetry; rainwater resistance: stone *kuhla* prevents, or at least reduces, the seepage of rainwater by firstly blocking its entry through the surface, and secondly by inviting moisture in the inner layers to pass through it into the outside surface; strength: *kuhla* is a bonding material, cementing blocks of stone together, since it is physically impossible for the brittle non-uniformly edged blocks to be exactly placed on each other. When stone tiles are used in roofs and open yards, *kuhla* is applied for additional strength as a local bonding agent and for water seepage resistance.

Typically, *kuhla* of stone wall profiles requires replacement every 10-15 years, that of roof and floor tiles, every five to eight years; most often for frequently used roofs and floors.

### ***Floor and wall tiles***

As reported earlier, the vast majority of Old City residential and other structures have stone floor tiles, with varying surface areas, thicknesses and extent of deterioration, depending on age, maintenance frequency, use and type of stone. It is regrettable that



since the second half of the century in particular, homeowners were more tempted to replace their homes' existing floors by concrete mosaic or marble tiles. Especially in the last decade or so, over 30% of Old City dwellings have altered the tiles of their floors.

Ceramic wall tiles are used in bathrooms and around sinks and washbasins. Due to their relatively high cost, this feature is very rare in Old City dwellings and, where present, ceramic tiles only cover limited areas. Tiles are generally placed directly against the second plaster layer in walls. It is worth noting in this context, that ceramic tiles are considered a must in bathrooms and kitchens of new buildings and most old dwellings outside the City walls.

### ***Stonework***

Stonework operations are the fourth most frequently performed by maintenance and restoration teams in the Old City. Detailed discussion of such operations shall be included later in the archaeological restoration section. Around 95% of buildings in the West Bank are faced with stone blocks. In the Old City, new construction is very rare and stonework operations are more or less restricted to the replacement of weathered or deteriorated stones.

### ***Metalwork and carpentry (doors, windows and window grilles)***

It is very rare for homeowners to resort to the repair and/or maintenance of old doors or windows. In general, they opt for their replacement by new items. Today, the majority of tenants prefer the use of steel windows with steel grilles and door. Interior doors are usually chosen from timber or lightweight steel. Simple steel doors consisting of a single continuous 1mm thick metal sheet, reinforced by a steel angle section frame, and a diagonal double-angle section of the interior surface, is by far the most popular and economic choice. Better off homeowners tend to prefer the more expensive and durable metal profiles that are filled with extra interior reinforcement, and are commonly decorated with set patterns. The same applies to timber doors that are basically assembled from two 5 mm planks separated by 3 cm of cavity, and held together by intermittent, internally fixed bars.

As for windows, 90% of those newly installed are steel angle frames, with simple old-fashioned handles and plain glass. The remaining 10% are aluminum and timber. Outside the Old City, most new buildings install double glazing aluminum windows with silver, dark brown or white sections. The use of timber windows is growing less with time.

### ***Electrical connections and installations***

It is typical for homeowners to replace their electrical wiring during wall plastering repairs. In comparison with modern or new construction, electrical installations, those of the Old City, are extremely primitive. Even light fixtures are restricted to single regular bulbs or fluorescent lamps. It should be remembered that the dampness inside the

walls and ceilings has its own severe effect on the life of wiring, making its frequent replacement a necessity. It is also worth noting that safety standards, in regards to electrical installations, are appalling, and accidents occur on daily basis in one home or another as a result of either excessive dampness or faulty wiring. Again, automatic and semi-automatic safety switches installed in new buildings are rare in Old City homes.

***Plumbing (sewage disposal and sanitary installations)***

Homeowners are usually encouraged to carry out plumbing projects during the execution of plaster and floor tile replacement operations. In regards to plumbing (water lines), work procedure is generally similar to new construction, except that tenants of Old City homes rarely install electric boilers, and are content with small-scale gas heating. Few homeowners (though more nowadays) have invested in solar heating. As for sewage disposal, most residents continue to rely on sedimentation pits. All new sewage lines are generally connected to City networks by the local authority and shall be touched upon in more detail at a later stage.

In terms of sanitary installations, homeowners in the Old City only recently started imitating their counterparts outside the City walls, with ceramic bathrooms, showers, sinks, washbasins and toilets. Such modern installations are however not very popular due to their high cost and their unsuitability in the restricted spaces of Old City homes. The use of white Romanian or locally-manufactured, plastic, stainless steel, or ceramic utensils is more widespread. Modern toilets are not very common; the traditional Moslem residents are still using the so-called "Arabic toilet", a simple ceramic base fixed to the ground, with an opening connected to the local sewage system.

Central heating installations do not exist in Moslem Quarter homes.

***Wall paint (emulsion, oil and lime)***

Over 30% of Old City homes do not bother with wall paint for economic considerations. Such negligence is excused by the fact that dampness does not allow wall paint to remain in reasonable condition for long. Those residents who attempt to maintain presentable homes apply new wall and ceiling paint annually. Wall paint is usually applied in three layers, preceded by another layer of paste on non-uniform surfaces. As in new construction, paint is chosen from one of three available mixtures: diluted lime mix, typically used for ceilings and the most economic; emulsion paint, mostly used for walls; and oil paint also used for walls (up to 1.5 m height).

***Brickwork***

Hollow cement blocks are widely used in new construction as well as in maintenance operations. In the latter, in addition to the use of bricks in plastering, it had been very common in humid environments to erect substitute walls at approximately 5 cm away from the original wall plane.

As for new construction, bricks are widely used in the Old City as an alternative for the more usual stone/concrete. This preference is also based on practical considerations: bricks are easily obtainable and can be built at a much faster rate. Their light weight is also of great benefit, especially when new construction is erected on existing structures where columns and foundations could be done without. Most important of all is the fact that new brickwork construction does not require a building permit by the local authority as does concrete. Residents use this loophole in regulations to the full for creating much needed additional living space with the minimum of bother.

### ***Asbestos roofing***

A similar argument as in the use of brickwork in new construction applies to asbestos which is very widely used in roofing of uncovered areas. The use of thin corrugated planks, one metre wide and various lengths, had become very popular for roofing in and out of the Old City. Many homeowners in the City were tempted to use the cheap, easy to install asbestos for covering exposed inner yards and external extensions for more space. Asbestos planks are generally fixed directly on bricks or steel trusses. Again, its installation does not require an authority permit, which explains its increasing popularity. The light weight and relative durability of the material is also advantageous.

### ***Roof asphaltting - waterproofing***

Many homeowners who became fed up with leaky roofs and could not afford basic treatment were encouraged to apply a film of hot asphalt, which possesses water resistant properties, in two stages to roof surfaces. An intermediate layer of fiberglass sheeting is very commonly used for additional efficiency in regards to moisture absorption and asphalt fixity. The same process is also popular in new construction with flat concrete surfaces. It had proved to be reasonably efficient if no accumulation of water is allowed at any one point on the roof. The better off homeowners precede the asphalt film by a perfectly sloping smooth concrete surface which invites water to accumulate at a predetermined point with an external drainage outlet. Sand, emulsion paint, or white fine aggregate are literally sprayed into the asphalt surface to avoid problems associated with melting of the latter in hot weather. Nevertheless, it should be remembered that despite its benefits, the asphalt surface distorts the image and general style of the City's structures, especially when applied directly into the old roof of domes, and flat surfaces.

## **Archaeological Restoration**

### **the Centre for Maintenance and Restoration of Archaeological Structures - CMR**

The CMR, which is partly affiliated with the Administration of Waqf and Islamic Affairs, is the only existing professional body specialized in this field in Palestine. Few current owners of ancient Islamic buildings perform limited repairs. Such operations are generally supervised and executed solely by the CMR. The Centre was established in 1984, and currently has two qualified archaeologists, an architect, and an assistant structural engineer.

In addition to their own research facilities and resources, CMR personnel enjoy direct access to all the facilities of the Islamic Archaeology Department, including a photography laboratory and the trained foremen and draughtsmen in the Department. No less than thirty skilled and unskilled labourers are also employed by the CMR on a daily basis. Restoration operations performed by the CMR are concentrated on structures of Mamluk origin. Until the second half of 1988, work has either been completed or is currently in progress on a dozen or so buildings in various locations all over the City.

Restoration operations in the Old City shall be discussed in detail below as planned and executed by the CMR, whose role as the executive arm of the Archaeology Department gave it unrivalled authority.

#### ***Appraisal: General approach***

Prior to the execution stage, restoration teams prepare preliminary studies on the structure/s in question. The appraisal stage, following the exact identification of the site, proceeds as follows. Firstly, a thorough historical-archaeological study based on available literature, field trips and any other sources of information, is presented in report form, including all relevant aspects of architecture and present (and past) usage of the property under study.

Secondly, field work commences with surveyors and technical draughtsmen aided by a professional photographer according to set instructions by the design-supervision team of archaeologists, architect and engineer. Thirdly, drawing office work commences, at the end of which a whole set of detailed drawings are produced. In addition to the usual plans, elevations and sections, detailed drawings are produced for every element to be worked on.

The final step, before actual restoration work begins, involves the setting out of a work plan and budget. The latter, after being prepared by the design team, is submitted for approval to the financial committee in charge of the CMR's activities. In accordance with the size and conditions of allocated funds, a project budget is then prepared in its final form, with each planned stage of construction treated independently.

### ***Strategy and work procedure***

The nature of restoration operations differs from regular maintenance work in the Old City in many respects. On the whole, experts estimate that 40% of the total amount of work carried out in buildings and other structures of archaeological significance, are similar in nature to structural/architectural operations discussed in the two previous sections. In order to avoid repetition, only the other 60% shall be analysed in detail in the following section.

Restoration work strategy is generally based on the need to replace unfit components by more suitable substitutes which are as close as possible to original forms of the components in question. Style, type of material and physical condition (extent of erosion for instance) are some of the most influential issues that decide on the definitions of such terms as "unfit" and "more suitable". Many structures require only the minimum of repairs such as the replacement of *kuhla*, plastering or cleaning accumulated dirt on wall or floor profiles, while others demand much greater attention, skill and knowledge. Complex technical and other operations make restoration work in the Old City more challenging than similar work in other parts of the world. Vanished writings and decorations, totally deteriorated members and unfriendly tenants of some structures are only few of the numerous issues that continue to hinder restoration teams' efforts to recapture authentic features.

One last and extremely important reminder is the fact that despite the destruction and neglect that historical buildings have suffered in the past, they continue to exhibit a remarkable degree of preservation. This should be constantly assessed and examined by restoration teams whose slightest errors, both in planning and execution, might deny a structure its intrinsic historical value, which it has for so long managed to preserve.

### ***Stonework***

Most restoration work in the Old City is related in some ways to stonework. This is not surprising when one is dealing with Mamluk structures which have gained worldwide recognition for their rich use of splendid and highly artistic stone construction. The extent of care restoration teams dedicate to stone profiles is shown by the fact that blocks of stone are treated individually, each having its own set of drawings or photographs as required by stonelayers and carvers. In all operations that have been completed, or recently started, work procedure has followed a more or less similar pattern. Initially, large, manually handled and cut to size blocks of stone are purchased from local quarries and transported to site where they are classified and labelled according to working drawings. Specialized carvers then commence their careful artistic work on individual blocks as required. In the meantime, other craftsmen, also stone builders, are assigned to removing deteriorated blocks that are to be replaced by substitutes.

In some cases, individual blocks are replaced in position, one at a time, in others, complete profiles are dismantled and reconstructed gradually in sets. The process of fixing new stone moulds differs greatly from one location to another, especially in

relation to structural requirements and when dealing with very large blocks weighing in excess of 100 kg. The use of extensive scaffolding is common in all dismantling and reconstruction operations when stone profiles were restored. Special attention was also paid to the use of the best mixes of concrete and bonding mortars.

According to experienced craftsmen, the strong bonding that existed between adjacent blocks, no matter how eroded, was astonishing. It had proved to be extremely difficult to separate unfit blocks, and even more difficult to achieve a similar standard of bonding with their new replacements. One of the trickiest and most sophisticated operations that involved stonework restoration was the "marathon" at Al-Madrassa Al-Ashrafiyya on the Haram's western border. After months of restoration work inside the Madrassa compound, currently a girl's religious school managed by the AWIA, the team of technicians and builders moved to the main entrance portal. The porch opens through two pointed arches to east and south. Both are constructed of similarly patterned, red and cream coloured Ablaq voussoirs, enclosed by an irregularly shaped moulding. The vaulted slab is an elaborate form of folded cross vault, with alternate courses of red-painted lines some of which have been replaced at a later stage.

Initially, a scaffold was erected directly beneath the main vault whose blocks were to be substituted. Work then started on dismantling the blocks of the south-eastern vault side. Apart from the difficulty of cutting individual blocks to shape, the main concern, from a structural point of view, was the reconstruction process which started from the lowest point in each side. The trickiest part was to ensure the temporary and permanent stability of successively fixed blocks.

Upon the advice of the experienced stone layer, individual adjacent blocks were literally fitted into each other according to pre-cut forms in the vault-arch plane, with concrete-stone chips mixture used for bonding into the upper slab thickness. The use of the latter was adopted for improved concrete bonding and hardening. Steel tie-bars were fixed into pre-set holes for extra strength and fixity between adjacent blocks. The operation was then temporarily halted for economic difficulties, with one arch only being completed. Of all operations so far completed in the Old City, it is estimated that over 90% of stonework restoration involved moulds of different shapes and patterns; the remaining 10% involving the re-creation of old inscriptions. In the case of the latter, stone carvers had on occasions to work on fixed in-profile blocks at 2m-plus elevations, thus needing scaffolding for the whole duration of carving, instead of the more comfortable and controllable process with individual blocks on ground level.

In summary, the mere restoration or replacement of a particular mould or stone-plate inscription requires a lengthy highly sensitive process that demands the combined efforts of skilled craftsmen and expert technicians for its successful realisation. In addition to preliminary efforts by draughtsmen, photographers, architects and archaeologists, the physical execution of work demands the best skilled of builders and complimentary labour.

### ***Rock types***

As for rock types, it is almost impossible to obtain exactly identical stone types to the originals. It would be difficult to determine the exact origins in the first place except when certain red, black or other distinctive types were used. The most popular sites where rock deposits are obtained include: Alsulayyeb, just north of Bethlehem, known for its red-coloured deposits; Tiberias, in the north, close to the Syrian border, known for its black rock deposits; Hebron and surrounding villages, known for their yellowish-white samples; and Nablus and the North, known for their white deposits which are harder and less permeable to water than Hebron rock.

Natural properties of typically used rock deposits vary between the very hard, impermeable, and insusceptible to changes in colouring at one end (stone from Qabatia near Nablus) and the soft, permeable deposits (Yatta near Hebron). Some samples are pure white while others have coloured threads (yellow and red) which become more dominant as the sample is subjected to water. Choices of rock to be used in a particular site depend on the purpose of use, workability, compatibility with the surroundings, relative costs and market availability, amongst other factors.

It was noticeable in some locations that mixed stone types were present prior to any restoration, which implied faulty restoration or maintenance at an earlier period. Today's teams have been taking great care to avoid such practices, and when necessary, or possible, to dispose of such unwanted members. On some occasions, it was decided that existing items should be restored rather than replaced. Such operations demanded the same skills and care as replacement of individual specimens, especially when dealing with decorated blocks and moulds of various shapes. The same sequence of drawing, photographing, etc. is followed except that the item to be restored is treated in position.

Where only minor, superficial damage was evident, it was customary to carry out surface treatment only without altering the basic existing forms. In such cases, stone profiles were cleaned by steel brushes and then applying *kuhla* as usual. When very sticky dirt was met, hammers and nails were used carefully for the cleaning process. Also in the stone cleaning treatment is the uprooting of plant growth and vegetation.

When very fine, slightly eroded samples were met, rugged treatment was avoided to prevent crumbling. Even cleaning was restricted to soft brush or hand operations.

### ***Roof and floor tiles***

In general terms, adopted procedures of restoration of roof and floor tiles in Mamluk structures in the Old City were dependent on the desires of respective supervisors rather than other issues. It has been customary for the balance to shift towards the archaeologist's wishes which more often than not involved the re-use of old tiles. Architects and engineers on the other hand, generally preferred the use of new substitutes, so long as they were durable and nicely shaped. Tile restoration operations carried out by the CMR in the Old City followed one of four procedures: re-fitting original tiles, by far the most popular technique, which generally followed the pouring

of a new concrete surface as discussed before; placing new stone tiles of various rectangular dimensions on a soft sand layer; *kuhla* application, when only minor damages and limited deterioration were observed; or uncovering hidden surfaces: on one or two occasions, where old stone-tiled surfaces were completely covered with new tiles or concrete surfaces, the latter were removed to reveal the older, original surfaces, which were then cleaned and treated with *kuhla* as required.

### ***Adopted procedures***

Some of the factors that influenced the choice of different alternatives included: extent of deterioration of existing material, archaeological considerations, future use of surfaces, cost restraints, limited supply, desires of current occupants, and architectural considerations.

Ideally, the only solution that is certain to satisfy the desires of archaeologists, architects and engineers would be the re-application of the same tiles after providing sufficient subgrade strength and *kuhla* to the final tile surface. This process is, however, costly in comparison with other alternatives, and current occupants are certain to prefer the application of new, modern mosaic tiling. In other incidents, where heavy traffic was expected, engineers insisted on using new strong, stone tiles, which architects rarely minded. Again, opposition came from economic and archaeological considerations. Ultimately, the procedure is usually chosen after weighing the alternatives in relation to compatibility with local surroundings. It is admitted that on some occasions, certain steps were followed just because they were the least troublesome to supervisors of work at the time.

### ***Other operations***

#### ***Doors***

During the last few years, the CMR restored or re-constructed only a handful of old doors in Mamluk structures in the Old City. Even though the City boasts a large number of highly skilled blacksmiths and carpenters, the quality of restored items (metal and timber doors) was in most cases inferior to the originals, especially in relation to detail and durability.

So far, none of the beautifully decorated gates that protected the old *madrassas* and *ribats* of the Old City has been perfectly restored or re-constructed. One particular case that stands out in the CMR's short record was the restoration of the main entrance gate to the Turba Alkilaniyya in Bab Alsilsileh road. The ancient weathered gate was reconstructed very skillfully using some of the suitable original components in addition to necessary additions. In other locations, less emphasis was placed on the restoration of doors and usually modern equivalents were used instead. Work supervisors defend their actions by pointing out that at the majority of sites, original items were completely eroded so that few traces were evident, thus ruling out the possibility of restoration or



repair of existing items. Exact imitations were also vetoed for economic considerations, or for their lack of originality since they would always look like imitations. The general strategy of restoration of doors was based on either repairing existing items with minor, secondary additions where needed, or installing completely new items where no traces were evident of the originals.

#### ***Windows and window grilles***

Ancient original windows of Old City buildings were mostly manufactured from plain timber or timber/gypsum combinations, with rectangular grilles of steel bars usually only in ground floors. In regards to shape and layout, windows were generally rich with their decorative, well-defined patterns. In all of the well-known historical/religious structures, windows were laid out in symmetrical patterns and groups.

Sizes and shapes varied according to floor position, and use of respective buildings. Windows in public buildings were generally larger than residential ones while upper floors always enjoyed wider openings. It was only possible to design and manufacture new identical items as opposed to repairing existing ones, especially because original elements were very rare. Exact descriptions of techniques and material used in door and window restoration work shall be included in the Case study section of this chapter.

#### ***Restoration of original features***

This process shall be described in relation to case studies and real life operations. Numerous examples exist of this phenomenon where either additions were removed or altered features were restored to their original forms. Hidden features at some locations were also revealed and repaired as required.

#### ***Obstacles and limitations***

Restoration operations performed under the direction or supervision of CMR staff in the Old City have been highly acclaimed by local as well as international bodies for the high quality, creativity and originality of execution. Nevertheless, as the current teams of restoration experts admit, there is plenty of scope for improvement as far as the overall standard of operations is concerned. Tremendous progress is certain to be achieved if any one or all of the following obstacles were overcome.

#### ***Funding***

Limited and inconsistent provision of funds had been the most serious drawback facing the development and progress of restoration work in the Old City. The foremost setback was the inability to design and act upon long term wide scale plans, forcing operators to adopt a policy of stages and neglect the need for continuity required in such work.

Because understaffed, CMR had not been able to operate a full research facility; instead, its specialised personnel were forced to carry out an assortment of duties other

than their own. The archaeology expert for instance was expected to register daily labour attendance and payment records, in addition to his more normal duties in historical research and site investigations. A much needed change of strategy and priorities with more staff being brought in and greater attention being allocated towards theoretical and field research is certain to produce the most favourable results in regards to the overall quality and standard of operations.

Insufficient allocation of funds to restoration projects had prevented on many occasions the adoption of ideal techniques in favour of incompatible, less costly options. Successive cutbacks in the CMR's budget cost the departure of a number of highly skilled specialized craftsmen who refused to accept the reduced wages. At certain locations, the shortage in funding forced resort to surface treatment, such as the use of stone surface cover as opposed to the replacement of the complete thickness of eroded blocks.

### ***Technical difficulties***

#### ***Deficiency in experienced personnel***

Despite the CMR's hard-working team of supervisors, the majority of staff lack the desired combination of academic and field education that are essential in this line of work. Greater attention must be placed on providing training opportunities for its staff, by inviting more experienced technical staff to assist in passing on their skills and know-how as well as joining efforts for the enhanced development and progress of operations. The criticism is not aimed at undermining the CMR's technical abilities, but at their improvement.

#### ***Determining authenticity***

One of the commonest technical obstacles facing restoration experts was the determination of authentic boundaries or building material in a particular structure. Their tasks was made more challenging by the fact that many buildings have been subjected to numerous modifications along the years. In 300-plus year-old structures, the distinction between stone blocks placed 100 years apart could not be considered a straightforward task.

A noticeable factor that contributed to the complexity of work was the faulty maintenance that was performed at many locations. In some Mamluk structures, the use of non-conforming building material by Ottoman maintenance operators only added to such complications in identifying original Mamluk components.

#### ***Building material***

Strong claims made by structural conservation enthusiasts are best supported by the fact that it would be physically impossible to replace deteriorated components by exactly identical substitutes. Especially with older structures or those composed of imported

building material, the difficulty of determining the nature and origin of used material is only exceeded by the difficulty of finding identical or suitable replacements.

The other obstacle facing restoration teams in regards to building material is the nature of operations on one hand and the natural properties of material on the other. A distinctive example is the production of complex moulded patterns and shapes from the brittle stone.

### ***Skilled labour***

Old City restoration work demands high levels of skill by labourers and craftsmen to enable the reproduction of extremely complex and highly artistic creations of their skilled predecessors. Hundreds of years after many of the City's structures were first built, and keeping in mind the development of the construction industry during the same period, it is not surprising that the required skills demanded by restoration operations are not easy to come by nowadays.

Able and experienced craftsmen are very rare, and when available, they are very expensive. It is not surprising that in other parts of the world, where structural or architectural restoration is common, special institutions for skilled labour training are found. In addition to the required basic skills, labourers have to be able to operate under the most severe and uncomfortable circumstances such as narrow space and high altitudes with scandalously inadequate safety precautions.

### ***Current use of buildings and absence of authority***

With reference to the earlier section, CMR personnel explain that one of the most serious limitations to their work is the current use of historically significant structures in the Old City. Approximately 95% of *madrassas, ribats, khanquas*, etc. which were originally founded for public use are at present occupied by ordinary citizens who could not afford to live elsewhere. Numerous additions or alterations introduced by successive landlords have changed the original style of such buildings. Even when tempted with large scale maintenance to their dwellings in return, very few residents of historical structures responded positively to requests for the elimination of additions or alterations as required by restoration operations.

It would suffice to conclude that the absence of any responsible, conscientious legal authority which would have considered such options as allocating alternative residence, or paying out reasonable compensations to evicted residents, contributed enormously to the current state of affairs.

### ***Cost of operations***

In comparison with regular maintenance work in the Old City or even in new construction, restoration operations are very costly. The great emphasis placed on quality and standard of work accounts largely for the escalated costs. The nature of operations, which demands the use of specific building techniques, accounts for the slow productivity

rate and, thus, the inflated expenditure. In contrast to maintenance operations, where mostly structural considerations only are of value, restoration work takes into account historical and architectural issues in addition to the basic structural requirements.

## **Case study - Al Turba Al Kilaniyya**

The Turba compound is situated on the northern side of Bab Alsilsileh road, immediately to the west of the Taziyya. The choice of Alkilaniyya as the case study was for the one reason that its restoration was the most complete so far in the Old City. It was the largest single stage operation of that nature, wholly executed by the CMR. The \$85,000 project, which consumed the better part of two years for completion includes typical representation of almost all of the previously touched upon restoration operations. Typical restraints and obstacles were also faced by the restoration team.

### *Introductory Notes*

#### *Structure and brief history*

The Turba complex is surrounded by older structures from all sides except for that of the street. Despite the clear evidence of domestic modifications in the structure's interior layout, one could still identify its three main parts: two domed tomb chambers and the intermediate, also domed, vestibule and entrance portal; ground floor open courtyard; and the two-storey structure in the north western corner of the compound.

According to Mujir al-din, the Kilaniyya was named after the Hajj Jamal al-din Pahlavan, son of the Lord of Kilan, who instructed his son to allocate funds for the construction of a mausoleum in Jerusalem for his burial. The year 1352 A.D. is agreed on as the year in which actual construction was started. The only relevant information about the Turba during Ottoman times was the execution of necessary repairs to the structure in the year 1575.

#### *Architecture*

The splendid architecture of the street facade is represented by the symmetrical arrangement of the two chambers on either side of the main entrance portal; the continuous frame moulding; and the *muquarnas* semidome, also of the same portal. Windows on both floor levels have been decorated richly, with a pattern of curves and darts for the ground floor and a *muquarnas*-headed recess for the upper floor. Three domes rise above the facade, with the one at the centre rising at least one metre above the other two. The central and eastern domes rest on octagonal drums pierced by eight windows whereas the western dome is sixteen sided and has eight round headed windows.

***Restoration process***

At present, the compound is wholly occupied by the Da'na family who lived in the Waqf Zurri (Ansari family) building for many decades. Originally Hebronite, the family came to the Holy City in the early thirties and most of its surviving members were born in the Kilaniyya compound. The western tomb chamber, the whole ground floor, and the north western two storey structure, are occupied by members of the largest of the three Da'na families living in the compound. The other two share the second and third stories of the south western section respectively.

Actual restoration work did not start before the completion of an extensive study and detailed documentation process. Once the prepared project budget was approved, negotiations with the residents commenced. In short, their condition for approving the proposed repairs and modifications was to guarantee the execution of full scale structural and architectural maintenance to their respective dwellings, which had exhibited serious deterioration in all areas. The first serious disagreement between the residents and CMR staff was in relation to the latter's insistence that a cantilevered timber balcony added to the second floor should be dismantled; and the transfer of a small kitchen and bathroom facility on the roof to another location away from the street side. The asbestos mini-structure was only a few years ago irregularly squeezed between the three domes on the roof of the compound. Eventually, after appreciable efforts by outsiders, the residents gave in to CMR demands on both.

***Stonework: the street facade***

First on the agenda was the main street facade which exhibited severe erosion. After a thorough inspection, it was decided that between 10-20% of all the facade's blocks should be replaced. With the assistance of pre-set drawings for individual blocks, an order sheet was prepared for exact dimensions of all samples to be imported. A scaffold was then set up, and workers started cleaning plants and accumulated dirt off the stone profile. Special care was taken to avoid further damage to the already instable upper third of the wall's height. Similar care was taken while removing individual blocks of stone to be replaced or rebuilt. Old, deeply entrenched plant roots were treated with chemicals to ensure their destruction.

In places where relatively thick sections (in excess of 50 cm) were met, it was thought enough to substitute only part of the total thickness so as not to jeopardise the wall's stability on one hand, and to save in costs on the other. In most cases, it was decided to peel off a 20-30 cm chunk, then place a concrete/lime mix, followed by fixing the prepared stone replacement in place. Lime was used for extra hardening, compatibility with stone and allowing moisture to seep out through the *kuhla* lines. After few months of work, the team of six craftsmen completed the restoration of the whole street facade including the cornice frames around ground floor windows (the tomb chambers), the *muquarnas* entrance portal, the semi-domed *muquarnas* of the top central window, damaged window lintels as well as a scattered selection of eroded blocks.

As for the *muquarnas* treatment, the majority of stalactite pieces were merely cleaned, with only a handful being partly replaced. Added parts were glued on to the bulkier, fixed blocks. The top parapet patterns were also repositioned in a more acceptable form, closer to the original. On completion, the street facade included a selection of new blocks, with older ones, either partly eroded or in reasonably good condition. The unharmonious sight of mixed colours is, however, certain to become more compatible with time, as the new, whiter blocks become exposed to the local atmospheric conditions.

### ***The Tomb Chambers***

The western tomb chamber, which did not include any tombs, was wholly replastered, retiled with the same tiles and received new white *kuhla* in exposed stone zones which did not receive any plaster. The eastern tomb chamber had its interior stones restored in the usual method, and the tomb itself was completely reshaped and faced with new stone. The only criticism due in this context was the restoration team's negligence of the original shape of the tomb, three overlapping domes, and substituting them with an ordinary, easier to construct rectangular shape.

The re-creation of the external steps leading up to the two chambers, the installation of doors, windows, and grilles were common to the chambers on either side of the entrance. The timber doors were decorated with horizontal copper bands, in a form close to the original. Windows were also of timber, with continuous surface shutters that were interrupted at the top with two small swinging windows (also as in the original structure). Finally, the iron grilles were partly repaired and partly replaced and fixed into the stone window frames. Two concrete slabs, constructed at an earlier stage (Ottoman) at different levels, and in both tomb chambers, were demolished, with their joining lines at the walls being repaired as required.

In addition, the main street gate was restored in a very satisfactory and relatively low-cost operation which made use of all available items in the original door. The double-leafed green door was manufactured from interior timber stuffing, with external steel sheets on both sides. A continuous steel angle section frame was installed around the whole perimeter for fixing the heavy door. The old, varnished exterior decoration was also restored to an extent.

### ***Domes***

The three main domes facing the street side were next for restoration treatment. All three segmental arched domes had their tiles removed followed by the application of a solid concrete mix layer, before the same old stone tiles were re-placed as before. *Kuhla* was applied to the whole surface as usual. In the eastern dome, a double pattern of groups of openings were poured from gypsum, concrete and crooked steel reinforcement, using circular moulds to cover the dome surface.

In regards to the domes' tile surface, the almost perfect final product was primarily achieved through the superior skills of the specialized layers and *kuhla* operatives. Their concentrated efforts made easy the exact re-application of the small eroded stone tiles on the almost vertical sides.

#### ***Other operations***

Other more typical operations that were performed in the Turba structure at the same time included the placing of new reinforced concrete slabs, rough stucco wall plastering, retiling and modern style timber doors and windows to the majority of rooms on both storeys. Basic sanitary, plumbing and electrical installations were also supplied. Finally, a completely new sewage system was installed and connected to the public network recently provided in the area. The plumbing work during the installation process was particularly costly and laborious, largely due to the bad state of the whole compound, the unfavourable locations of sanitary fittings and the below street level elevation of the ground floor.

Throughout the 18-month duration of the job, at least six labourers (both skilled and unskilled) were working on site. One third of the total expenditure was on material, the remaining two thirds, labour. It is worth noting that upon the persistent requests of the ground floor residents, the committee for Waqf Zurri had undertaken the replacement of most of the floor area stone tiles by new mosaic ones. Plastering defects were also repaired in parts in addition to steel doors and grilles to all openings facing the inner yard.

## **Town Planning and Public Services**

Jerusalem Municipality is the only local body with effective authority and executive power over public affairs in the region. Despite the Arab population's official non-recognition of its legality with respect to East Jerusalem, every Arab resident has had to deal directly or otherwise with one of its legal or service departments at some time during the occupation.

Due to its symbolic significance and commercial value, especially in relation to tourism, the Old City has continued to receive the lion's share of attention to the Arab areas in the City of Jerusalem. In particular during the last decade or so, the local authority had completed a number of large scale projects within the Old City's perimeter aimed at improving public facilities and services in the area. The Arab residents of the City in particular, and Palestinians worldwide, acknowledge gratefully the authority's contributions in such fields as the beautification of the City, but on the other hand pause to question its real intentions. The relatively brief account of some of the more significant improvements introduced by the Israeli local authority in the Old City of Jerusalem shall be divided into two categories: urban planning and public services.

The reader should keep in mind the multi-million dollar operation recently completed in the Jewish Quarter of the Old City. The East Jerusalem Development Company (EJDC), which co-financed the whole project, continues to provide all forms of assistance to Old City Jewish residents who wish to purchase Moslem owned property in the City and to renovation of such property.

***Urban planning: structural maintenance and architecture***

Jerusalem Municipality is credited with a number of major projects in and around the Old City perimeter. Most noticeable are the landscaping projects aimed at improving and modernising the City's image, largely for the benefit of tourism. Adventurous designs involving the re-organisation of the layouts of popular locations are carefully planned to combine an allowance for practical demands as well as a well-balanced mixture of modern and ancient architecture.

Shortly after the war in 1967, the local authority started the first of its planned facelifts just outside the Old City walls. Such projects have continued and are still in progress in some parts. Those completed operations include Damascus Gate, Herod's Gate and the strip running parallel with the wall joining Jaffa Gate, the New Gate, Damascus Gate and Herod's Gate. Two other projects of similar nature, but yet to be completed, include the strip at the Moslem cemetery at St. Stephens Gate and the narrow square just inside New Gate. The last of such projects is the St. Stephens Gate/Alghazali Square plaza. Complex administrative and financial factors have contributed to its delayed completion.

As for structural maintenance, the local authority is also credited with several projects at various locations throughout the Moslem Quarter of the City. All operations involved the provision of support to unsafe structures, even those privately owned by Arabs. The scale of such activities has, however, been very limited, as the recipients of such aid were expected to pay.

***Landscaping and Architecture***

***Bab Alamoud: Damascus Gate***

Many years back, Damascus Gate was one of Jerusalem's busiest and most popular crossing points. Thousands of years later, the same gate is still the most used of the City's gates, aided by the fact that the central East Jerusalem bus station and taxi terminals are only a few yards away. In addition, the City Centre, including all shopping facilities in and out of the walls, are within walking distance.

Any plan aimed at improving the scenery or landscaping in the region has to allow for the urgent need to accommodate comfortably the pedestrian traffic congestion. The plan ultimately adopted was extremely effective in space utilization on either side of the Gate. The abundant space between the Wall and the nearby street was perfectly exploited to accommodate the huge crowds crossing the gate, by inviting them to scatter



through a divergent semi-circular stairs and seat arrangement. Stone tiles were used for paving while different sized cubic stone blocks were utilized as seating platforms by tourists and local unemployed youth who watch the multi-national assortment of pedestrians passing by.

On either side of the four main stairflights, the space is occupied by stalls of fruit, clothes and other common goods. The same applies to the stairs leading into the Old City, which are even more heavily congested by such market stalls, money changers and sweets salesmen. A few yards into the gate, modern shops and street cafes attract tourists and locals alike. The whole sector on the street's western side, previously neglected, was re-opened and renovated completely to accommodate additional shopping and rest space.

***Herod's Gate: Bab Alshira***

A similar, but certainly less spectacular arrangement was completed at the main square just outside Herod's Gate. The project was particularly successful in solving the previous traffic problem caused by its use as a taxi terminal in addition to a public car park. Instead, a very pleasant, spacious, newly paved square stands in its place today.

Seating platforms, also of stone, were lined along the wall perimeter to complete the layout which served a double purpose, beautifying the area on one hand, and ridding it of the previous dirt accumulating corners on either side of the gate, on the other.

***Lion's Gate: Bab Alasbat or St. Stephen's Gate***

Two independent projects were planned for the area just inside the Gate, while the small car park on the outside was paved with new stone tiles. Two short pyramids were erected on either side of the gate, using cubic stone blocks.

As far as the first project was concerned, approximately 100 metres away from the gate along the Via Dolorosa, a yellowish-white stone platform was erected in the early eighties by the EJDC to symbolise the second temple period. The elevated platform was stepped to meet the street level throughout its length. An arrangement of four pairs of vertical stone pillars, approximately two metres high, was erected nearer to the street side. The platform, eight by 40 metres, is reached by six steps from the eastern end, and two from the western end.

The elegant mini-plaza is very popular with tourists and postcard boys who make the most of its comfortable stone seats and surrounding flowers beds. A self-explanatory tourist map, mounted on a short pillar structure, provides an additional attraction for the eager tourists.

As for the second St. Stephens Gate project, the job initially planned has yet to be completed; the bulk of stonework operations has however been successfully executed. This extensive project should not be wholly credited to the Israeli authority since the AWIA (Administration of Waqf and Islamic Affairs) was in charge of supervision as well as financing of construction. The former's contribution to the project was its design and

co-supervision. Despite its undeniable benefits, mostly in regards to public cleanliness, the new-look, spacious plaza and adjacent square were largely rejected by the locals as well as the AWIA technical and administrative staff. Locals' rejection was based on the hardship they were caused by the demolition of the UNRWA facility previously distributing in the location monthly food and fuel rations. The authority had earlier made it clear that in the event of the landowner (the AWIA) refusing to cooperate with the plan, the former would take it upon itself to bring the new arrangement into existence by force of law. Residents and nearby business owners were also dissatisfied with the abolition of the free parking space previously available in the area.

As for the AWIA, its opposition to the authority's proposal was that the new arrangement was too modern and non-Islamic for its liking. AWIA architects' prolonged discussions and arguments with their City counterparts resulted in a final format which was accepted by both sides. Unfortunately, the construction process was interrupted on many occasions. The new layout, which covers a total area of almost one and a half donums, is composed of large stone seating arrangements and flower beds at various elevations. The eastern strip running parallel to the Old City wall, the pedestrian passage joining the Haram and the City gates, has been completely re-tiled using reddish/white stones.

The western side of the site was confined by a new double faced stone wall to separate it from the waste disposal dump on the other side. A triple bay, circular stone flower bed arrangement has been completed in the south western corner of the seating plaza while the remaining space consisted largely of scattered patterns of cubic shapes to serve as seating platforms. A five metre wide passage diagonally intercepted the seating area to allow emergency vehicles to reach the Haram gate.

According to AWIA and municipality personnel, the final layout when completed shall include adequate lighting fixtures, street lanterns and ground projectors. The total cost of the project is expected to reach \$150,000.

#### ***Jaffa Gate-New Gate strip***

The strategic dividing line between East and West Jerusalem occupied top priority in the authority's agenda in regards to town planning projects. Only months after the annexation of East Jerusalem, the Municipality commenced the execution of a twofold plan aimed at improving the unattractive landscaping as well as emphasising the re-unification of the City of Jerusalem by creating a flowing uninterrupted new look at the dividing line. In addition to a collection of beautifully arranged gardens, public squares and parks, the whole length of strip was paved with new stone tiles. Light projectors, hand rails and other minor installations were also part of the new-look scenery.

#### ***Wall strip***

Identical arrangements to the preceding location were also completed in all the strips running parallel to the City walls, and joining New Gate, Damascus Gate and Herod's

Gate up to the Moslem cemetery at St. Stephens Gate. The long strip was completely re-paved, again with stone tiles, in addition to an adequate number of scattered seats (also of stone) at frequent intervals.

***Moslem cemetery at Bab Alasbat (Lions Gate)***

A whole segment of the Cemetery's east-south perimeter was re-organised creating additional space for the busy road following the same direction. A new high wall was rebuilt at the Cemetery's new boundary, using old stone blocks from nearby sites. A wide pedestrian pavement was also constructed using dark brown/reddish cement tiles.

***Pavements inside the Old City***

As was reported earlier, the Old City streets and alleys were unfit for pedestrian use. Since the early seventies, the local authority had launched an ambitious long term plan to restore eroded pavements throughout the City. Main roads that accommodated vehicle traffic such as Via Dolorosa and Alwad were first in line to receive the new pavements, as were popular tourist locations. White limestone tiles were the most frequently used.

Similar operations in progress include the densely populated Bab Hutta neighbourhood in the north eastern sector of the City. Earlier, work was completed in Bab Alsilsileh road and in limited areas in Harat Alssadiyya. New sewage system installations generally determined the course of paving operations inside the City.

Unfortunately, the recently installed tiles, which were primarily aimed at reducing pedestrian discomfort, did not serve that purpose for very long. At almost all of the newly paved areas, defects in tiling workmanship soon became evident causing local settlement in some zones, and single tile displacement in others. As it turned out, no street is free from rainwater accumulation in ditches in winter and no surface is uniform enough for pedestrian comfort. All such defects are partly blamed on the poor quality of workmanship and the weak subgrade layer underlying the new tiles. In limited areas where subsurface reinforced concrete slabs were placed, more favourable results were achieved.

***Structural Maintenance***

Jerusalem Municipality, similar to other local authorities worldwide, boasts its own Unsafe Structures division, with a specialised team exclusively in charge of Old City operations. The assigned engineer and technicians are instructed to conduct routine inspection tours inside the Old City. Their duties include the identification of unsafe structures, notification of owners and at times supervising the execution of remedial work.

Since the mid-seventies and until the early eighties, the unit was very actively involved in structural repair operations throughout the City; their role was gradually diminished in recent years with the AWIA's more active involvement in that department, particularly in the Moslem Quarter of Jerusalem. It could be said that the unsafe

structures division's duties are restricted at present to issuing maintenance or evacuation notices.

In regards to structural maintenance operations carried out on behalf of the Jerusalem Municipality, adopted techniques tended to differ in their approach and nature from common procedures followed by Arab bodies, namely the AWIA. At all sites where remedial work was undertaken by the authority, damage was initiated by highly controversial, risky excavations directly beneath affected structures. In order to contain public outrage, both locally and abroad, the authority was forced to act immediately. Depending on the nature of damage, City engineers resorted to providing the most suitable form of alternative support, either permanent or temporary. Common techniques employed for structural support purposes in the Old City's Moslem Quarter include the following.

***Steel tie-bars*** At numerous locations where vertical structural components (walls) suffered from cracking or outward overturning, 25 mm steel tie-bars were used to connect together opposite members. To provide fixity, a primitive version of prestressed concrete, circular steel plates and steel bolts were used on the exterior surfaces in both ends. The technique was highly advantageous in providing lateral support with very little effort and low cost. The procedure does have its drawbacks however, especially in relation to its local tearing effect in the case of additional induced forces. The technique is also criticised on the grounds that steel bars could be seen through living areas and only provide limited effective support.

***Steel beams and stanchions*** Steel beam/stanchion towers were erected at several locations where external walls exhibited large lateral displacements. The technique proved effective in regards to providing support to instable structures but was criticised on two accounts. Firstly, its totally unharmonious shape with Old City construction and, secondly, its obstruction of traffic, especially in confined spaces.

***Permanent tower support*** At situations that required immediate remedial action, where structural damage was very severe and other alternatives were not possible permanent support was erected directly below affected zones. In the majority of locations where similar techniques were deployed, large steel members were fixed in a tower shape, with timber planks used to fill in the curved and confined zones. Again, the bulky structures were very effective in providing support, but were not considered ideal in regards to space limitations and compatibility with the surroundings.

***Concrete walls and foundations*** Both techniques were discussed in detail earlier in terms of structural stability and remedial work.

***Demolition and re-construction*** In one or two rare incidents, the local authority was forced to completely re-construct severely damaged structures which were declared unsafe as a result of authority initiated activities in the area.

***"Swan's mouth" segmental arched beams*** Many of the Old City's buildings have been held together by similarly constructed elements which were first erected hundreds of years ago. The relatively costly technique is ideal in serving structural as well as architectural purposes, by providing effective lateral stability and keeping in harmony with the surroundings.

A curved slightly tapered arched beam extends between opposite structures, meeting one side at right angles. A larger cross-section is usually fixed on the lower side. Whereas the ancient beams were typically from clay/rubble mixtures, such components are today constructed from reinforced or plain concrete sections that are faced with stone blocks on all sides. The use or otherwise of reinforcement depends upon other factors such as the length of span in question.

#### ***General comments***

The majority of Arab inhabitants of the Old City express serious doubts as to the real intentions of the local authority's construction related activities in the City. Disregarding factors related to politics and economics, all beautification operations in the Old City have been widely criticised by Arab, and particularly Moslem engineers, architects and other scholarly sectors of the population. Structural maintenance operations have also been labelled with similar criticism, and at times accusation of either deliberate faulty execution or outright neglect. None of the recently executed facelifting projects in and around the City could be described as compatible with the traditional style of the City. Authority architects were repeatedly accused of depending on all forms of architecture other than Islamic; a combination of Ancient Roman or modern design concepts was largely used.

On a different note, the local authority is accused of neglecting urgent requirements (both in relation to architecture and civil engineering) in the Arab Quarters of the Old City. A typical example is the authority's disregard for repairing the numerous archways that are regarded as public property, and suffer from serious construction defects.

#### ***Public Services and Facilities***

The most acknowledged and appreciated achievements of the local Israeli authority, as far as the Arab inhabitants of the Old City are concerned, are those in the field of public services. In spite of all obstacles and restraints facing such activities, the authority has managed throughout the last two decades to bring about numerous improvements in the local environment. In addition to the new sewage system project, the inhabitants have

been highly appreciative of other services such as garbage disposal, new water mains, public toilets, telephone lines and public facilities.

In regards to parks and playing grounds, due to lack of space, only one such facility was established inside the Old City's Moslem Quarter. In Bab Hutta, a small yard was supplied with a handful of swings and other games. As for public toilets, the municipality has financed the installation of adequate facilities in various sectors of the City. All such facilities have so far been well maintained. Close to ten such facilities are at present operational in the Moslem Quarter, touristy places boasting the largest share.

Another valuable service that the Jerusalem Municipality operates is the daily collection of domestic waste, ensuring the previously littered streets and small alleys are kept free from unhygienic garbage. However, garbage heaps are still observed in many areas in the City, largely due to residents' non-cooperation and negligence. Before new water mains were installed in the Old City, the majority of homeowners relied on wells for their water supplies. At present, over 95% of the City's inhabited structures are connected to public networks. Most wells have been out of use or demolished altogether since the change. Telephone services have also improved tremendously during the last two decades.

While acknowledging the tremendous progress the City had undergone in relation to public services and facilities during Israeli rule, the reader should be reminded that similar progress had also been achieved in other parts of the country that were wholly run by Arab bodies, such as Bethlehem and other cities. On these grounds, one could easily dismiss the Israeli claims that the Arab people of Palestine have only become more civilized as a result of Israeli efforts. Most people insist that all efforts should be directed towards creating a more prosperous society under present conditions, no matter which party claims the credit.

## **IV. Case Study: Chain Gate Road** (Bab Al-Silsileh)

### **Introduction**

Native Jerusalemites and those who live in other towns and villages all over Palestine never waste an opportunity to visit the Old City whether for business or leisure. Many of the ancient trades that have become extinct in other parts of the country survive in the Old City, bringing those living outside the walls to visit the area for particular items or services. It is necessary that a case study be included at this stage to complete the connection between theory and practice. Bab al-Silsileh (Chain Gate) road was chosen to include the maximum number of relevant analogies so as to ensure the optimum illustrative value. This discussion provides the reader with a more conclusive understanding and a better feel for the Old City of Jerusalem with all its diversities and contradictions.

### ***Bab al-Silsileh Road***

Making a decision as to the most ideal representative of all of the above issues in the Old City was not an easy task. Tariq Bab al-Silsileh has not only proved to be a useful choice, but also a very unique one in terms of its strategic location on one hand, and its rich architecture and tradition on the other.

Visitors to the site, both local and foreign, find great pleasure in the beautiful images that pass through one's mind on coming across the splendid architectural masterpieces and archaeological landmarks, many of which have been recently restored. Past and present, changes and ironies, miseries and injustice, the beauty and elegance of the City of Jerusalem in general and the Old City in particular, flash across one's mind on passing by and casually examining this ancient street. However, one cannot fail to notice the Israeli flags in the predominantly Moslem neighbourhood, or the abandoned remains of what used to be, until two decades ago, a very densely populated residential street.

### ***Geography***

Tariq Bab al-Silsileh is strategically situated along the dividing line between the Arab and Jewish sectors of the Old City. The east-west stretch joins the Haram al-Sharif at its eastern end and Jaffa Gate road to the west. The Moslem Quarter is situated on its northern side, the Jewish Quarter to the south. The Wailing Wall compound and plaza occupy the eastern end to its south.

### ***Strategic location***

Bab al-Silsileh road is one of only three gates through which entry of non-Moslem visitors into the Haram al-Sharif compound is permitted. Towards the other end of the road to the west, a short alley joins it with the Jaffa Gate road, which in turn leads out to Jaffa Gate, the only southern entrance to the Old City, and one of its busiest traffic routes. The same short alley at the road's western end leads directly into no less than six of the City's most ancient markets.

On either side of the Bab al-Silsileh road, numerous streets and alleyways intercept it leading to Moslem owned property to the north and Jewish owned buildings to the south. The Moroccan Quarter, currently a residential compound occupied by a handful of Moslem families of Moroccan origin, is situated along one of the short alleys that joint the Bab al-Silsileh road to the Wailing Wall plaza. Many Arab inhabited homes on the southern edge of the road directly face the holiest of Jewish shrines, the Western Wall. It is probably this which led the Israeli Border Police to operate its regional headquarters from a Moslem owned building on the same side of the road. The Madrassa Altankaziyya compound was confiscated by the Army for that purpose, located at the corner where the Haram wall meets the Wailing Wall. Military observation posts established on the main structure's roof monitor all pedestrian activity in the vicinity, and the surrounding Arab homes. Most of the Haram area is clearly visible from the same posts.

## **Property use and ownership**

### ***Property use***

As far as the local Arab population is concerned, Tariq Bab al-Silsileh is a residential district. The majority of buildings are occupied by Moslem families except for the western-most strip which is wholly occupied by shops, also owned by Moslems. On the southern side of the Tariq, two large Jewish Religious Schools occupy two separate compounds in addition to a single Jewish family that lives in the ground floor of an otherwise completely Arab building.

The Administration of Waqf and Islamic Affairs (AWIA) operates two facilities, also on the south side of the road. The first is the recently established Alms and Pilgrimage Department, only two hundred yards away from the Haram gate; the second is the Ghazzali School nearer to the western end of the road. This four-storey structure is used by almost 400 elementary pupils, most residents of the Old City. Both compounds were completely restored and repaired by the AWIA engineering office.

As one passes through Bab al-Silsileh road, the notable distinction between the eastern and western halves becomes very clear, especially in relation to pedestrian traffic and purpose of use of property. Extending between the Haram gate and the Kilaniyya structure at the first Jewish Quarter intersection, the eastern 200m stretch is almost exclusively residential except for the handful of shops still open. Most shops on both



sides of the road are shut down at present; even those that continue to do business, a barber, a men's tailor, a greengrocer and a couple of souvenir stores, complain of the slow commercial activity in their area. At least three homes in the same stretch of road are currently abandoned while a few others are partly occupied by single elderly citizens.

To the west, the second half of the road extends from the Kilaniyya to the Market Strip intersection. This predominantly commercial section contains souvenir shops, grocery stores that deal in traditional Arab style sweets, foods and spices, an old copper store, an ancient mill, a cafe, an old watch repair shop, in addition to a number of shoe repair and other workshops in the Khan al-Sultan complex just off the main road. At peak shopping hours, the extremely narrow strip (less than two metres in parts) is densely packed with tourists, shop owners, regular Arab shoppers and the nearby Jewish residents who pass through on their way to the inner Old City market area. Besides its narrowness, its completely covered roof adds to the impression of crowdedness.

#### ***Property ownership and residency***

Except for the few Jewish owned structures on the south side of the road, the majority of property is owned by the Waqf (sahih and zurri). The AWIA is directly entrusted with ownership deeds for the two previously referred to structures in addition to a large residential complex (occupied by eight Moslem Arab families) opposite the Tankaziyya School, just outside the Haram Gate. The AWIA is also entrusted with the adjacent, also residential, complex on the same side of the road. The Dar al-Yanno building as it is known locally is occupied by at least two families.

The two residential complexes have been repeatedly maintained and restored by the AWIA which, in turn, receives a nominal rent from each family. The majority of residents (ten families altogether) have rejected AWIA proposals for wide renovations and modernisation in return for a reasonable increase in the rent, preferring to make do with their present living conditions.

Most of the families living in the two compounds are of Hebronite origin, and came to Jerusalem during the British Mandate in the early thirties. Other Waqf owned property in the area includes the Khan al-Sultan complex. Over 90% of the remaining property in Tariq Bab al-Silsileh belongs to Family Waqf (Waqf zurri); the other 10% is privately owned.

#### ***Waqf Zurri property***

Well-known Jerusalemite families have for many centuries owned the endowment deeds for most of the residential buildings and shops in the area. One of the most prominent of such families was the Khalidi family which is still represented by no less than six households in the central sector of the road. Other residential structures owned by the same family Waqf are occupied by Moslem families of Hebronite origin. The Khalidi family is best known today for the library compound opposite the Kilaniyya. The ground floor complex, on the corner of the Wailing wall intersection, has been restored by

family funds. This library is surrounded by Jewish owned property to the east and south in addition to a partially overlying second storey of the nearby Jewish religious school.

The other Jerusalemite family with most Waqf Zurri property in Bab al-Silsileh road is the Ansari family which owns ownership deeds for the Kilaniyya and a few other structures in the area. The Asali and Nashashibi families also own appreciable residential space in the same road. Other families either own single structures that they continue to occupy or have rented to non-Jerusalemites.

The Moroccan Quarter, Zawiyat Abu Midyan al-Chaith, is located directly behind the Tashtumuriyya compound to its south. The two-storey compound includes a separate mosque, serving the handful of remaining families.

As to the population of Bab al-Silsileh road, it had been extremely difficult to obtain a close estimate. This is largely due to the fact that a number of residents have maintained other homes, mostly in the new suburbs of Jerusalem. Another important reason is the residents lack of cooperation with any body, official or otherwise, that might attempt to conduct a population census in the area, to do with certain "privileges" that could be lost if they were proved to be living elsewhere, and residents' suspicious nature with respect to any form of investigation of their private lives. Even with AWIA personnel, one could still detect the feeling of distrust or even fear when inquiries were made on such issues.

A casual survey recently conducted by AWIA staff estimates the number of Moslem Arab families currently living in Tariq Bab al-Silsileh at eighty, averaging four members each. The estimated number of abandoned dwellings whose owners are known to live in other parts of the country is ten; the majority of whom were forced to leave during the last decade, after clear evidence of structural damage or severe architectural deterioration had been observed.

One such structure, a few yards to the west of the Tashtumuriyya building, previously occupied by three Arab families, had been transformed into a garbage dump after all three decided they could no longer put up with the unfit and structurally unsafe walls and ceilings of their homes. Timber doors and windows had all but vanished through extreme deterioration as did the interior wall plaster and exterior *kuhla*.

Sadly, all three families have consistently refused to invest in the maintenance of their homes despite their being relatively wealthy. Two of the same families own three storey structures in the new Jerusalem suburbs while the other is a local merchant. Neither was the Jerusalemite family whose Waqf trust owns the property prepared to contribute to the urgently required repairs, being content with applying to the AWIA engineering office. They could not, however, be blamed for their actions since the \$100 or so they received annually from all three families as rent was understandably not worth the trouble.

Almost two years ago the AWIA agreed to participate in the maintenance process on the condition that residents and landlords alike join in. After a relatively small contribution was made by the AWIA, and the two parties' non-fulfillment of the required

conditions, the former stopped all aid, leaving the two-storey structure to the garbage of neighbouring residents.

## **Archaeological and historical structures**

Bab al-Silsileh road boasts the highest concentration of archaeological sites in any single road inside the Old City. The following detailed account shall include ample reference to almost all of the previously touched upon issues such as the undesirable features of Old City residence, maintenance and restoration, in addition to providing a record of each of the listed sites in relation to previous and present uses. Archaeological sites will be listed according to location; starting with the northern side of the road from the Haram Gate end.

### ***Bab al-Silsileh Minaret***

This square, tower-shaped stone minaret was wholly re-built according to most historians in 1329 A.D. The original structure was estimated to have been built six centuries earlier during the Umayyad reign. The minaret is reached nowadays through the entrance staircase of the Ashrafiyya, on the Haram's western border.

### ***Sabil (fountain) Bab al-Silsileh***

The Sabil is situated on the western side of the Bab al-Silsileh square, directly opposite the Haram Gate, and on the external wall of Al-Turba al-Saa'diyya. It was first built during the reign of Sultan Suleiman in 1537 A.D. Similar to other structures constructed by the same ruler, it had a rectangular gate shape, with a splendid arch and surrounding perfectly shaped minute additions. According to some historians, the Sabil position was previously occupied by a tank structure constructed during the early Mamluk times. At present, the Sabil is largely neglected, and like most other similar structures in the Moslem Quarter of the Old City (Sabil Alwad, only a few yards away) is in great need of repair and restoration.

### ***Turba al-Saa'diyya***

The Turba compound is situated on the north side of the main road, immediately to the west of the main Bab al-Silsileh square. It is named after its founder Amir Sa'd al-Din Masad who was also buried on site, whose tomb, located in a separate chamber on the ground floor, was recently restored by the AWIA. According to Mujir Eddin, the building was recorded in a Waqf endowment deed in the year 1311 A.D. by its founder. At present, four Moslem families are living in the premises which has been rented to them on behalf of the Khalidi family by a local landlord. To the locals, the Turba is known as Dar al-Khalidi. The limited restoration operation has left the remainder of the structure in urgent need of repair. All chambers, except the tomb chamber, on both floors of the building have yet to be restored.

### ***Turba of Turkan Khatoun***

The site includes a tomb chamber, bound by the street to the south, the Saa'diyya to the east, a shop to the west and a narrow alley leading to other structures on the north side. Little is known about the history of the building except that it was named after the Lady Turkan from the eastern parts of the Islamic world.

### ***Al-Jaliqiyya***

This is situated on the north side of the road, immediately west of the connecting street to al-Wad road (Daraj al-Ain); the main entrance to the two-storey structure, including the ground floor tomb chamber, is located on the main Bab al-Silsileh road, following the blocking of the original Daraj al-Ain entrance some time ago. Its date of construction was sometime before 1307 A.D., when the body of its founder, Baybars al-Jaliq, was buried on site. In 1977, the Israeli authorities ordered the removal of all waste material directly underneath the main structure allowing the construction of a vaulted passage, which joins al-Wad road with the main Wailing Wall plaza.

This Khalidi family Waqf building is currently occupied by an originally Hebronite family who came to the City in the forties. Only second floor chambers are occupied, the ground floor being, until recently, unfit for accommodation. This situation is, however, being altered by CMR restoration work, directed towards bringing the lower section of the building back into use.

### ***Al-Taziyya***

The Madrassa compound is located on the north side of the road, directly opposite the Khalidiyya Library (turba of Barka Khan). The structure takes the shape of an inverted L, with the longer side perpendicular to the main road; the shorter side engulfs the Kilaniyya structure from the north. The Madrassa was established in 1361 A.D. by Sayf al-Din Taz who was originally a Mamluk of the Sultan al-Malik al-Nasir Mohammad. Most historians agree that he had died before the construction of the Taziyya was completed and was buried in Damascus. At present, the Madrassa structure is wholly abandoned and has been so for many years. It is not certain how the current owner, a native Jerusalemite, obtained the ownership endowment deed for the building, which is better known locally after its earlier owners Dar al-Hidayat. No information is available as to the whereabouts of the latter. The only used part of the structure is the ground floor chamber that faces the street and is occupied by an antiquities dealer.

Casual archaeological inspections have revealed some evidence of earlier structures on the same site. The L-shape provides additional proof to the theory that different boundaries had existed. Dates of earlier construction were extremely difficult to determine; the twelfth century being the earliest possible date. As far as restoration work is concerned, the building was largely neglected even by its owners, and requires urgent repairs and maintenance. Severe deterioration of building material is clearly

evident throughout the main street facade which provides fertile ground for thick vegetation growth.

***Al-Turba al-Kilaniyya***

The Turba residential complex had been discussed in detail in relation to maintenance and restoration of archaeological structures in the Old City.

***Khan al-Sultan: al-Wakala***

The last archaeological landmark on Bab al-Silsileh road's north side, Khan al-Sultan, or al-Wakala as many call it, is owned by the AWIA. The complex is located in the heart of the market strip, with its only access provided by a vaulted passageway off Bab al-Silsileh road. Regular users of the area are accustomed to the roof passage, reached via a steel staircase at the western end of Souq al-Husour.

The Caravanserai of Sultan Barquq, its founder, was renewed in 1386-87. Archaeologists have established that the shops and market street to its south and west, were either built or re-built in the Crusader period. The courtyard and surrounding chambers were built during Mamluk times. The Khan's architecture was discussed earlier with reference to restoration of archaeological buildings.

***Al-Madrassa al-Tankaziyya***

This large Madrassa complex is strategically situated on the western Haram border, being the first structure on Bab al-Silsileh road's south side from the end. The present three storey structure is thought to be supported by earlier sub-structures below ground level. The Madrassa was founded by Amir Sayf al-Din Sa'id Tankiz, in 1328-29 A.D., who ordered its construction during a visit to the Holy City at that time. A bath, a *khanquah* and a *dar al-Hadith* were also to be constructed in conjunction with the Madrassa structure. The present structure also includes four shops to the west side of the main building entrance. The common title of al-Mahkama (the Court House), as the compound is better known by the locals, has been associated with the building since the late Ottoman period when it was used as a court house. In the late twenties, the Mufti of Jerusalem, Haj Amin al-Husseini, transformed the compound into his own family residence.

This Waqf Sahih property also served during the thirties as the headquarters of the Islamic High Council. Under Jordanian rule, the compound was partly used as a field clinic for a short period. Today, the compound is completely off limits to civilians. Its entry is restricted to military personnel. Border Police have used the facility as regional headquarters since the Israeli annexation of the Holy City in 1967.

***Dar al-Quran al-Sallamiyya***

The building is located on the south side of the road, almost directly opposite the Jaliqiyya. It spans east-west across al-Wad road in the same way as al-Jaliqiyya. Again, like many other structures in the same road, the present day building was subject to

numerous alterations on the original construction, whose exact date has not been established. It is estimated that the original structure predated its endowment as a Quran teaching school by over a century. The compound was named after its founder Siraj al-Din al-Sallami. Its endowment deed was dated in 1360 A.D.

At present, the compound is occupied by the AWIA which purchased the property from a Khalidi family member a few years ago. Since then the structure has been wholly restored and renovated for public use. It now houses the offices of the Haj and Zaka department (Alms and Pilgrimage) affiliated with the AWIA.

As for its architecture, Dar al-Quran is not regarded in the same class as many of the other Mamluk masterpieces in the same road. Its main street facade is relatively plain, with very little detail in the stonework. The remainder of the structure is very much the same. The AWIA office section of the compound is reached via two stairs from street level and into an open yard. Facing the entrance gate are the second storey stairs which also lead to AWIA offices.

Included in the same complex, but reached through a separate street entrance further to the west, are homes of three families. One is a single elderly person, whose two-room dwelling was fitted with new plaster, floor tiles and electricity; the other two homes are in urgent need of structural and architectural repairs.

#### *Turba of Barka Khan*

The site is clearly defined on the corner of the Bab al-Silsileh road and Aquabat Abu Madyan, leading to the Moroccan Quarter and the Wailing Wall plaza. The Kilaniyya and Taziyya compounds are directly opposite the Turba. The building is thought to have been built in five stages, the earliest being of Mamluk age (1260-1280) and the latest, Ottoman. In 1390 A.D. the building was expanded further by the Waqf supervisor at the time, Amir Nasir al-Din Alai. The structure includes the tomb of Barka Khan and his sons. In 1900, the building was converted into an Islamic Library, thus its modern, and present day name al-Maktaba al-Khalidiyya, after its latest owners, the Khalidi family.

The structure is partially overlapped by the extension of a Jewish owned religious school. The latter's main structure extends almost twenty metres to the east where its street entrance is located. In 1971, the Israeli Military Authority issued an expropriation order for the premises on security grounds. It was claimed that explosives were thrown at a passing military patrol from the building.

Moving back to the Turba structure, the Khalidi family commenced and finished the sixth stage of construction in the life of the building in the 1988. Major restoration work was performed in the ground floor, including the east and west chambers, the main street facade, the inscription plate and the stone cornice moulding, also in the same profile. All costs of the operation were raised by Khalidi family funds, with no contributions by the AWIA. The latter was only recently requested to bear some of the expenses of installing metal doors in the compound after the family funds had run out.

***Al-Tashtumuriyya***

According to a foundation inscription, the structure was first constructed by Sayf al-Din Tashtamur al-Ala'i in the year 1383. Its boundaries were defined as the south side of Bab al-Silsileh, on the intersection of the main road with Aquabat Abu Madyan. Other considerations aside, it is highly unusual for a structure of such calibre and significance to exhibit the confused general appearance clearly visible in the main street facade. Possible reasons for the disarray and confusion of construction are, firstly the sloping contour of the terrain and secondly its crowdedness with remains of older structures.

***Zawiyat al-Maghariba - The Moroccan Quarter***

Zawiyat Abu Madyan al-Chouth, as it is sometimes called, is located on the west side of the short alley bearing the same name leading to the Wailing Wall plaza. Whereas the Waqf of Abu Madyan was established in 1320, the Quarter compound dates back only to 1853. It was said that its establishment was initiated by the French government. Entry to the Zawiya is through a large green timber gate which leads into a small yard partly covered by an arched slab. On one side of the yard, one can reach the second floor staircase as well as two separate dwellings on the same level. On the other side, another flight of stairs leads into a single chamber dwelling with a domed roof; two other dwellings are located directly facing the street gate. The second floor of the compound is composed of a spacious open yard, surrounded by no less than fifteen single chamber dwellings, each owned by a different family. All families are of Moroccan origin.

On the north side of the yard, one can almost touch the boundary of the Tashtumuriyya. Most of the western side of the second floor is occupied by a mosque partly supervised by the AWIA. Altogether, the two-storey compound is inhabited by eight families who share a common kitchen on the ground floor, and twelve other families sharing the scattered chambers on the first. No more than six families are currently residing in their Zawiya homes, the others only for short periods at intervals. The Zawiya trust includes an endowment deed for a number of nearby shops; the income is distributed among all beneficiaries who continue to live on location.

***Al-Burak pool***

The Pool is not considered as a significant historical landmark, especially when compared with other existing structures in the area. It is thought to be situated below the Tankaziyya, directly beneath the famous Wilson's Arch. British archaeologist Charles Wilson referred to its existence inside the "Ancient Suleimani Cellar" with emphasis on its large size. Some historians nowadays refer to the tall, stone cylinder structure, almost three metres across opposite the Sabil of Bab al-Silsileh, as a possible opening to the same pool. Others disagree, pointing out the presumably lower level of the pool in relation to other established structures below ground level in the area.

## **Architecture: description and analysis**

Mamluk architecture, of which the majority of Old City structures are typical representatives, had been described in innumerable publications, with ample detail and variety. Its distinguished captivating style is renowned for its articulate use of stonework and the special emphasis it dedicated to detail. Bab al-Silsileh road stands out in that respect with more than its fair share of famous archaeological sites of Mamluk origin, including almost fifteen *Madrassas*, *Zawiyas*, *Turbas* and *Khans*. It is not surprising that the Mamluk trademark architecture is clearly visible throughout the whole stretch of the road and its side alleys. One should remember, however, that since the fourteenth century, when many of the Tariq's buildings were first constructed, numerous alterations and additions have been introduced by successive owners and/or tenants. A descriptive account of the road's architecture, as seen today, is primarily aimed at pointing out the more recent modifications and changes, so far missing in available publications.

### ***First impression***

To the visitor, a casual examination of the general form of architecture could be extremely misleading, in relation to age and construction modes of buildings on either side of the road. It would not be possible but for experts to differentiate between original and altered forms. Bab al-Silsileh road, in particular, is very unique for its mixed construction and architecture. Passers-by are immediately confused when coming across adjacent structures that were first built hundreds of years apart. To add to the confusion are the restored or renewed structures that exhibit non-conforming patterns and colours. The visitor's first impression of the site might also differ depending on the end from which entry is made to the road. While the western end would seem like an overcrowded *Souq* that one could do without passing through, the Haram (eastern) end would appear as attractive as any other location in the Old City.

The following descriptive account shall concentrate on the age and present state of respective structures, not only those situated directly on the street sides, but also the tens of homes hidden through the numerous dark cul-de-sacs on both sides of the Tariq.

### ***Bab al-Silsileh square***

As one makes the exit through the Bab al-Silsileh Haram Gate, a spacious half covered square precedes the first stretch of road. Directly opposite the gate is the abandoned sabil, on the back wall of the Sa'adiyya. Despite its deteriorated appearance, the architecture of the Sabil is still remarkable. The general shape of the structure is rectangular gate-like, with decorated, thin weaved pillars on either boundary. The perfectly set out arch, the crowns and the fine blossoming roses carved into the stonework are truly outstanding. The perimeter boundary is confined by a simple cornice, also severely eroded, that terminates with a snail bend at the lower end. The Sabil is reached via four three sided stairs, at a lower level than the main square.



As for the Square, it is half covered by two adjacent domes, supported by point arched portals in the north-south direction. A third arched portal extends between the Haram wall at one end and the centre of the other portals on the other. The majestic height of the domes (almost 10 m at the centre) adds to the elegant view.

Looking back towards the Haram wall, one admires the two large green doors (thick timber sections) of Bab al-Silsileh and the adjacent Bab al-Sakina; the latter closed for a long time. Blackish-grey marble pillars, most likely of Byzantine age, decorate either side of both doors, with four pairs completing the symmetrical arrangement. Each pillar is in turn split into two identical, inversely vertical halves. At the top of each part is a Roman style "Taj", that was most likely obtained from earlier Roman structures in the vicinity.

More recent construction on the north side of the Square area partly blocked the northern-most dome and interrupted the northern arched portal at the centre. The inside ceiling of the domes has been plastered with a pale yellow lime paint. The bracket column joint between the two portals is composed of very large stone blocks, with another pair of marble pillars placed on the inner side facing the Haram wall. Another pair of pillars which appeared to have existed on the south, Tankaziyya, side had been replaced at some later stage probably during the Mamluk period, and is currently composed of eroded stone blocks in a vertical column shape. The Square is confined by the Tankaziyya on the south, the Sabil and the road on the west, the Haram wall on the east and a huge structure, Waqf property, on its northern side.

Looking towards the northern side of the Square, one notices very clearly the altered features of the external wall boundary of the residential compound, stretching across the whole length between the Haram wall and the western edge of the Square. Most evident is the arched Mihrab profile towards the west, which was blocked by a large high new iron gate. No information was available on the possible sequence of these and other architectural changes on the facade. A close inspection, in association with available literature, indicated that the area covered by the Square, including both domes and the arched portals, were originally constructed in 1200 A.D., at the same period as the Haram gates (Bab al-Silsileh and al-Sakina). The Mihrab structure, along with the attached residential compound, was probably constructed one hundred years later in three storeys. During the Ottoman reign over the City, it is thought that the first of the alterations was introduced. First, the Mihrab frame was "opened". At a later stage, a new staircase leading up to the first floor of the building was erected. A new door opening was introduced at the top of the stairs. Finally, during the early years of this century, the Mihrab opening was closed with a large steel gate.

The residential building complex on the north side of the Square is divided into two separate units, both of which are possibly of early Mamluk age. The unit is reached through a street level doorway while the second is entered at the end of the staircase just mentioned. The former is composed of a ground floor open courtyard, with scattered living quarters in typical Old City fashion. The disorganised, unsymmetrical arrangement

is compatible with the mixed, distorted architecture of the area. Metal staircase and rails were imposed on old stonework construction, with rectangular, balcony-like landings on the second storey units. The inner yard perimeter, mostly an eroded, medium-sized stone profile, had been only partially restored with *kuhla*.

The most recent new construction, currently underway in the ground floor of the compound, consisted of the re-construction of an old, deteriorated stone wall using reinforced concrete and hollow cement blocks. The two-chambered unit on the northern end of the structure was refurbished with new mosaic floor tiles, steel doors and windows. The self-financed maintenance operation further changes the original shape of the unit, especially in re-positioning some of the door and window openings, and the demolition of the old stone construction. The tenant's excuse for his actions was the need to provide the dwelling with better ventilated living space. The other unit of the residential compound, the western end, was also typical of Old City construction, with a relatively long narrow passageway joining the inner courtyard with the main entrance. All sides have been recently plastered, while all well-shaped stone profiles received new *kuhla*. All maintenance and restoration work performed in the structure was financed and supervised by the AWIA.

#### ***The road stretch***

Towards the western end of the Square, two wide stairs mark the beginning of the Bab al-Silsileh road stretch. The uniformly ascending road surface had been completely re-tiled in one of the most recent Jerusalem Municipality Old City projects. Small yellowish stones with white cement *kuhla* were used throughout the whole length. The difference in level between the eastern and western ends of the road was overcome by well placed groups of stairs at regular intervals, ensuring both a pleasant aspect and a comfortable surface for pedestrians.

Pausing at the beginning of the road stretch, between al-Sa'adiyya and al-Tankaziyya, one observes the recently restored facades of the two adjacent structures, al-Sa'adiyya and Turkan Khatoun on the north side, facing the south side facade of the Dar al-Hadith al-Sallamiyya, also recently restored. Despite their historical significance and archaeological value, none of the three structures is regarded with admiration in regards to architecture, the red and white carved stone profile of the Sa'adiyya being the only outstanding feature in all three. The relatively plain architecture of the buildings is however only inferior when compared to other structures of the same period like the Kilaniyya and Tashtumuriyya.

As one moves west, the contrast between the Waqf owned (al-Sayfi family Waqf) compound on the north side, and the opposite structure on the south, becomes evident. The former is reached through a long, dark tunnel, with floor surface which makes safe passage almost impossible. The green and black walls and ceiling typify a sizeable proportion of old buildings inside the City walls. No less than six families are currently occupying the partly demolished units scattered through the two-storey structure.

Residents warn visitors of spider webs between walls and hanging from the ceiling of the tunnel.

In complete contrast, residential compounds immediately to the west and south exhibit very clean stone profiles with matching interior architecture. The structure on the south side was originally built on one storey during the late Ottoman period, with another added floor constructed during the Jordanian period. The plain architecture of the building, both exterior and interior, is typical of similar structures that were built outside the Walls of the Old City during the same period. Simple, undecorated stonework, rectangular metal windows and doors on the exterior are matched with hollow block partitions and flat ceilings on the interiors. The same original *kuhla* and interior wall plaster are still evident.

The opposite compound on the north side of the road is also typical of modern construction. The late Ottoman-early British structure is entered through three stone stairs above street level.

Further to the west, on the north side of the road, a small, largely ignored sabil precedes the Daraj al-Ain road intersection which leads to al-Wad road. The Sabil structure is also in need of repair, having been out of use for many years, like its predecessor on the west side of the Square. Unlike the latter, however, the small sabil is not rich in architectural detail. On the other side of Daraj al-Ain, the Jaliqiyya structure precedes another mid-Ottoman building of two stories. The stone street facade is relatively plain with rectangular openings typical of more recent construction.

### ***The Jewish School***

Back to the south side of the road, and opposite the Jaliqiyya, one finds the reddish stone structure of the Jewish Religious School. The building extends over 40 metres east to west, existing in one, two and three storeys at various positions. The western boundary of the compound ends with the Tomb of Barka Khan (the Khalidiyya Library). The main Bab al-Silsileh school entrance is located on the first floor, reached via an exterior stone faced staircase running parallel with the building.

As far as the main street facade is concerned, the most distinguished feature is the clear contrast between the stonework in each of the three levels. On the ground floor, which is mostly occupied by Arab tenants except for a single service chamber included in the Jewish owned section, old stonework has been completely replaced by limestone blocks while the second floor level consists of restored ancient blocks with white pointing. The third level, which was constructed with a 1.5m recess away from the street, has only half the surface area of the lower floor; the facade consists of reddish/yellow new stone blocks.

Other significant features of the structure include the beautiful reddish timber balcony on the second floor level, supported on four stone cobbles, typical of other structures in the same area (the Taziyya and Tashtumuriyya). Rectangular timber

windows were installed in place of the original openings with steel grilles and iron gates at all levels of the structure, including the top floor terrace and staircase exit.

Finally, it should be pointed out that the mixed styles of architecture employed in the street facade in particular were the source of criticism on the part of local Arab architects involved in restoration work in the City. Most of the criticism was towards the use of stonework and the large heating/cooling and ventilation installations on the roof. Residents of the area have not forgotten that the huge Jewish complex was, until a few years back, Arab owned.

### ***The Tashtumuriyya***

The Tashtumuriyya compound is located on the south side of the road, at the beginning of the *souq* stretch of Bab al-Silsileh. It consists of three levels, with contrasting fortunes. The two-storey eastern section, which is Jewish owned, is completely uninhabited and in urgent need of repair. The separate street entrance is covered with a sheet of steel as are the windows on both sides of the street corner. Window openings are arched and set out in symmetrical pairs on both sides.

The Arab owned section of the structure extends over a large area which includes all of the third floor, the western and southern parts of the first and ground floors. The outstanding feature of the ground floor is the porched entrance portal and semi-circular stairs that lead up to the eroded ancient main entrance gate. All stonework patterns, including the *muquarnas* ceiling and the entrance side walls have been beautifully restored by the AWIA CMR. The second level facade exhibits mostly eroded stone blocks, with a deteriorated timber balcony. The southern end of the same floor consists of three irregularly scattered chambers separated by crooked, steep stairs. A small open yard in the south-eastern corner of the same section is confined by high stone walls, separating the Tashtumuriyya from the Moroccan Quarter on the south, and the Jewish Quarter from the east side. The former wall boundary consists of old eroded stones while the latter was completely re-built with new reddish/white blocks. The third level, which only covers half the lower floor surface area, is only partly occupied. A concrete surfaced dome in the background and a four metre length of new parapet stone rows are evidence of the recent restoration operation performed in the building. The adjacent eroded stone balcony is evidence of required restoration in the structure; it is supported on short stone beams (cobble) in typical fashion. Finally, all window openings of the street facade are rectangular, with the vast majority, especially on the third level, lacking any suitable window fittings.

### ***Market stretch***

Moving past the Taziyya and Kilaniyya on the north side, and the Tashtumuriyya on the south, one soon notices the crowdedness of the remaining stretch of road, the market stretch. This name has been adopted for clarification purposes only, since no such exact naming had ever been associated with that region. It is also important to stress that the

stretch is not restricted to commercial premises since no less than twenty Arab families are currently living in residential compounds on either side of the road.

Both sides of the road are lined with assorted shops at street level. Residential quarters are reached through short passages that branch off the main street. Since the largest section of the stretch is covered, only the eroded stones and the shops' iron gates can be observed from the street.

As for the age of construction, the majority of structures were late Ottoman, with a handful from the beginning of the century. In some areas, one notices more recent additions to older structures such as cantilevered balconies and red-tiled sloping roofs.

The next building to the west after the Tashtumuriyya is also of Mamluk age but has no significant archaeological or historical value. The second storey is divided into two. The first storey is occupied by shops. The only apparent distinction between the two upper halves is the completely restored Jewish-owned part and its largely abandoned and eroded Arab-owned second half. A typical stone veranda supported on four cobbled sections decorates the wall profile. The next noticeable structure on the same side of the road is the Ghazzali elementary school run by the AWIA. The building was originally built in four storeys above street level, making it the tallest Arab owned structure in Bab al-Silsileh road. Prior to its transformation into a school, the compound served as a residential unit, with shops occupying all of the ground floor. One notices three cantilevered balconies spanning out of each of the second, third and fourth levels. The late British steel-concrete attachments were added to the original Ottoman construction, with diagonal steel sections used to provide additional support.

Opposite the school on the other side of the Hakara road intersection a large building from Mandate times stands out with its red tiled, sloping roof, and street side balconies. A similar pattern of construction is repeated in two more structures further up the road, and another, spanning its width.

The next alleyway on the north side leads into a large, disorganised residential complex shared by eight families. The "nurses alley" as it is locally known, is composed of a number of detached structures mostly built during British rule.

### ***General observations***

Towards the last 100 metres of the road, one notices the towering Jewish Quarter structures behind Arab owned buildings on the south side of the road. Three alleys, not more than ten metres apart, join the main Bab al-Silsileh Tariq with major roads inside the Jewish Quarter of the Old City. At one particular location, an Arab-owned currently uninhabited compound is directly overlapped by a three storey Jewish owned structure which was built in the late seventies or early eighties. Similar to all roads inside the Old City, many structures span across the road width. Most such *qanater* have arched lower surfaces plastered with cream coloured, rough finish layers. Supported structures generally consist of single storey units. Bab al-Silsileh's skyline is interrupted by five of these.

## V. The Future

### ***Introduction***

One of the most ancient cities in the world, Jerusalem has witnessed and survived numerous wars and natural disasters. Successive civilisations flourished in the City throughout its 5,000 years of existence and influenced its development in many different ways. In the next few pages, an attempt shall be made to predict the near future of the Holy City in relation to the two fields on which much of the preceding material has focused: socio-political conditions and architecture and town planning.

In order to remain in touch with the reality of the situation, and so as to keep in mind the uncertainty of any forecast, it was decided to formulate an "ideal" solution that would both ensure the preservation of tradition and heritage and save its inhabitants further distress. In addition, a special section shall tackle such issues as defects in construction and undesirable features of Old City residence. Possible means of influencing, or improving, the current state of affairs shall also be touched upon.

Finally, it must be remembered that the future of the Old City is dependent to a great extent on the attitude of the present generation towards the well-being and prosperity of their City. In a community such as Jerusalem's, one should never underestimate the influence of individuals in that respect. The destiny of the City has so often been controlled by individuals, and it is thus the duty of all members of the community to play an active role in shaping the future of their City.

### **Political Questions**

Numerous writers and politicians representing all sides of the conflict have excelled in establishing the legality of their respective claims to "ownership" of the city. A neutral reader would find it extremely difficult to align his/her views and convictions with either party since both seem equally convincing in representing their cases.

Followers of the three monotheistic religions (Judaism, Christianity and Islam) while all believe in the same God, disagree on all other issues; each sect presenting a strong case in support of its claim. The case of Jerusalem in particular, and the whole of Palestine in general is not any different, in that one becomes embroiled in irrelevant debates. Another motive for avoiding the controversial subject is based on personal considerations. It would be almost impossible for any individual who was aligned with one side of the conflict to avoid prejudice and favouritism in passing judgement or in decision making.

The simplest, and most likely prediction on the near future of Jerusalem is of no change, the continuation of the status quo, at least with respect to sovereignty over the City. As far as the Old City is concerned, it is sufficient to visit the new Jewish Quarter to obtain a realistic view of Israeli intentions in the City. In short, the material and

spiritual investment that the Zionist regime committed to the City during the last two decades, as well as the Jewish people's traditional and historical attachment with this land are the best indications of the likelihood of their not giving up the unified city.

***Social and Economic Implications***

Social and economic implications of the above prediction are even more difficult to forecast as their influence would not only be restricted to the local economy or social standards but are certain to reach international dimensions.

Assuming the initial prediction comes true, the most crucial issue that would determine the course of change would be the Arab, especially the Moslem, population's reaction to continued Israeli authority. It is certain that the government shall continue to pursue its aggressive judaisation policy by all means at its disposal, such as property purchases, "legal" evictions, confiscation and others.

However, it is the agreement of all nations with the exception of Israel that the Old City is part of East Jerusalem, which in turn is unlawfully occupied by the Jewish state. It is increasingly apparent that it is only a matter of time before the City is returned to Arab sovereignty. Thirdly, the local Arab population is fighting against its military rulers, with increasing momentum in recent years. Their resilience and total commitment to ridding the City of occupation is more organised and effective than ever. Lastly, the small chance the Israeli authority might have of maintaining its grip on the City's Arab sector requires increased commitment towards fast and more conclusive judaisation.

So, whether the Israeli leadership thought its control of the Old City was to last for many more years, or that it was only a matter of time before they were forced to give it up, the more intensified oppression of the Arabs shall be the core of the new occupation strategy. The government of Israel is certain to put up a very stiff fight either way; the only real losers shall be the City itself in general, and its non-Jewish population in particular.

***The Arab side***

As far as the Arab population of the Old City is concerned, the implications of continued Israeli occupation shall be most influential in the economic field. First, the tension between residents on one side and their Jewish neighbours on the other is certain to prevail. After twenty one years of occupation, one can assuredly state that only minimal, if any, social relations exist between them even for those who live inside the densely populated Moslem Quarter neighbourhoods. Such "communal" relations, or the lack of them, are supported by the fact that only those extremists, who attended Jewish religious institutions inside the City, and were famed for their strong anti-Arab sentiment chose to live in such areas. Arabs in turn have on the whole stayed away to avoid possible trouble and humiliation. In most cases when verbal contact was established between the two parties, it was more often than not in an attempt to find a solution for a local dispute. In the wake of the recent political developments in the region, and the increased

animosity between the two peoples, all realistic forecasts agree on the continued and possibly elevated tensions that exist today.

Perhaps the most critical factor is the economy of the West Bank in general and the City of Jerusalem as a whole, the Arab part in particular. Assuming the continuation of the status quo, Israeli control over the City, it is expected that Arab residents would hold on to their property and maintain the Moslem majority in the Old City, due to the relatively low cost of living in one of the most deprived sectors of Jerusalem.

Nationalistic and religious sentiment amongst the Arab population is also another influential factor. No dramatic changes are expected in general for the next few years, at least in relation to property purchases and ownership. Gradual change is however predicted in the near future. The direction of change shall be determined by the state of the local economy at the time. A poor economy, and high levels of unemployment amongst the Arab residents would mean the poor being unable to establish residence in the more privileged neighbourhoods outside the Old City. This is conditional to some extent on outside aid, especially in relation to funds donated from Arab and Moslem countries all over the world for the maintenance of Arab owned property inside the City. On the other hand, a prosperous economy and an improved standard of living would be disastrous to the national cause. A wealthier population would be most likely to opt for spending its wealth in the superior environment outside the Walls, rather than sticking to the unhealthy and unpleasant conditions inside.

It is saddening that while many Jewish residents will be more than willing to go to extreme lengths for an Old City home, Arabs have grown to take their City for granted without really appreciating its unique value, despite their possessing a peculiar sense of attachment to it. It is unlikely that wealthier Arab residents would purchase property inside the Old City for dwelling purposes.

Having said that, it is worth pointing out that there have been signs, particularly in the more recent years, of revived Arab awareness and growing appreciation of their City's rich heritage and tradition. Without major political achievement and success, however, these new signs are certain to vanish very rapidly. We can only hope that Palestinian Arabs, whether Moslem or Christian, never forget the way their land was robbed in front of their own eyes during the early years of the current century, lest their awakening come when it is too late.

### ***Long Term Forecast***

As for the long-term forecast in relation to the City's future status, it is expected that the "unification", or annexation, shall only last for a few more decades at most. The re-division of the City is thus only a matter of time.

Despite their efforts to portray the truly united City image, the authorities have so far failed in achieving their goals, with their own admittance. In short, the Arab neighbourhoods have remained Arab, and have expanded accordingly. New Jewish neighbourhoods which were established since 1967 in East Jerusalem have remained



completely separated, both geographically and demographically from their Arab counterparts. As both parties would ascertain, the City would never be truly united under Jewish rule.

The re-division of Jerusalem, with the Old City being returned to Arab sovereignty as part of the eastern sector, is tied up to political change in the region as a whole, with wide ranging implications for this whole conflict.

### ***What is Best for Jerusalem's Old City***

Putting aside one's loyalties, and keeping in mind Jerusalem's, and particularly the Old City's survival and prosperity as first priority, one can proceed with formulating an ideal solution which would ensure no return to misery and suffering. First, one should attempt to identify the real issues at the heart of the conflict. This can only be achieved through a thorough revision of the history of the City and the country. The recommended solution shall obviously require the approval of today's communities, and there would thus be no point, or at least little benefit, in turning the clock back to old issues. A twofold approach towards solving the problem has to be adopted, taking into consideration the need to satisfy: firstly, the welfare of the inhabitants, including their basic political, economic and social rights; secondly, ensuring free access for all to the City's holy sites.

It would be best for the City if an agreement was reached between all sides involved in the conflict, whether directly or otherwise, for the establishment of a single committee with just representation to administer the affairs of the City in the framework of an international body. Such a committee shall be responsible for the daily affairs of the inhabitants as well as their relations with the outside world. An international, demilitarised zone would be an ideal nucleus around which a more detailed strategy and, ultimately, a constitution could be devised. One certain outcome of such an arrangement would be the end of bloodshed and destruction in the region. The newly gained stability is also certain to result in the swift prosperity of all concerned.

### ***Main points of the scheme***

- \* Complete internationalisation of the City including East and West Jerusalem;
- \* Adopting a principle of shared authority based on proportional representation;
- \* Establishment of a higher committee with two sub-committees in charge of local and foreign affairs respectively;
- \* Regarding religious sites and affairs, each sect is charged with the administration of its own religious sites; a religious affairs committee would coordinate between them; all sites shall remain open to the public; non-interference by bodies from all sects in the affairs of the higher committee, except where religious affairs were in question;
- \* Equal and full political and social rights for all sectors of the community;
- \* Establishment of another international body or committee for supervising the trouble-free operation of the above.

## **Architecture and town planning**

As far as architecture and structural stability of Old City buildings are concerned the future shall depend to a large extent on the influence of maintenance, restoration and conservation. In other words, the principles of "art", "history" and "technology" shall play a major role in determining the outcome. The influence of each is again dependent on the nature of political and economic development and progress. Due to the complex interrelations between all such issues, a simple categorization would prove beneficial.

### ***Expectations: change and progress***

Ignoring such issues as politics and legal restrictions, the present day trend of modernisation and progress is expected to continue strongly on the Arab side. The inhabitants of the Old City are more inclined to put their own interests and comfort first, rather than worrying about the need to maintain the rich heritage and ancient architecture of their City. Again, the key issue is the appreciation, or lack of it, the residents feel. Even the least financially able inhabitants are showing signs of temptation by modern change, and seem to be increasingly attracted by any available chance to add on extra living space to their dwellings. New construction would certainly consist of modern style components, with very little, if any, likelihood for ancient construction techniques to be adopted.

At this stage, it might be useful to take a brief look at the nearby Jewish Quarter of the City. With all issues taken into account, it is thought that the Moslem neighbourhoods will need little time to follow a similar pattern to their Jewish "neighbour" to the south and west. The transformation of the old, domed, and stone tiled structures is inevitable if the Old City is to remain a totally residential region. The only possible difference would be the disorganised fashion of the Moslem Quarter's transformation as opposed to the harmonious layout of the Jewish sector. The distinction could be partly related to the long-term gradual transformation expected in the former, which is likely to take the better part of a few decades; whereas the Jewish part was completely renovated in one systematic operation.

Be that as it may, one should not forget that tenants of Moslem Quarter homes are faced with many restrictions in regards to introducing alterations or additions to their homes. The following are some of the more influential issues related to the subject, including restrictions, likely consequences, and other considerations.

### ***Property ownership***

The majority of Old City tenants are living in rented homes, and are therefore unable, strictly speaking, to introduce any alternations to the basic structural, and in some cases architectural, features of buildings. The landlord's rejection of any such actions by their tenants are not however based on the wish to preserve the archaeological or historical value of their property, but purely on economic considerations. On many occasions,

floors and roofs, changing interior wall partitioning, and closing ancient drinking water wells.

## **Recommendations for the future**

The architecture of the Old City is too precious to be considered casually, and should not be left to be tampered with ignorantly. It would be an unforgivable act on behalf of the local community if the present negligence were to continue. It is the duty of all responsible individuals to take the initiative in creating and directing effectively a wide interest, both locally and abroad, in the future of the City. Only when that is achieved, and an appreciable level of sincere and dedicated interest is reached can the unique, extraordinary value of the City be preserved and enhanced.

### ***Undesirable features of Moslem Quarter residence: Remedial action***

To start with, it might be useful to recall the long list of "undesirable features" presented in detail earlier. The list includes: access, lack of unbuilt space, interior home design, maintenance, deterioration of building material, sewage disposal, structural stability, dampness, shortage in public services and facilities.

Assuming that the Moslem Quarter of the Old City is to remain as densely populated as today, one could devise a workable approach, aimed at reducing the harmful levels of such features, and providing more comfort to the inhabitants, without totally ignoring the traditional style of the original City layout and that of individual structures. With the needs and comfort of residents high on the list of priorities, recommended steps are more biased towards modernisation than preservation.

Several points are in order here. First, in general terms, the trend in modernisation of homes, both inside and outside the Old City, is restricted to interior architecture. Major exterior, architectural alternations are resorted to only when structural stability requires. Second, new construction and other added features, such as solar heating cylinders and water tanks on roofs of buildings, are generally composed of lightweight material, and could be classified as temporary units that would be easily dismantled if the need arose, without jeopardizing the overall stability of the older components. Third, structural stability represents the most important threat that faces the survival and development of ancient, Old City Jerusalem. Where that is not the immediate threat to building safety, it is a serious restraint on attempts to abolish other drawbacks. A frequent common example is the damage caused by sewage excavations to adjacent structures. Fourth, whereas private individuals exercise their own influence on alternations inside their homes, they possess no power whatsoever over publicly owned property, such as roads and alleys where some of the City's major problems exist. Such matters are the sole responsibility of the legal authority (Jerusalem municipality) which has the right to introduce changes if and in whichever way it sees fit.

stubborn landlords have given their approval to literally begging tenants only when an agreement was reached for an immediate rent increase. The majority of incidents, however, have involved landlords sticking to their refusal, as tenants opted for non-cooperation with the formers' requests and had to either make do with the status quo or await being sued by the owners (the main reason for most inhabitants' continuing to live in the Old City is the low rent in comparison with other parts of Jerusalem).

### ***Legal authority***

Another influential deterrent is the legal authority's requirement of a building permit for certain maintenance or construction operations. Local law forbids changing structural components unless proof is provided of its necessity. New construction is only permitted if hollow blocks, timber, asbestos or other similar lightweight building material are used. The use of concrete is only approved when structural safety is jeopardised or when a full permit was obtained. Again, while generally adhering to these laws and other legal restrictions, many residents decide to take the risk and ignore such limitations. Devious techniques have become the trademark of the majority of local building contractors who excel in devising means to overcome such restraints.

On most occasions, actual construction work is carried out on Friday afternoons or Saturdays, when municipality officials are off duty. Some operations are carried out only at night time. If and when they are caught, residents deal with the resulting court action in their own way. In the end, and depending on how convincing their excuses were, added or altered components are either demolished, or left intact in return for a sizeable fine. (The AWIA on the whole operates within the limits of authority regulations inside the Old City.)

### ***Sources of funding***

AWIA maintenance and restoration operations account for the largest proportion of all construction work carried out in the Old City, especially in the Moslem Quarter. Whether it was a straight donation, or a long-term loan, AWIA staff have to directly supervise the execution of work. In general, AWIA officials are more aware of the historical value of particular structures inside the City, and are inclined to discourage tenants and homeowners who have sought their aid and advice from damaging any ancient components of construction, unless it was the only alternative. Their influence is however limited at times by stubborn opposition from certain homeowners who refuse to adhere to their direction and advice, knowing that the AWIA could not resort to court action.

Typical alterations and additions in Old City structures include: asbestos roofing, hollow block wall construction, plastering of eroded stone profiles instead of the existing *kuhla* thus covering the stone surface completely, demolishing domes in favour of new concrete or asbestos surfaces, use of metal doors and windows, altering original positions of door and window openings or changing their size, replacement of old stone tiles in

With the above points in mind, what remains is to outline a strategy aimed at tackling the basic problems. It must be emphasized, however, that before all else, it is those who are actually suffering who are capable of improving their own living conditions. Outside help can only be provided in the form of guidance, direction and minimum material support. One must also realise that the City's problems cannot be solved overnight, and need a long-term step-by-step systematic process to achieve even minimal success.

***Research, executive power and authority***

Unfortunately, the only existing executive body today with a reasonable degree of authority and influence within the City's Moslem Sector, is the AWIA. Without attempting to undermine its tremendous contribution to the welfare of the inhabitants and the good of the community, the fact that it is a government affiliated body greatly limits its effectiveness. The few conscientious employees who attempt to improve the professional standard of services provided through the administration, are usually faced with neglect and non-cooperation from other employees and high officials. Their initial enthusiasm for creativity, and sincere contribution is soon replaced by being content with performing their basic duties with minimum effort. In other words, it could be said that the AWIA, the only body able to exercise any positive authority towards advancing the welfare of the City's Moslem population, is literally paralysed by administrative, bureaucratic routine and its total reliance on old, backward planning strategy.

A growing conviction amongst large sectors of local professional groups, such as historians and engineers who are associated with the City of Jerusalem in one way or another, is the urgent need to establish a research facility complementary to the AWIA, with reasonable executive authority, at least over the technical side of affairs.

The tasks and goals of such a facility are the conduct of practical research inside the Old City in relation to architecture, town planning and purpose of use of buildings. Studies are to be based on field observations and investigations, with close reference to established historical and archaeological findings and concepts. The unit shall also be required to produce recommendations as to the direction and progress of aid operations in the City in order for maximum benefit to be obtained. A research unit has been demanded by many parties who regret the disorganised, undirected efforts put in for the City's benefit. It is also saddening to observe the unintentional damage inflicted on its traditional style by ignorant actions. In the event that such a facility be established in the near future, it might be worthwhile for all but the very urgently needed maintenance and restoration operations to be temporarily halted awaiting its establishment.

***Structure and operational strategy***

The first pre-requisite for the realisation of a research unit is the need for an independent source of funding for its operations. The source should be totally committed to non-interference in the day to day activities. A team of technically-qualified personnel, with

reasonable experience in the field of maintenance and restoration shall form the backbone of the unit. Accounting, management and public relations expertise would complete the nucleus of the initial team. It shall not be expected to provide speedy material results from the adopted plan of action in the first stages of its operation. Sufficient time should be allowed and efforts be allocated from all sides towards building up faith, trust and confidence in its activities, especially from long established organisations in the same field, namely the AWIA and its various affiliated departments. Close contact and cooperation with such bodies serves a twofold purpose in the preliminary stages of research. Firstly, the AWIA's various departments have accumulated over the years valuable knowledge, public relations and experience that would be of great benefit for the progress of future research and investigation. Secondly, the strong influence and wide authority of the Administration over the City's inhabitants and property owners could provide a most suitable launching pad for putting into practice the findings and recommendations of research at later stages.

For instance, with respect to construction work inside the City, most local contractors and craftsmen have worked at some time with Waqf-connected bodies. It would thus be a perfect opportunity for testing new building techniques or material of construction as recommended by the research unit findings.

Under current circumstances, close attachment to the AWIA would be necessary for other reasons: its unique legal status and relative independence and freedom of operation could prove extremely vital to the research unit's formation and activities.

It would be ideal if the staff included at least one representative of each of the following professions: architect, archaeologist, structural/civil engineer, technical draughtsman, foreman/technician. All personnel would be required to possess minimum experience and familiarity with the environment and history of the City.

### ***Plan of action***

Suggested plans of action should be considered in the preliminary stages in accordance with the prevailing circumstances at the time. Priority should be given to investigating the most immediate needs of the inhabitants, namely improving local living conditions. Before narrowing the discussion to specific items and issues to be investigated within the format of a plan of action, it is worth considering creating a new entity within the Old City community for social organisation. The basic concept is the establishment of one or more local leagues for landlords and tenants inside the City. Keeping in mind the complex nature of property ownership in the Old City Moslem Quarter in particular (such as Waqf sahih, Waqf zurri, and private ownership), it would be of great service if some form of united grouping was to be established within the community. The concept is not however as simple as it may first appear, and would have to overcome many restrictions and obstacles before its formation. Similar difficulties are certain to face such leagues during their operation. If successful, such a body would contribute immensely to the

better welfare of the Arab cause in general, and the inhabitants of the Old City in particular.

### ***Possible Formations***

#### ***Old City residents association***

Such a formation would be most difficult to bring about. At the same time it would be the most effective and efficient in serving the interests and welfare of the locals. A residents league with over 15,000 members could form a very formidable front capable of dealing with all difficulties. In practical terms, local committees could be set up gradually in the densely populated neighbourhoods, with elected representatives being assigned to the mother league. This division would allow more attention to be allocated to local community issues, within the framework of the whole community's public interest.

After a shaky start, the local committee for Aquabat al-Khalidiyya neighbourhood has been functioning since 1986 with increasing efficiency. The local residents have succeeded in setting a useful example to others regarding their ability to organise and carry out their various activities within a democratic structure. "Aquabat al-Khalidiyya Social Progress and Welfare Committee" activities include the operation of a local medical clinic, maintenance of abandoned sites and the installation of new steel doors and windows to the majority of street-level dwellings in the neighbourhood.

#### ***Landlords (homeowners) association***

As had been repeatedly emphasized, property ownership in the Old City is a very complex issue and could be blamed to a certain extent for many of the inhabitants' problems. The most serious drawback in the current property ownership status is the lack of interest owners express in regards to their property, especially Waqf Zurri directors (*mitwalli*). Their neglect is, however, partly excusable since they do not receive acceptable returns for rented property. An association for landlords including public (Waqf) and private homeowners would be able to look after their interests in collective, organised fashion, without endangering the delicate tenant/landlord relation inside the Old City. A landlords' league should act in a responsible, patriotic manner that would ensure mutual benefit for all sectors of the community.

#### ***Benefits and advantages***

Collective action is always more effective and influential than individual initiatives. United efforts can stop an unwanted action or speed up one called for. A united front of Arab groupings would be more difficult to annihilate in any one of the frequent Arab-Israeli confrontations. Constant judaisation attempts are certain to be faced with stiffer and more organised resistance. Residents would feel more secure and safe when protected by a stronger body, such as an association, also knowing that their interests would be

better looked after and their complaints dealt with more effectively. A democratically run association would be a tremendously useful experience for the majority of inhabitants who have so far not been used to such practices. For practical purposes, a league would provide a semi-legal authority which could defend its member's rights, and simultaneously ensure their performing what is expected of them. It is very important for a patriotic, conscientious authority, that commands the trust and confidence of its subjects, to be able to exercise executive powers to which the response would be unanimous.

### ***Obstacles and Restraints***

***The Israeli authority*** It is not unlikely, especially under the current circumstances, for an Israeli ban on the formation of such associations in the Arab community.

***The Arab side*** Prospects for organising and bringing together all or a large sector of the residents of the Old City is not very encouraging. Opposition to the concept might not be direct but is certainly expected from the old-fashioned local community leaders who command influence at present, such as Mukhtars and wealthy individuals in the City. The establishment of a new, democratic entity would most certainly be seen as a threat to their own influence and prestige. The efficient day to day running of a public association could prove very difficult at present. Getting used to democratic elections and non-favouritism is not easily attainable but is not impossible. The most serious drawback in the process is the deeply entrenched sense of tribalism (family alliances) which could jeopardize the effectiveness and success of the whole concept. Personal inter-Arab disputes could also hinder the progress of any form of collective activity.

### ***General comments***

True aims of such leagues are not purely political. The creation of any one or more of those suggested, or any other form of association, would continue to serve and work for the social and economic interests of their members at all times. Bearing in mind all the restrictions, and other relevant considerations outside the scope of this text, a possible start for the long process would be the formation of a charitable society analogous to hundreds of similar bodies currently in the West Bank and Gaza. The most important factors which favour that choice are its non-profit nature; its avoidance of confrontation with the Israeli authority, and the "charitable society" which qualifies it for outside assistance.

### ***Technical Research: suggestions and recommendations***

Moving back to the proposal of a research facility in the Old City, the next few pages present possible issues and items for discussion. Many concepts will be presented in the form of suggestions for an initial plan of action while others assume the shape of



City of Jerusalem, as well as in other towns and villages in Palestine where ancient buildings exist such as the Old Cities of Nablus and Hebron.

When completed, such a document would be the only official technical guide to maintenance and restoration work in the Old City. All issues that were discussed in the previous section are to be in the code. Wholescale plans have to be designed for upgrading the standard of public services and facilities in the City. Rules have to be set out and adhered to by homeowners and other bodies conducting maintenance and restoration work in the Old City, in the same way that building licenses are required by law for new construction.

### ***History and Archaeology***

One of the most controversial issues in archaeological/historical research in the Old City is authenticity. Determination of authentic building material, shapes, forms, patterns and other issues related to ancient construction is made more difficult by the numerous alterations and additions introduced along the years.

Despite their conflicting professional principles, the collective efforts of engineers, architects and archaeologists are required to produce the most exact historical records in the City. A useful starting point for studying the history and original forms of existing structures in the Old City would be the adoption of reference periods to which other periods could be related. In general, architectural features (alteration or additions) should be related to corresponding historical events and developments. Such adaptations could in turn be compared with established records.

Investigators should be aware of hidden alterations which could only be spotted through close examination. Evidence of such cases would be observed in components where only limited maintenance was performed at an earlier period. One could easily be deceived by the harmonious colours or symmetrical patterns in a particular stone profile without noting the faint distinction between original parts and more recent replacements. Investigators would benefit from examining past trends of development, allowing simple deductions to be made accordingly. Faster and more conclusive results could be obtained from carrying out investigations on specific set targets, such as alleys or roads, as representative samples of similar locations and objects.

### **Future conservation of heritage and tradition**

Supporters of restoring the City's old heritage are faced with an impossible challenge, at least under present circumstances. Almost all ancient *Madrassa*, *Ribats*, *Zawiyas* and *Khanquas* have been transformed into residential compounds. It would need an extremely ambitious project to reverse the transformation under prevailing conditions. The difficulty is not merely restricted to providing alternative housing for the thousands of would-be homeless inhabitants, but also involves other uncontrollable factors such as local political conditions. Another factor worth considering is the fact that most buildings have been

recommended solutions for particular problems. On the whole, the coming pages are to provide material for thought, and to help point future research efforts in the most useful and rewarding direction. A brief account of specific issues also sets guidelines for further investigation.

### ***Architecture and Civil Engineering***

Long years of research, laboratory testing and field investigations shall be needed for the material realisation of results. It would thus be advisable to set out a preliminary theoretical approach specifying exact proposals, objectives and operational procedures for conducting experimental testing and investigation.

As was established earlier, structural stability of buildings presents one of the major problems in the Old City. It would be essential to concentrate practical research into that field, and into other related drawbacks. In the theoretical, appraisal stages, it is strongly recommended that structures be classified into categories or groups with certain identical features, or properties, such as the time of construction, technique or method of construction and material of construction. Identification and subsequent classification of structures into categories would be very useful in regard to the quality and duration of investigations. The process would also provide a very important and informative architectural/structural record of the Old City. Each category should be examined separately to establish exact information about properties and features of each. An initial phase of theoretical analysis in conjunction with laboratory and field testing would provide a clearer insight into the stability and durability of buildings.

Throughout the preliminary stages, work should concentrate on establishing new information about the present state of the City's architecture and structural stability. In the latter stages, possible treatment techniques are to be investigated thoroughly, ultimately producing a complete set of remedies.

All research is to be based on two issues: maintenance and restoration, and the drawbacks of architecture and engineering. The outcome of investigations is to be presented in the form of guidelines for performing maintenance and restoration operations on the one hand, and possible treatment methods for drawbacks of Old City residence in relation to architecture and town planning on the other.

Specific phenomena worthy of particular interest include: dampness, structural stability, properties of building material used in maintenance work, loading (structural) including self-weight and live loading.

### ***Code of Practice***

The next logical step as an ultimate outcome of the above findings, is to formulate a Code of Practice for design and execution of construction work in the Old City. A local construction code, analogous to similar documents in other parts of the world, such as the British standards for steel and reinforced concrete, would be extremely useful in organising and regulating maintenance and new construction operations inside the Old

subjected to major structural and architectural alterations which would require very costly and complex restoration to their original forms. Society has to decide whether it wishes to restore those buildings to their original forms, even if they were not to be used as residential compounds. Certain sectors of society, in addition to restoration activists, support the same cause for religious reasons. They base their claims on the noticeable trend of a return to Islamic teaching in the last few years. According to their arguments, any re-opened religious *Madrassa* would certainly find sufficient students.

***Maintenance, restoration, conservation or new construction?***

One of the most interesting questions that Old City enthusiasts put is: "What will the Old City look like in a hundred years?" Others query about who is going to win the battle. Are the conservationists going to have the upper hand, and leave the City's buildings unmaintained or restored until they weather out? Is it going in favour of those who want to "modernise" the City? Or is it going to remain basically unchanged, with a mixture of restored buildings and shanty roofs amidst the ancient, partially maintained structures dominating the City's skyline?

***Final comment***

How is the City going to adapt to the future? How should it be adjusted to meet new demands of modern life? It is the wish of every conscientious Jerusalemite, and any one else who cares for this precious landmark of ancient civilisation and rich heritage, to witness an end of all wars over the Holy City. Many dream of a prosperous future and a free society where goodwill prevails. Others would be content with a clean environment, with well-kept public and private property, regardless of other considerations.

Many academic circles on the other hand are only concerned with the need to preserve the ancient architecture of the City at all costs and with any available means. In reality, none of those wishes are likely to be fulfilled in the foreseeable future, as even the most extreme optimists confess. However, pessimism should not lead to despair and everyone must be encouraged to work tirelessly for the realisation of their dreams. Each individual must realise that it is the combined little contributions that will make the difference and make a reality of more dreams. Jerusalemites shall have more pride in their City, in its past, its present and with hope for its future.

## Appendix: I

### Moslem archaeological structures in the old city

#### A. Mosques

##### *The Moslem Quarter*

1. Moses Dome: Al-Haram, opposite Bab al-Silsileh
2. Bab Hutta: Al-Haram, at Bab Hutta
3. Suleiman's Chain: Al-Haram, east side
4. Moroccan: Al-Haram, Bab al-Magharba
5. Ghawanma: Al-Haram, Bab al-Ghawanma
6. Dar al-Imam: Al-Haram, Bab al-Mujahideen
7. Khan el-Zeit: the Souq
8. Suweiquat Alloun: the Souq
9. Sheik Loulou: Damascus Gate
10. Al-Saghir: Damascus Gate
11. Al-Buraq al-Sharif: The Buraq (Wailing Wall)
12. Khan al-Sultan: Bab al-Silsileh
13. Al-Kirami: Tariq al-Kirami
14. Zawiya al-akshabandiyya: Bab Hutta

##### *The Christian Quarter*

15. Al-Kala: Jaffa Gate
16. Al-Khankah: Christian Quarter road
17. Kumbar: New Gate
18. Al-Omari: Church of the Holy Sepulchre
19. Al-Yacoubi: near the Citadel
20. Bani Hassannear: the Citadel
21. Christian Quarter: Khan el-Zeit
22. Al-Bazaar: Souq al-Bazaar

##### *The Jewish Quarter*

23. Jewish Quarter Greater: east side of Quarter
24. Jewish Quarter Lesser: north side of Quarter

##### *The Armenian Quarter*

25. Harat al-Arman: near Armenian Monastery
26. Nabi Daoud road: Nabi Daoud road
27. Harat al-Jawalidiyya

### **Zawiyas**

1. Al-Khanthaniyya	south of al Aqsa	1191	Abandoned
2. Al-Jerahiyya	outside walls	1201	"
3. Al-Hunoud/Indians	Herod's gate	1200s	Dwelling
4. Al-Sheik Hayder	Jewish Quarter	1275	"
5. Al-Kabkiyya	outside walls	1289	"
6. Al-Mihmaziyya	Bab Hutta	1345	"
7. Al-Adhamiyya	outside walls	1361	"
8. Al-Bustamiyya	Harat al-Sa'diyya	1368	Dwelling
9. Al-Loulouyiyya	Damascus gate	1380	Mosque
10. Al-Kiramiyya	Al-Kirami	1386	Mosque
11. Al-Wafaiyya	Bab al-Majlis	1400s	Dwelling
12. Al-Zahiriyya	Dar al-Beirak	1400s	Mosque
13. Sh.Yacoub Ajami	Armenian Quarter	1630	Dwelling
14. Al-Afghaniyya	Via Dolorosa	1630	Dwelling
15. Abou Madyan	Bab al-Silsileh	1852	Dwelling

### **Ribats**

1. Al Eddin Buseiri	Bab al-Majlis	1268	Dwelling
2. Al-Mansuri	Bab al-Majlis	1282	Dwelling
3. Al-Zamani	Al-Matthara	1476	Dwelling
4. Byrom Jaweesh	Aquabat al-Takiyya	1540	School
5. Al-Kurd	Bab al-Hadid	----	Dwelling

### **Turbas**

1. Al-Sheik Dirbas	Via Dolorosa	1200	----
2. Barka Khan	Bab al-Silsileh	1246	Library
3. Al-Awhadiyya	Bab Hutta	1298	Dwelling
4. Al-Jalikiyya	Bab al-Silsileh	1307	Dwelling
5. Al-Sa'adiyya	Bab al-Silsileh	1311	Dwelling
6. Al-Kilaniyya	Bab al-Silsileh	1352	Dwelling
7. Turkan Khatoun	Bab al-Silsileh	1352	Dwelling
8. Al-Taziyya	Bab al-Silsileh	1362	Abandoned
9. Al-Baladiyya	Bab al-Silsileh	1380	Dwelling
10. Al-Tashtumuriyya	Bab al-Silsileh	1382	Dwelling
11. Al-Sit Tunshuk	Aquabat al-Tikiyya	1300s	Tomb

**Madrassas**

<b>Name</b>	<b>Location</b>	<b>Date</b>	<b>Use</b>
1. Al-Salahiyya	Bab Hutta	1192	Church property
2. Al-Mua'thamiyya	Tariq al-Mujahideen	1217	Dwelling
3. Al-Salamiyya	Bab al-Item	1300	Dwelling
4. Al-Jawiliyya	Haram north side	1315-20	School
5. Al-Karimiyya	Bab Hutta	1319	Dwelling
6. Al-Tankaziyya	Bab al-Silsileh	1329	Police H.Q.
7. Al-Aminiyya	Bab al-Item	1330	Dwelling
8. Al-Malakiyya	Haram north side	1340	Dwelling
9. Al-Farisiyya	Haram north side	1354	Dwelling
10. Al-Tashtumuriyya	Ala'Eddin Al-Buseiri	1358	Dwelling
11. Al-Arghoundiyya	Bab al-Hadid	1357	Dwelling
12. Al-Muhaddathiyya	Haram northwest side	1360	Dwelling
13. Al-Manjakiyya	Haram west side	1361	Waqf offices
14. Al-Taziyya	Bab al-Silsileh	1362	Abandoned
15. Al-Asa'rdiyya	Haram north side	1368	Dwelling
16. Al-Hanbaliyya	Bab al-Hadid	1380	Dwelling
17. Al-Loulouiyya	Al-Kirami	1380	Dwelling
18. Al-Baladiyya	Bab al-Silsileh	1380	Dwelling
19. Al-Khatouniyya	Bab al-Hadid	1380	Dwelling
20. Al-Tashtumuriyya	Bab al-Silsileh	1383	Dwelling
21. Al-Subaybiyya	Haram north side	1406	Abandoned school
22. Al-Kamiliyya	Bab Hutta	1413	Dwelling
23. Al-Basitiyya	Bab al-Item	1431	School
24. Al-Ghadiriyya	Haram north side	1432	Abandoned
25. Al-Hasaniyya	Bab al-Majlis	1434	Dwelling
26. Al-Uthmaniyya	Al-Matthara	1437	Dwelling
27. Al-Jawhariyya	Bab al-Hadid	1440	Dwelling/offices
28. Al-Mazhariyya	Bab al-Hadid	1481	Dwelling
29. Al-Ashrafiyya	Haram west side	1482	Library/school

**Khans**

1. Tankaz	Souq al-Kattanin	1336	Dwelling/abandoned
2. Al-Sultan	Bab al-Silsileh	1386	shops

Typical "furnished" dwelling inside the Old City



## Appendix II

**Khankas**

1. Al-Salahiyya	Christian Quarter	1189	Dwelling
2. Al-Dawadariyya	Bab al-Item	1295	School
3. Al-Fakhriyya	Haram south side	1330	Part museum

**Hammams**

1. Al-Shifa'	Souq al-Kattanin	1336	Disused
2. Al-Ein	Al-Wad	1336	Disused
3. Al-Sultan	Al-Wad	1500's	Disused

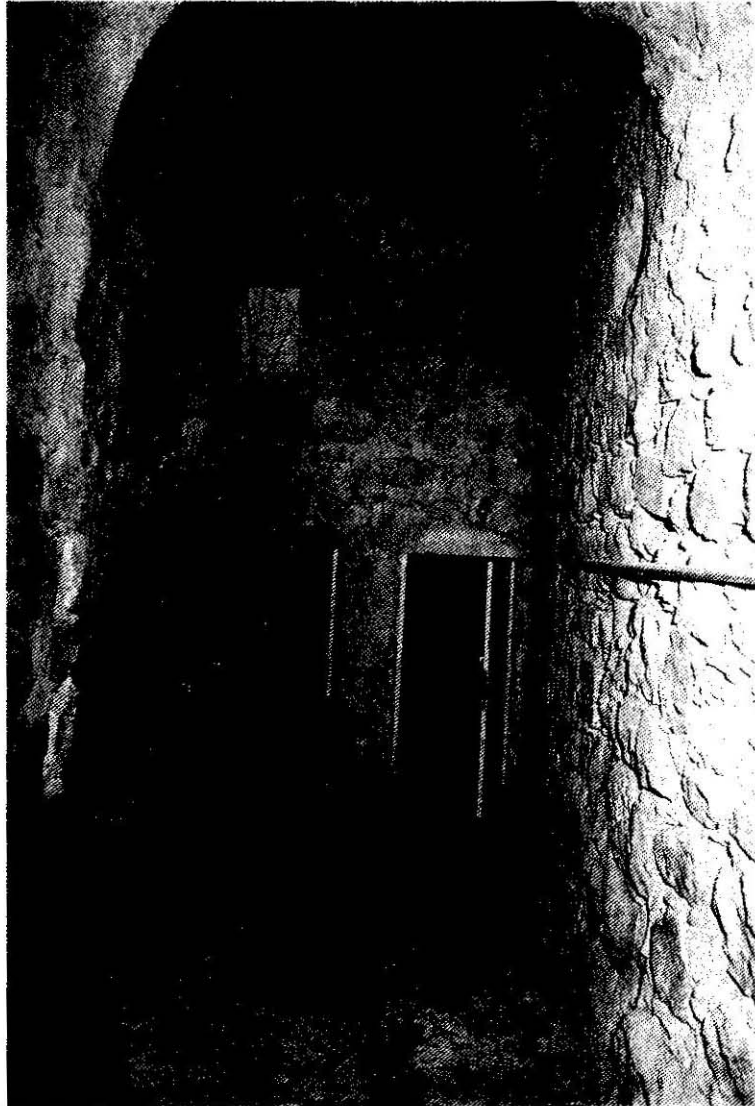
**Sabils**

1. Sha'alan	Haram	1216	
2. Al-Buseiri	Haram	1435	
3. Kaytbay	Haram	1482	
4. Bab al-Mahkama	Haram	1527	
5. Tariq al-Wad	Al-Wad	1536	
6. Bab al-Silsileh	Bab al-Silsileh	1537	
7. Bab al-Item	Bab al-Item	1537	
8. Bab al-Nazer	Tariq Ala' Eddin	1537	
9. Bab Sitti Miriam	St. Stephen's gate	1537	
10. Al-Sheik Badir	Haram	1740	

**Other**

1. Al-Matthara	Al-Matthara gate	1193	in use
2. Kubbat al-Miaraj	Haram	1200	----
3. Women's Mosque	Al-Aqsa	1194	Islamic college
4. Kubbat Suleiman	Haram	1200	----
5. Kubba al Nuhawiya	Dome of Rock platform	1207	Mufti H.Q.
6. Kubbat Mouse	Haram	1249	----
7. Dar al-Quran	Bab al-Silsileh	1360	Waqf offices
8. Kubbat al-Arwah	Haram	1500s	----
9. Takiyyat Khasqisultan	Aquabat al Takiyya	1552	School
10. Kubbat Yousef	Dome of Rock Plat.	1681	----





Entrance to residential complex in Moslem Quarter of the Old City

Typical alley in Moslem Quarter of the Old City





Collapse of a ninety year old slab due to deterioration of building material  
and severe cracking



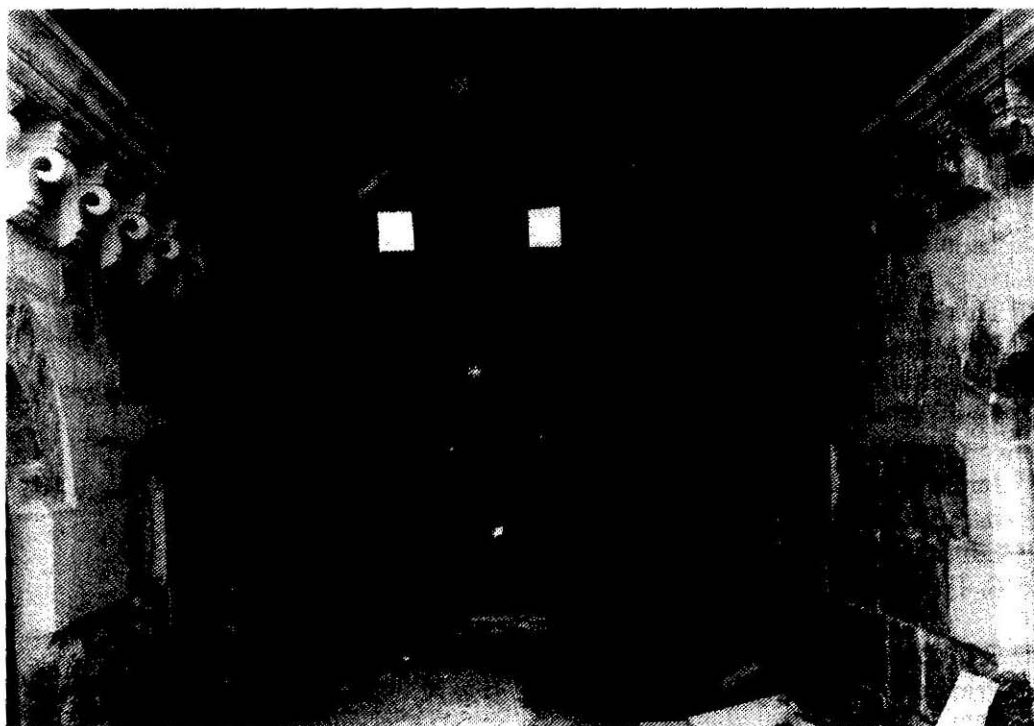
**Sewage network excavations in the Old City caused severe structural damage  
at numerous locations**



**Khan al - Sultan (al - Wakala) entance in Bab al - Silsila Rd. (before restoration)**

"Unsafe" maintenance work on domed roof at Bab hutta Rd





**Khan al - Sultan (al - Wakala) entrance in Bab al - Silsila Rd. (after restoration)**

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