This thesis has evolved through three years of learning from Maurice Smith. His consistent encouragement/criticism and insight have lent clarification to my unformed notions of architecture. The cross-cultural nature of this thesis suggests the universal applicability of Maurice's architecture design principles, which will continue to intrigue and inspire my future work. It is with gratitude and affection that I regard Maurice's wit and commitment to teaching/learning.

I also thank:
Mary Meagher, Gabriel Berriz, Kim Sammis.
Nina Kim, Greta Jones.
Jane Gitlin, Karen Swett.

This thesis is dedicated to Laila Erfan and Roushdy Abousoda and, of course, to Aida.
Building In Cairo, Building Over Cairo.

by: Hassan Abouseda.

Submitted to the Department of Architecture on February 17, 1987 in partial fulfillment of the requirements for the degree of Master of Architecture.

Abstract

The section of the Medieval city of Cairo centred around Shari' Al Moe'iz which connects the Northern gate of Bab Al Futuh with the Southern gate Bab Zowayla, is now known as Al Gamaliya. From the time the city of Cairo was laid-out, in 969 A.D. to the arrival of European colonialism with the Napoleonic Campaign, Al Gamaliya has been the site for buildings that serve as superb examples of the formal beliefs, technical capabilities and social patterns of the respective eras that built them. For this project, I have elected to inhabit the now empty pockets that riddle this dense and seemingly homogeneous environment, in an effort to place an architecture of the late twentieth century among the historic structures of Shari' Al Moe'iz.

Fundamental to this effort is a definition of a contemporary formal vocabulary that would be in harmony with those historic vocabularies which exist. Many of the elements of the various styles, from Fatimid to Mamluke, such as arches and vaults were a direct result of technical limitations, others such as the distinctive mashrabiya screens were an accommodation of social patterns, while the gilt inscription band carried from one building to the other down Shari' Al Moe'iz served as religious icon. The power of such elements lies in their historic integrity as direct expressions of climatic, technological and social conditions of their time. The mere replication of existing or historic formal vocabularies or the reorganization of such vocabularies in a pastiche of iconic elements to house current uses, totally alien to them, does not adequately satisfy the conditions of our time. The issues involved are simultaneously simpler and more profound. Climate remains a powerful factor but the availability of materials and technology offers opportunities until recently unknown. The cultural or behavioural patterns which simultaneously inspired and resulted from these historic structures prompts a recognition of formal, particularly dimensional concerns, and the exigencies of modern life, as mundane as vehicular access and parking on streets designed only for pedestrians, present an additional set of requirements to which we must respond.

This thesis is an attempt to manifest an understanding of these conditions, as a result of observation, and, based on such understanding, to develop formal principles, which offer a transformation of the traditional as well as a reflection of the contemporary.

Thesis Supervisor: Maurice K. Smith

Title: Professor of Architecture
Table of Contents

Abstract. III
History of Al Gamaliya. 1
Theory. 9
Design. 11
Bibliography. 41
History of Al Gamaliya

In 969 A.D., the Fatimids came from Al Mahdiya in present day Tunisia, to conquer Egypt. Their general, Gawhar Al Siqily chose the plain bounded by the old capital of Al Fustat on the South, 'Ain Shams on the North, and the waterways Khalig Amir Al Mumineen on the west and Khalig Al Gabal Al Ahmar on the East, as a site for the new Egyptian capital: Al Qahira. Al Qahira was formed of a walled enclosure with a gate on the North named Bab Al Futuh and one on the South named Bab Zowayla, connected by a grand boulevard known then as Qasabat Al Qahira and now as Shari' Al Moe'iz Li-Din Illah. Halfway down the Qasaba and on its East side the Fatimids built a palace for the Khalifa Al Moe'iz, which was named Al Qasr Al Kabir Al Moe'izi or the Eastern palace and which faced Al Bostan Al Kafouri (The Eucaliptus Garden) across the Qasaba.

In 1060 A.D. a smaller palace was built on the Western side of Qasbat Al Qahira replacing Al Bostan Al Kafouri. Since it was built for the new Khalifa, Al-Aziz, it was named Al Qasr Al Saghir Al Azizi or the Western palace and the widening of the Qasabah which it defined with the Eastern palace was renamed Maydan Bain Al Qasrein (The Square Between The Two Palaces). (Khitat, vol. 1, p. 384 & 457.) Although no record remains of either of these two palaces, the formal vocabulary and organization principles of Fatimid architecture are perfectly exemplified in the facade of the mosque of Al Aqmar built in 1125 A.D. and still standing on its site which was once directly adjacent to the Eastern palace.

Towards the decline of the Fatimid dynasty, two events were to drastically alter the character of their capital, Al Qahira. The first is the burning of the old Capital, Al Fustat, in 1168 A.D. by the wazir Shawar who feared that the Christian crusaders, already occupying the nearby Birkat Al Habash, would use it as a base from which to launch an attack on Al-Qahira. The people of Al-Fustat fled Northward seeking shelter behind the walls of Al Qahira. The second event took place in 1170 A.D. shortly after the Ayyubids took over under the leadership of Salah El-Din Al Ayyubi (Saladin). After conquering Syria, Salah Al Din returned to Egypt and began the construction of his citadel on the Mokattam hills outside the walls of Al Qahira; thus shunning not only the old palaces of the Fatimids but their royal city itself. Although he did not live to see its completion, the citadel of Salah Al-Din became the residence of all the Ayyubid governors who succeeded him. This led to the absence of the government from the city, a change which in conjunction with the masses of Fustat who
Al Hussamiya quarter looking over the Northern wall of Al Qahira.1

Northern wall looking from Bab Al Nast to the mosque of Al-Hakim.1

Mosque of Al Aqmar (Detail).

Bab Zowayla from within the city walls.

Mosque of Al-Aqmar.2

Bab Zowayla and the mosque of Al Moayyed form outside the Southern wall.
moved in after the fire, transformed Al Qahirah from the princely city of the Fatimid ruling class to a booming metropolis. Construction took place filling up all available sites, Fatimid villas were converted into commercial structures and even the two great Eastern and Western palaces were subdivided into residences for minor Ayyubid officials. Northern portion of the Eastern palace was occupied by Qasr Beshtak. (Khitat, vol.1,p.70.) The Southern portion of the West palace was used by Al Malik Al Mofadal Qotb El-Din Ahmad and, consequently, known as Dar Al Qotbiya. (Khitat, vol.2,p.406.) while the Northern portion was occupied by the corn-sellers. In the area of the Maydan Bayn Al-Qasrein (The square) in front of the corn-sellers, a house and a slave market were built only to be demolished in 1225 A.D. by the sultan Al-Kamil Nasir Al-Din to make way for the construction of his school of theology: AL Madrasa Al Kamiliya. (Khitat, vol.2,p.375.) Since this building occupied the square itself, it represents the first step in the transformation of the square into the street that it is today. Al Madrasa Al Kamiliya divided the square into two unequal portions: the smaller of which was infilled in 1242 A.D. by the palace, bath and gardens of the Mamluke Amir Al Baisari. (Khitat, vol.2,p.69.) Also in 1242, a large section of the Eastern palace was demolished for the construction of the Madrasa of Al Salih Nigm El-Din Ayyub.

The Mamluke takeover started after the death of Al-Salih Ayyub in 1249 and was complete and the Mamlukes consolidated into a dynasty in 1260 A.D. at the hands of Al Zahir Baybars. In that same year, Al Zahir Baybars demolished the Hall of Tents and the Hall of Lotus, the two halls of the Fatimid Eastern palace adjacent to the Madrasa of Al Salih Ayyub, to make way for the construction of his Al Madrasa Al Zahiriya which was completed in 1262 A.D. (Khitat vol.2,p.378.). In 1285 another major step was taken in the transformation of the Maydan Bain Al Qarein into a street when the Sultan Qalaun demolished Dar Al Qotbiya to use its site together with the portion of the square directly infront of it for the construction of his maristan (hospital) which to him shortly added a madrasa and a mausoleum. In 1295 A.D. a bath adjacent to the mausoleum of Qalaun was demolished to make way for the construction of the Madrasa of Al Nasir Mohammad. (Khitat, vol. 2,p.382.) and in 1384 A.D., the transformation of the square into Shari' Al-Moe'iz became complete with the construction of the madrasa of the sultan Barquq int the gap remaining between the Madrasa of Al-Nasir Mohammad and the earlier, Ayyubid Al Madrasa Al-Kamiliya.

Comparing present day Al Gamaliya with Al Maqrizi’s description of it in his book Al-Khitat Al Maqrizia, one realizes that, although some streets and bazars may have different names and some buildings may no longer exist, the character of this section of medieval Cairo has not changed much since the 15th century. According to his record, starting just South of where the Fatimid Eastern palace once stood, one found the Khan Masour to one’s right, flanked by a room where black slaves were sold and Dikkat Al Mamaleek(meaning Turk’s Bench) where Turkish slaves were sold. Slave trade, he tells us, was outlawed by the Sultan Barquq. Across the street form this, was the Kaisariya were arrows were manufactured and sold, and this whole section of the street, Shari’ Al-Moe'iz, was, and still is, known as Suq Al Nahaseen(Book Merchant’s Bazar.) Further North, one arrived at a narrow street, on the right, which led past a public bath to, what still is, Al Sagha(Jewelers’ Bazar.). On the left, there was Suq Al Kuttubiyn(Book Merchant’s Bazar) and, adjacent to it, Suq Al Mashateen where combs were sold. Next, and by now across the Shari’ Al Moe’iz from the complex of Sultan Qalaun, was Suq Al Suyufyin where swords were sold. Actually against the facade of the Qalaun complex, stalls were lined-up for the selling of rings of all kinds, while infront of the Madrasa of Al Nasir Mohammad, one found Suq Al Silah where weapons were sold. The portion of the street at this point was still known as Maydan Bayn AL Qarein, however the two palaces referenced in this name were those of
Ruins of Al Madrasa Al Kamiliya, 3

Mausoleum of Al-Salih Nigm Al-Din Ayyub.

Madrasa of Al-Salih Nigm Al-Din Ayyub.

Remains of the madrasa of Al-Zahir Baybars.

Madrasa of Sultan Qalawun, 6

Madrasa of Al-Nasir Mohammad, 7

Madrasa of Sultan Qalaun, 6

Sahri Al Moe'ez. Madrasa of Sultan Barquq, 8
Beshtak Al-Nasiri and the Amir Al-Baisari.

Beyond that point the street forked, and if one followed the left branch of the fork one arrived at Suq Al Daggageen Wa Al Wazzazeen where merchants sold birds either for food or pets. Finally one came to the mosque of Al Aqmar across the street from which was Suq Al Sahma’in (Wax Maker’s Bazar) which, according to Al-Maqrizi, remained open well into the night when it got frequented by prostitutes.

In the beginning of the 15th century, the Amir Gamal Al-Din Yussef Al Ustadar who owned a house in the area of darb Qirmiz reached by the passage through the Madrasa of Mitqal, bought up a large portion of that whole area and renamed it: Al Gamaliya. Since that time, the only major change in the character of Al Gamaliya came in 1874 A.D. with the demolition of the madrasa of Al Zahir Baybars after its minaret had collapsed. This led to the creation of Shari’ Bayt Al Qadi connecting Shari’ Al Moe’iz to Maydan Bayt Al Qadi.

For this project, I have chosen to confine my intervention to the section of Al Gamaliya bound by Shari’ Al Moe’iz on the West, Shari’ Al Tambakshiya on the North, Shari’ Habs Al Rahba and Maydan Bayt Al Qadi on the East and Shari’ Bayt Al Qadi on the South.

Although present day Al-Gamaliya is graced with highest concentration of historic monuments, its deteriorating condition prompts some to view it as an overpopulated slum. This attitude is especially true of the merchants and craftsmen who have lived in the area probably even before Al-Maqrizi saw it and who regard the “old” buildings as a necessary evil which they tolerate primarily for the economic gain it provides through tourist trade. This thesis intends to upgrade the area but also to facilitate a shifting of the population to include those subgroups, mainly artists and students who have an interest in the preservation of this historic environment. Although still small, these groups have already demonstrated their interest and commitment to the documentation and preservation of Al-Gamaliya. The students brave traffic congestion, the chaos of crowds, noise, and sometimes overflowing sewers to photograph, measure or merely take one more look at a favourite crumbling building, while the artists, in the rare occasions where the government has allowed them the use of such buildings as Al-Musafirkhana, Qasr Al Gawhara or Al-Ghari complex, have undertaken the restoration of these monuments with practically no budgets but their own skills. However it is important to note that such a regard for historic precedence does not necessarily lead to inappropriate replication. In fact, it provides more fundamental notions to inform contemporary architecture inserted in this environment.
Distant view of Al Gamaliya, looking North. In the background, the dome and minaret of the Qahira complex.

General view of Al-Qahira.

General view of Al-Qahira.
Darb Qirmiz. Mausoleum of Sheikh Sinnan.

Darb Qirmiz. Dead Eastern end.

Darb Qirmiz. Madrasa of Al Amir Mitqal.

Sharr' Al Moe'iz looking South at the madrasa of Barquq with the Qalaun complex in the background.
The "International Style" rejected the effects of regional differences such as climate, local formal vocabularies, scale and behavioral patterns, on architecture. Therefore, when it was adopted by developing cultures, for its associations with progress, the results were especially disappointing, particularly in their violation of historic environments. In reaction to this failure, the trend among contemporary designers faced with the challenge of in-filling a precious gap on a narrow street lined with monuments, has become one of total submission to the context; sometimes referred to as "contextualism".

The definition of "contextualism" as a design attitude that is supposedly sensitive to the environment is not very clear. However, it lies somewhere on a scale between two extremes.

One of these extremes randomly chooses forms or characteristics of a historic vocabulary, manufactures them in contemporary materials using contemporary technology and then applies them to buildings that are otherwise direct products of the International style. The specific elements reproduced are not chosen for their meaning or their continued suitability to behavioural patterns. They are chosen for the strength of their association, usually in the mind of the designer, with a certain "style". Thus separated from the forces that once shaped them, these forms are stripped of their meaning and reduced to surface motifs.

In addition to demeaning the historic vocabulary, this attitude disallows the capabilities of contemporary materials and methods of construction to develop alternative formal principles. Steel structure, once celebrated for heralding the Modern Movement, is carefully hidden behind masonry veneer. Reinforced concrete is awkwardly forced into the historic forms of domes and arches revealing only the difficulty of building formwork in the shape of a dome, instead of utilizing the spanning capabilities of the material.

Hassan Fathy is at the forefront of the other extreme, which goes further than the first to place itself actually in history. He not only faithfully replicates the historic formal vocabulary and organizing principles but also builds these facsimiles in the same materials and using the same building methods as their historic originals. I do not wish to detract from the value or beauty of his architecture. Certainly, in the village of "New Gourna" his return to local mud-brick, dried in the sun and assembled into domes and vaults, simultaneously arose from, and reinforced the traditional behavioral patterns still practiced by the villagers. Moreover it proved to be technologically efficient in
substantially reducing the cost of the project.

However, current applications of his attitudes to expensive country homes for members of the already Westernized upper class is questionable. The historic formal vocabulary used in those "villas" bears little relation to the life that goes on within them, a life primarily informed by Western commodities and symbols. The nostalgic beauty of great halls crowned with stained-glass pierced drums supporting perfectly cut stone domes is so easily ridiculed by the presence of the over-sized colour television set. Such use of a historic formal vocabulary reduces it to a compulsively crafted yet anachronistic setting, disconnected from modern life, ultimately demeaning the traditions it seeks to emulate.

This unthinking replication of history implies only a return to the past. It further confuses the struggle, prevalent in the developing world, to define a contemporary Eastern architecture which acknowledges Western symbols and the possibilities of modern technology.

The thesis tested by this design is premised on the understanding that although the context is historic it is not homogeneous. The medieval city of Cairo, as it now stands is the product of 1000 years of commitment by subsequent generations of builders to their respective formal principles. Not only do the forms of the building elements change as one generation becomes more technologically capable than its predecessor, but also new building types, such as the madrasa and the sabil-kuttab, are introduced as social patterns evolve. Therefore, the rich complexity of present-day Medieval Cairo is not the result of careful replication but rather a commitment to continued adjustments in response to changing behavioral patterns and technologies. This thesis is in keeping with that pattern. It treats the context as a set of climatic, dimensional and social conditions to which the form should directly respond in a manner influenced by the available building technology and not by either historic or "Western" images.
Design

Over the past five years I have photographed, measured and recorded the environment of Al-Ghamaliya. As a result of these observations I was able to isolate some basic relationships between form and behaviour that are still effective. Almost all of the buildings there utilize a building system made of load-bearing masonry walls either of stone or of mud brick. While the lack of alternative materials may have prompted this building system initially, it is also a response to conditions, such as climate, which are still prevalent. The low thermal conductivity of these walls protect against heat; controlled openings which are heavily shuttered and screened shield inhabitants from the bright light.

Equally powerful, however, are the cultural patterns to which these walls respond. Social trends still lean towards organizations of privacies which are directly provided by the containments required for the structural stability of such a system. This observation led to the assumption that a concrete or steel frame building system where containment is not integral to structure but only possible through partitioning is not appropriate.

However, alleviating the density of the ground plane to provide the space needed for vehicular access and parking questioned the choice of a load-bearing wall system. Such a system would only densify the street level even more. Moreover, it would put at risk the minor structures and fragments of historic buildings which give the environment much of its character, and which, in the recent past, have been demolished to make way for new construction.

What was therefore required was a wall system capable of spanning over such historic sites as well as bridging over vehicular access and parking, and coming to the ground only in a limited number of supports. In a series of design studios, over the past few semesters, my advisor Maurice Smith, with the help of Waclaw Zalewski, has been developing such a system which proved to be appropriate for satisfying these requirements and which he refers to as the "Folded Wall".

The principles behind the "Folded Wall" can be visualized by imagining an I-beam, at least one storey high, with a folded flange. This effective corrugation substantially increases the spanning capabilities of the I-beam. If a larger span is needed, the height of the I-beam may be increased to more than one storey, or several I-beams may be used. The front and back surfaces of the folded wall behave like wall beams: their height cannot be less than a quarter of the span.

The folded surface together with the two floors containing it must be continuous enough to provide material for loads to travel through. This means that in any
References/Walls
The surface of the fold openings can only occur on one side of a line of forces represented by one of the two diagonals of that surface. In the case of the surfaces of the folded wall which run perpendicular to its main direction, it is necessary to keep this diagonal at an angle less than 45 degrees to the vertical since this is the maximum angle that still allows easy load transfer back and forth between the two surfaces running along the edge of the folded wall and finally down to the supports.

The "Folded Wall" is a suitable system for a project in Al-Gamaliya, because of its spanning capabilities and the containment provided by the corrugations or "folds". As in the load bearing wall system, structure and containment coincide.

In this particular project, the average height of the folded wall is four floors. It spans over streets, historic buildings and another system of vehicular access, parking and commercial use, which will be discussed later.

The supports for the folded walls are made up of pairs of steel channels 2 meters wide and braced 4 meters from each other. Each pair of channels supports a steel plate which is also welded to the reinforcement bars of the folded surface that sits on it, before the concrete is poured.

A secondary system of vertical steel trusses and precast concrete channels performs two functions. Firstly, the vertical trusses provide lateral support to the system since they are simultaneously connected to its supports by steel beams and to the folded wall itself through steel plates cast into it. Secondly, the precast concrete channels share the support of a secondary floor system with the folded wall. Since this secondary floor system is made of one-meter wide concrete planks it does not need to be as continuous as the floors of the folded wall with which it alternates. It also forms two levels of walkways which provide horizontal access along the folded wall and which are reached by means of stairs and freight elevators from courtyards between the historic buildings on the ground.

Where the folded wall does not form the edge of the building, closure is defined by a system made of masonry block viens spaced one meter on centre. These viens are interrupted at different heights, depending on the requirements of privacy, to support a sill made of a concrete plank 1.5 meters wide. Above these deep sills, the window space between the viens is filled with fixed wooden screens and shutters that are hinged on top and open outwards. Glazing in some cases occurs directly behind the screens or shutters; thus adding the dimension of the sill to the interior space, similar to a bay window. In other cases the glazing coincides with the innermost edge of the sill, thus assigning its dimension for exterior use and cooling down the air before it hits the glass.

At street level I used empty sites and ones where I assumed the demolition of recent "International Style" structures, for vehicular access and commercial space. A system of poured concrete veins four floors high and spaced six meters apart, defined two new vehicular routes, one connecting Shari Al Moe'iz to Maydan Bayt Al Qadi and another running parallel to Shari Al Tambakshiya. At street level these veins are inhabited by commercial space whose edge is defined by granite non-structural garden walls. Ramps take cars from the street up to parking floors which are above the commercial space and which cantilever over the streets to provide shade. Because these parking floors are also ramped, the height of the commercial space underneath them varies from one to three floors. Cars drive through the veins and park between them. In some cases some parking levels on one site are connected by bridges to corresponding ones on neighbouring sites.

The top floor of this system is not ramped and although cars are allowed in some cases to drive up to it, their routes are controlled and parking on it is limited to two or three spaces for deliveries. This level is in effect a transformation of the public courtyards in the traditional Wakalas
Folded Wall

Support for Folded Wall
such as Wakalat Al Bazaar. These courtyards have been traditionally used by the merchants and craftsmen in the commercial space either for storage or as extra work space. The residential floors above them benefit only from the light and ventilation that these courtyards provide. The structures I am proposing might be explained as contemporary Wakalas where the folded wall hovers at least one floor above the courtyards and therefore although it partially defines them spatially, it does not coincide with them directly. The courtyards extend beyond the boundaries of the folded wall all the way out to the streets. However, their privacy is maintained by their vertical displacement above street level.
Parking/Commercial
DISCLAIMER

MISSING PAGE(S)

21 - 24
DISCLAIMER

MISSING PAGE(S)
27 - 30
Street view, 1830.

Wakalat Bazar'a.

House of Al Suhaymi.

Wakalat Bazar'a.

House of Al Suhaymi.

House of Al Shabshiri.

Palace of Beshtak Al-Nasiri.

References/Housing Organization
DISCLAIMER

MISSING PAGE(S)

34
References/Closure
DISCLAIMER

MISSING PAGE(S)

39, 40
Bibliography:


Lane-Poole, Stanley, A History of Egypt in the Middle Ages. Methuen & Co., 36 Essex Street, London, 1901.


