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CONTENTS

EDITORS' NOTE

This volume of JRAP focuses on architectural practice. Wisdom, knowledge, acumen, competence, ideas and more goes into the making and shaping of the built environment around us. The architects and other allied professionals have a sizable role to play in the realm of this vast enterprise. Contents of this journal address several dimensions of practice and architectural applications through different exercises, contexts and people. Twentieth century saw the launch and completion of ambitious capital city building exercises. The city of Islamabad in Pakistan was a foremost mention. The paper by Professor Abdul Rehman documents and analyses the significant aspects of the professional ideas and input contributed by international architects of repute and stature. The author has critically appraised the various schemes, designs and proposals by this assorted community of professionals who had a significant role to play in shaping the emerging city. The paper by Architect Taimoor Khan Mumtaz addresses a rare facet of architectural application that is the contemporary manifestation of traditional architecture. With a focus on Islamic architecture and its examples, the paper delves deep into the geometrical tenets and parameters which embellish the external space and add comfort to the utilitarian aspects of buildings from yester years. The author has underlined the text by citing practical examples where this branch of knowledge was applied in the actual respect.

Professional practice around heritage buildings and sites often trigger debates and controversies. The tale of additions to the Lahore High Court building has made the core case study of the paper by Ghafer Shahzad. After a step by step analysis and review of the process, the paper offers insightful lessons for all concerned to be learned. Professor Arif Qayyum Butt has attempted to address the issues pertinent to housing provisions for the low income groups. The narrative excerpts from various initiatives in the past and contemporary times to draw conclusions, some of which are worthy for further exploration. Emerging times have made the interface of technology and design approaches a useful union. The papers by Shabnam Nigar/Lubaina Soni and Nazia Iftakhar highlight the multitude of dimensions which have become common place in architectural practice in the prevailing times. Isar Kamran touches upon the aesthetic rendering of space in correlation with attributes of application. Two book reviews are also part of this issue.

Editorial Board

CONTRIBUTION OF INTERNATIONAL ARCHITECTS IN THE DESIGN OF CAPITAL COMPLEX AT ISLAMABAD

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ABSTRACT

Islamabad is one of the few cities in the world where large number of international architects were hired for the design of the most prestigious public buildings located in close proximity to each other. A clear objective was placed before architects to design buildings keeping in view the grand tradition of architecture. This paper will discuss the contribution of international architects towards the design of buildings in the capitol complex in Islamabad and see to what extent the architects have been successful in achieving the desired objective of an appropriate architecture relevant both with historical and environmental context and imbued with modern technology.

Keywords: *Islamabad – International Architects – Appropriate Architecture*

INTRODUCTION

Islamabad, the new capital of Pakistan, was planned and constructed on a virgin site in the later half of the twentieth century. Greek planner Constantinos A Doxiadis was commissioned to plan the capital city in 1959 and soon after, the construction work commenced. The consultant was given clear objectives in the preparation of master plan and program for the development of the city. At the time when master plan of Islamabad was being prepared, the next important question was the selection of appropriate architects and the preparation of design brief for major public buildings. In the 60s there were a limited number of qualified architects in Pakistan, some of them occupied top positions in the administrative set up of the government, dealing mainly with administrative and development matters. They were not in a position to undertake design task simultaneously along with their administrative work. Therefore, it was thought to hire the services of International architects.

THE APPOINTMENT OF FOREIGN CONSULTANTS AND CLIENT'S VISION FOR FUTURE ARCHITECTURE

In the beginning it was discussed at length, the advisability or otherwise, of appointing either a single architect of great eminence such as Le Corbusier in the case of Chandigarh or Lucio Costa, the planner and Oscar Niemeyer, the architect for Brasilia, or to adopt the second alternative of having a group of like-minded architects to form a team. It was obvious that for political reasons, Corbusier's name was ruled out for the preparation of the master plan or planning the major group of buildings, in view of his association with Chandigarh. Doxiadis with his extreme enthusiasm for the project

Figure 1: Sir Robert Matthew with officials of Capital Development Authority. *(Photo Credit: Capital Development Authority).*

was already preparing not only the master plan for which, he had been duly commissioned, but also the perspectives of the major buildings including, what he called the "Presidential Palace". The National Assembly Building and the Secretariat Buildings, for which, he had assumed an implied assignment. In May 1961, a meeting took place in the lecture theater of General Headquarter of Armed Forces in the presence of President Ayub Khan, the ministers and the head of the armed forces and other high-ranking officials. Dr Doxiadis presented his report on style of architecture to be adopted by emphasizing the need for the establishment of Pakistan architecture. The perspectives of major buildings were also presented in the meeting. However, this was not to be, as the then Finance Minister, Mr. Shoaib, at a cabinet meeting firmly opposed the idea of entrusting the whole work of the design of major buildings to the main town planner of the city and said that he should confine himself to the work of preparation of the master plan only. It was at this stage, that various big names in the architectural world were reviewed with the intention of inviting one of them to collaborate with Doxiadis in the designing and development of the capital buildings (Khawaja, Zaheer-ud-din, 1998a). In all a list of twenty-six internationally acclaimed architects were finalized to undertake the buildings of national importance. Names of such giants as Walter Gropius, Minoru Yamasaki and Kenzo Tange, were mentioned. Consequently Gropius was invited to become the principal architect to mastermind the overall architectural concept of the capital. He declined the offer and replied that he was getting on in age and owing to his other pre-occupations, was unable to visit Pakistan to undertake the work, but that he would be glad to entrust the work to his firm, The Architects Collaborative (TAC), which consisted of a group of his prominent ex-students. This proposal was however unacceptable as Capital Development Authority (C.D.A) wanted the master himself, or to look elsewhere for the principal architect (Khawaja, Zaheer-ud-Din, 1998b). Later on similar offer was given to Professor Kenzo Tange in Japan but unfortunately a similar answer was received from him (Khawaja, Zaheer-ud-Din, 1998c). Having failed in acquiring the services of a major master architect for the capital, the second alternative was resorted to by inviting a group of like-minded architects to discuss their possible participation in the project. Consequently, letters were issued to various architects all over the world, including Sir Robert Matthew, Gio Ponti, Marcel Breuer, Arne Jacobsen, Sven Markelius and others. Sir Robert Matthew was one of the first to respond. Sir Robert Matthew – President of both, the Royal Institute of British Architects and the International Union of Architects in response of the request of the Capital Development Authority, had stopped in Rawalpindi on his way back from Delhi to London. He was asked to act as an architectural coordinator (Fig.1). In the beginning he was not very keen to be involved in the scheme and proposed Sir William Holford as coordinator. Finally Sir Robert Matthew accepted the responsibility to coordinate architects dealing with individual buildings within the administrative sector as well as buildings of cultural center. In addition to his responsibility as coordinator, he was entrusted the design of Armed Forces Museum, National Museum and National Archives building. The later project got completed in association with Pakistani architect Khawaja Zaheer-ud Din. Similarly, Gio Ponti was kind enough to visit Islamabad and inspite of his age, walked over the areas where the first few buildings were to be built.

Marcel Breuer, one of the pioneers of the modern movement in architecture, also visited Islamabad with his partner Hamilton, for preliminary discussions to examine the possibility of his participation in the national project (Khawaja, Zaheer-ud-Din, 1998d). (Fig.2) Unfortunately the bureaucrats and financial experts of CDA could not agree to his terms of fees and proposed overheads; nor was he willing to make any concessions owing to the prestigious nature of the project and so, three days of protracted negotiations ended with his abrupt departure for New York.

After selection of consultant architects the next question was what should be appropriate architecture of Islamabad? This question was in everyone's mind and needed appropriate answer. Architecture of Islamic world differs in

form from place to place. Each place has its own history and design tradition, even environmental, geographical and social conditions differ substantially. The long and interrupted history of Pakistan made it distinct from other countries in terms of history, culture and architecture. Therefore, it becomes important to handle this question in its own context considering development of technology and existence of rich craft tradition.

ARNE JACOBSEN AND DESIGN OF PARLIAMENT BUILDING

Arne Jacobsen, prominent Danish architect, was the first architect to be commissioned to design the Parliament building. Philosophically he was a modernist and influenced by the Swedish architect Erik Gunner Asplund, by Le Corbusier, and by Mies Van der Rohe. He was a graduate of the Academy of Arts in Copenhagen where he later served from 1956 to 1971 as a professor of architecture. Jacobsen laid the foundations of his architectural position in the 1930s, but soon moved beyond the obvious features of the International Style towards an architecture of formal restraint and material elegance, inspired by both the purity of the Danish vernacular and the disciplines of modern industrial design. He was one of the earliest architects to bring modernism to Denmark. Jacobsen's Royal S.A.S hotel was one of his best works where he designed furniture, pottery and lighting fixtures. His profound involvement even in minor details made him prominent in the field of architecture. Even when constrained by standardization, Jacobsen was able to maintain a close attention in working details in steel, glass, stone, wood and brick. The suspended spiral staircase of several of his buildings, with their expression of joints, connections, suspended rods and slender treads, were virtually works of art in their own right. In 1962-63 he did the drawings for Parliament building. The design concept was based upon simple massing consisting of low rectangular three storied structures surrounding a courtyard and a circular assembly hall (Fig. 3). A large walking space was reserved for pedestrians in all administrative sectors, which in turn led to a large open-sky space. Contrary to this, the space of same dimension on the

Figure 2: Marcel Breuer, his assistant Hamilton discussing matters of mutual interest with Khwaja Zaheer-ud-Din. *(Photo credit: Khwaja Zaheer ud Din).*

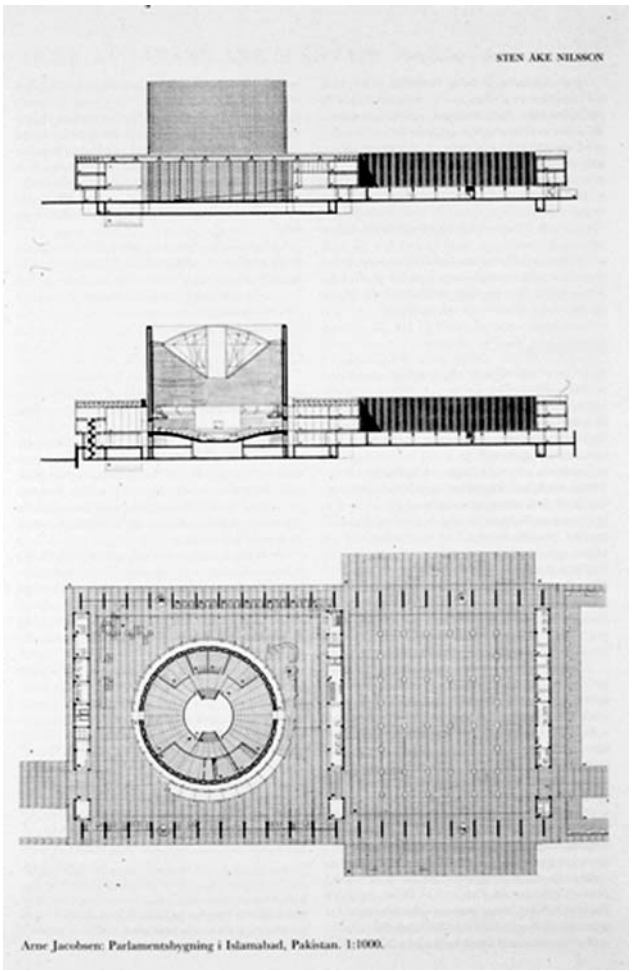

Figure 3: Plan and Section of Parliament building designed by Arne Jacobsen. (Drawing Credit: Sten Nillson)

west includes, Parliament house, hostels and halls, which were linked with the lounge, and restaurants for members of parliament. The main chamber contained 350 seats for members plus a public gallery accommodating 300 – 400 spectators.

The entrances were differentiated for variety of users: the main entry for members was placed at the east of this space, the entry for ceremonies was planned on the west, and public entry was linked with the walking place. The offices for interpreters, the committee rooms, halls, ministers' offices, the library and a large common office were distributed between the first and second floor.The Parliament building was proposed to be cladded on exterior and interior by white marble. A hanging garden was planned between the parliament building and the hostel. The elevation on first and second floors included a series of slim concrete pillars. The entrances were precompiled between them. The brise-soleils were made by boards of anodized aluminum extending up to the height of two floors. These panels were hung in front. The structure will be in reinforced concrete. A hanging metal-roof, with light concrete slabs on the exterior, will provide shade to the roof slab. The hanging roof will be coated from inside with copper, which will hide the light sources. Session hall, hostel and offices were supposed to be air-conditioned (Encyclopedia, 1982a).

His project was, however, rejected for the reason of being semiotic. The Pakistani authorities had asked for a modern building 'carefully designed to reflect our past culture' and found Jacobsen style strange and extravagant. He was earlier suggested that some "Islamic features be incorporated in the form of some arches in the cylinder, a dome above the cylinder, or some addition to the courtyard". At the same time it was suggested that a "dominating mosque for the use of members" be built near the assembly. Jacobsen refused to change his design and therefore, his contract was terminated. But in spite of all these efforts and comments Khwaja Zaheer ud Din wrote: Looking back over the years of all architects I had the pleasure of meeting and working with, during the construction of new capital, I consider Jacobsen as one of the greatest and in the finest tradition of the profession, totally dedicated to his task as an architect and committed to give nothing but what he considered to be his best for the Client without in any way compromising his principles of planning and aesthetics……(Anonymous, 1964) (Fig.4)

Following the termination of the agreement, the services of Professor Louis Kahn were hired. In early sixties Prof. Louis I Kahn was commissioned to design the second capital at Dhaka the capital of East Pakistan, now Bangladesh. This was one of his best career projects. In July 1963, while refining his master plan for the east capital in Dhaka, Kahn was selected as the architect for the President's Estate in Islamabad, intended as a residential and administrative complex. Gradually he assumed responsibility for other components of the capital as well, including the assembly building. At what point Kahn was invited to design the assembly building, and how definite his commission was, remains uncertain. In Kahn's much-delayed contract of January 1965 there is no mention of any responsibility for the assembly.

Louis I Kahn, Professor of Architecture in University of Pennsylvania and a key figure in American Architecture at that time, was trained in the Beaux-Arts system at Philadelphia under Paul Cret and was therefore fully acquainted with the classical grammar with devices of axial

Figure 4: Arne Jacobsen visiting the site of Parliament building. *(Photo Credit: Khwaja Zaheer-ud-Din).*

organization, hierarchy and composition, and with an attitude to design which took it for granted that one should consult tradition for support. His designs often involved sophisticated reversals of figures and ground, mass and void. Louis Kahn is considered the master of monumentality, which was of course, not his only preoccupation, but it was certainly a major one, and he evolved a philosophy and system of form extraordinarily well suited to the expression of honorific themes and moods. He was capable of handling problems of large size without degenerating into either an 'additive' approach or an overdone grandiosity; he knew how to fuse together modern construction means with traditional methods (Khawaja Zaheer-ud-Din, 1998e). He was swept in history but rarely produced pastiche, and his architecture was infused with a deep feeling for the meaning of human situations, which enabled him to avoid the mere shape making of the formalists.

Kahn apparently began to study the problem of Presidential estate at Islamabad without an official invitation, believing its sympathetic design critical to his own efforts and to the entire venture of the new capital (Fig.5). Kahn's own notes at the time allude to this, for he wrote, "The master plan and the spirit of its architecture are one," explains that the "establishment of a building order" was essential to the city as a whole and that the buildings of higher institutions must be the inspirations for the continuance of .... buildings designed by many architects (Encyclopedia, 1982b).

There is no evidence of any design effort on Kahn's part before December 1963. The earliest drawings found in Kahn's collection, date back to December 13, 1963. The sketches made during ensuing months show little more than preliminary efforts, with juxtaposed geometric forms portraying an active engagement of interrelated parts.

Louis Kahn embarked upon the project soon after the termination of contract with Arne Jacobsen. He started work with the new set of requirements in which Presidency, Supreme Court and other supported buildings of national importance were included in the terms of

Figure 5: Prof. Louis Kahn explaining salient features of the project to CDA officials. (Photo Credit: C.D.A).

reference. The site selected for the project was located on the Constitution Avenue overlooking the Quaid-e Azam Avenue. The most prominent feature of the contoured site comprised of three hills, the highest one around 100 feet high from the road overlooked the blue area and the city. This strong geographical feature provided a strong basis for the spatial character as well as composition of different buildings of the future capitol complex around the hill.

The real work on the project seems to have been started sometimes around September 1964, while Kahn was being pressured to present some indications of his design. His sketches suggest a firmer sense of architectural composition. The presidential complex, shown as a linear complex along the left, is linked by an angled square containing administrative offices to a triangular element designated as a center of Islamic studies. These three elements enclose one corner of what came to be known as presidential square, at the top of the drawing, (Brownlee, David G. & Lang, De., 1997a). Kahn beginning to take over from Jacobsen, sketched his first diagrammatic indication of the assembly building for Islamabad, shown as a circular building much like the hollow - column study for Dhaka. By the time of his first presentation in October, 1964, this had taken the form of a truncated pyramid, at its center was a circular opening and within that, an oblique placed cube. By January 1965, Kahn was also designing a national monument on the square, apparently developed as part of the Presidential complex.

Describing his initial idea to Robert Matthew, the architectural coordinator for the Administrative Sector of Islamabad, he said, "It could be a new concept of minaret embodying a small chapel raised above the level of the square, and a special platform from where one could preach facing Mecca ---- The sequence is being suggested as a roofless Hall of Meeting ---" The Assembly Building has remained essentially the same (Brownlee, David G. and Lang, De., 1997b). By March 1965 Kahn had further refined the assembly building as a cube atop a square platform with tower like elements at the corners. At the bottom of the model the linear presidential complex is elaborated with monumental spaces and at the top the National Monument appears as a truncated obelisk. The triangular center for Islamic studies defines the fourth side of presidential complex, and behind it Pont's administrative buildings are indicated as low rectangles.

After March 1965 Kahn's invitation to design the assembly must have been more legitimized, for during the summer, he focused on its design without further complaint from Matthew, and a developed scheme thus resulted. By August it had attained a clear definition that made the resembling shapes of the presidential complex seem unplanned by comparison (Brownlee, David G. and Lang, De., 1997c). In place of generalized form of his earlier cube, Kahn now proposed a shallow dome resting on an elongated dome that rose from its base. Ambulatories enclose the central chamber, where the rotated squares, indicated as generating the plan, emphasize centrality. The low wings of the outer enclosure are geometrically less complicated than Dhaka's, but only slightly less protective. Government officials have stipulated that the architecture be given an Islamic touch, and this accounts in parts for both the dome and the plan (Brownlee, David G. and Lang, De. 1997d). Kahn had written, 'The insistence of the Islamic touch is plaguing ------ but inspite of this, it can be stimulated resource not called on before (Brownlee, David G. and Lang, De. 1997e).

Prof. Kahn, right from the beginning, was committed to create a monumental complex keeping in view the sensitivity of the site that would determine the architectural character of Islamabad. Site planning and land use analysis were done through study models. In his initial studies, Kahn proposed Parliamentary square south east of the hills with buildings surrounding it on its southeast and southwest sides. The Presidential Square, comprised of the Houses of the President, secretariat, housing for his personnel and Museum of Islamic history, were planned on the hill. On the way between the two squares a court of Council of Islamic Ideology were diagonally placed. (Fig. 6) Just below the Presidential square, Kahn planned an artificial lake surrounded by three hills. The Parliament and Supreme Court were planned on the Constitution Avenue in line with the secretarial buildings designed by Gio Ponti. This was just block model without defining the architectural character of the buildings.

In the second proposal, a monumental highway ran from southwest towards Presidential Estate on northeast having triangular Museum of Islamic History in the middle. The Parliament building in the form of truncated pyramid faced the main Constitution Avenue. The Parliamentary square was designed opposite to the hill in the middle of museum and parliament. In this proposal a much closer connection is sought between the Presidents Estate and the Executive complex of Secretariat buildings along the south west of the museum. This proposal was further refined to give it a more practical form (Fig.7, 8& 9). The Presidential Estate and the Parliament building were each connected with sunken highway by a circular ramp. Kahn explained the proposal to Sir Robert Matthew in his letter dated January 8, 1965:

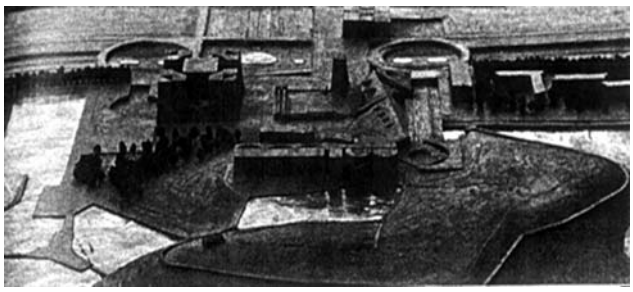

Figure 6: Model of first proposal of Capital Complex *(Photo Credit: University of Pennsylvania).*

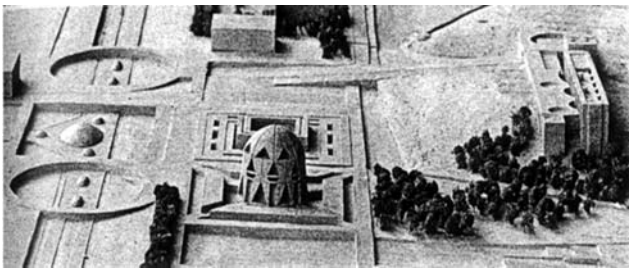

Figure 7: Model of third proposal of Capital Complex. (Photo Credit: University of Pennsylvania).

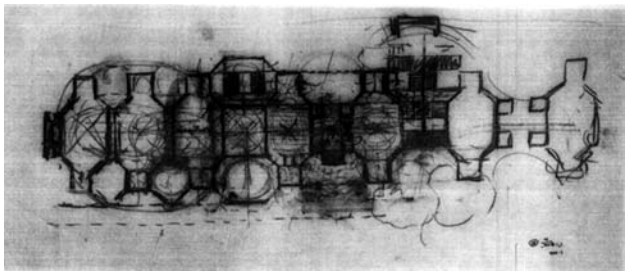

Figure 8: Schematic Plan of Administrative Building. (Photo Credit: University of Pennsylvania).

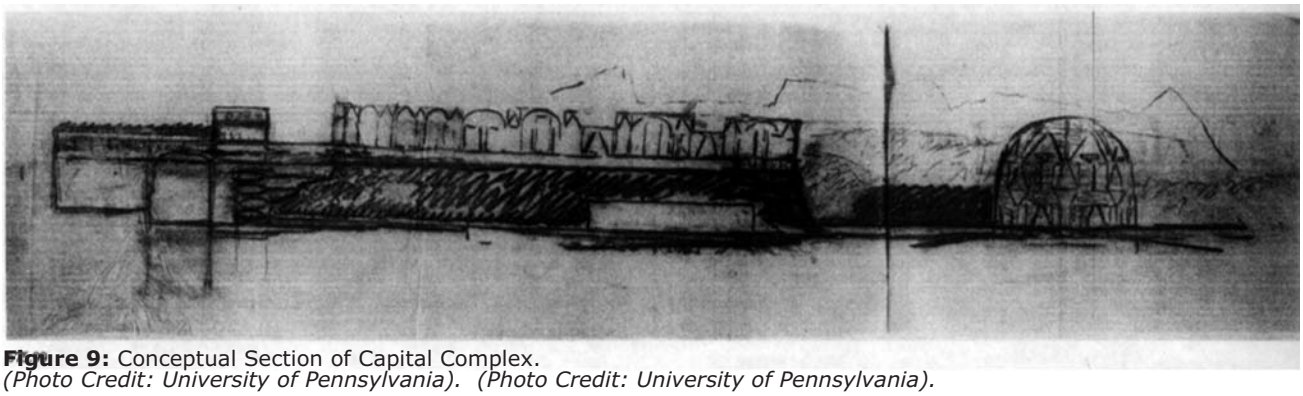

Figure 9: Conceptual Section of Capital Complex.
(Photo Credit: University of Pennsylvania). (Photo Credit: University of Pennsylvania).

"I have given more detailed Study to the Presidential Estate, the Presidential Square and its buildings. I have changed the President's House to strengthen its architecture. The position of the entrance buildings and the President's personnel Secretariat is essentially the same…. The landscaping of the two hills and the lake area harbored by the three hills is now more understandable."

"The National Monument on the square, in place of the Cabinet Building, is suggested out of the recent realization that it could be a new concept of Minaret embodying a small chapel raised above the level of the square, and a special platform from where one could preach facing Mecca towards the chapel and facing the multitude on the square. The square is being suggested as a roofless Hall of Meeting."

"The building for the Council of Islamic Ideology is simplified and woven into it, is the Cabinet building. The building promises, I believe, to be one of the more interesting buildings I have designed. The Assembly Building has remained essentially the same. Its shape was praised by Noguchi who was in to see me a few days ago. He helped to strengthen my mind about its relationship to the rest of the composition. I have improved the landscape and the street and traffic conceptions." (Letter)

Louis Kahn paid attention on three major subjects. Firstly he was concerned with architectural forms of the buildings. The triangular Museum, the truncated pyramid of Parliament building and composition of cylinders and rectangular masses for President House are all designed and integrated within the available site. Secondly he was concerned with spatial relationship between the buildings and landscape. Considering the topography of the site he planned lake and structures keeping in view the landform and topography of the site. He provided roads to connect President House at a lower plane compared with the buildings. The relationship between the Secretariat, Parliament and offices of the President was one of the important criteria in the preparation of zoning plan. Thirdly he was concerned with the visual image of the complex from the city. His free hand sketches amply illustrate his ideas about his architectural philosophy.

In his final design Louis Kahn proposed sunken highway and circular ramps leading to the complex. The Presidential Estate on the hilltop was connected with the Museum.

Prof. Kahn submitted three proposals one after the other. The latest date on the working drawing in the Kahn's collection is January 5, 1966. His contract was finally terminated on January 11,1966. For the design of presidential estate, Capital Development Authority tried one big name after the other. Edward Durell Stone Sr. was finally given the chance to render his services.

Stone's name first appeared in a letter from Dr. I.H. Usmani, chairman of the Pakistan Atomic Energy Commission, to the American architect dated 6th of July 1965: "Every time you come to Pakistan. I try to get you an assignment because we admire your love for the Mughal architecture and the spirit of grandeur the Mughal buildings emanate. Although you wrote to me that Mr. Shaikh, the previous chairman of the CDA, had asked you to design the Supreme Court building, I went and saw the new chairman, Mr. N.A, Faruqui, an old friend, and persuaded him to consider you for the design of all the four buildings in the most prominent square of Islamabad, namely the Supreme Court, the National Assembly, the Foreign Office and the President's House. He was very receptive to the idea but it seems his predecessor has made some commitments with Prof. Kahn in respect of the President's House and unless you can settle with the latter or suggest an easy way out, things may be delayed. It seems you are working jointly with Kahn on some other projects in the United States and can come to some face saving understanding with him in the interest of uniformity of concept and design of these four important buildings of our new capital. May I suggest that you come over to Pakistan as soon as you can and settle terms with Mr. Faruqui for your overall assignment. Meanwhile please do send him a copy of the letter you wrote to our President in 1961 about your interest in designing the whole of Islamabad. It is still not too late to revive the offer you had made then and let your evening of life be spent in creating a masterpiece through which your name may be immortalized." (Letter) and (Nelson, Sten, 1973)

Not suprisingly a prompt answer was cabled from New York: "Your efforts on my behalf are overwhelming and greatly appreciated by me stop I am extremely interested in the buildings at Islamabad stop." (Cable)

Stone had to wait for some time, however, as Faruqui informed Usmani that the CDA had just decided to give one more chance to Louis Kahn. Usmani wrote to Stone about Kahn's commitment and advised him; "Faruqui is very keen to get our Islamic heritage of architecture reflected in the public buildings of Islamabad. He likes your designs of our Institute but has not seen the design of other buildings done by you throughout the world, particularly those, which have domes, verandahs, etc. typical of the old Mughal buildings. I would therefore, appreciate if you could kindly send Faruqui a selected set of buildings designed by you reflecting such architecture and also send him a copy of your wonderful autobiography." After an official meeting with the government committee on the 11th of January 1966, a cable from Faruqui to Stone laconically urged the architect to come to Islamabad. In a following letter Faruqui asked Stone to undertake the designing of the central square, the President's House and the National Assembly, and to produce a few schematic plans for this complex of buildings.

Some two months later Edward Durell Stone with party, arrived in Rawalpindi for discussions with the CDA. On the 9th of April 1966 the Morning News announced the approval of the CDA agreement with Stone. The day after the same message was communicated by Dr. Usmani, who commented: "Mr. Stone is the only leading architect of world fame who has imbibed the spirit of Mughal architecture with beauty. He was brought to Pakistan for the first time by the Atomic Energy Commission to design the Pakistan Institute of Nuclear Science and Technology (PINSTECH) whose first phase (research reactor) has been completed. At that time there was uproar against the Commission's choice and uninformed criticism about 'wastages' etc. We are happy to find that Mr. Stone has

been selected by West Pakistan Water and Power Development Authority (WAPDA) to build their offices in Lahore and now by the Capital Development Authority (CDA) to design the important buildings of the capital which are bound to eclipse the heap of ugly structures around the capital area. The choice of the Commission now stands fully vindicated." (Khawaja, Zaheer-ud-Din, 1998f)

Stone believed architecture as a grimly serious business where as it requires the creation of whole environment. He considered the design of single building without regard for its relationship to the environment, as egotistical exercise. At the same time architecture should be timeless and convey by its very fiber the assurance of permanence. He asserts that a careful examination of all circumstances unique to each project should result in the creation of an original building and one hopes, a work of art (Stone, Edward Durell, 1962) and (Stone, Edward Durell, 1967a).

Stone was against the use of corridors and described them as the invention of the 19th century and a bad day for architecture; he therefore suggested atria and open courtyards in his projects. "I have found", he states "covered atria or open courtyards (depending on the climatic conditions), are as economical as corridors and I rely heavily on the contrast of multistoried central areas with smaller elements grouped around the periphery, which, not only imparts a dramatic element to spatial relationships but also facilitate easy orientation for the visitors (Stone, Edward Durell, 1967b)." These concepts are clearly apparent in his projects built in Islamabad and elsewhere in Pakistan.

At the end of May a draft agreement was still under consideration; at the end of June it was sent to Stone for approval and a month later the project was discussed at great length at the CDA offices in Rawalpindi. A crucial point, emphasized by the minutes of the meetings, was the combination of the central layout of Doxiadis' master plan and the proposal put forward by Stone. The approach of the American architect was rather formal; in his scheme the president's house was in the centre with the buildings of the assembly and the foreign office on either side of the national square. This arrangement presupposed a corresponding symmetry of the master plan, which was not at hand. "The Capital Avenue is not on the axis of the President's House; the Capital Avenue is the central avenue of Islamabad, and yet, as designed at present, it does not give the impression of being the heart of the city". (Vale, Lawrence J., 1992a)

In the master plan the presidential palace was placed on a hillock overlooking the city. The site is spread over adjacent hills in an area of 20 acres. In his preliminary design Edward Durell Stone proposed the major banquet hall and the reception area on the main plateau of the hills. In order to evolve a monumental building, he proposed the office building on southwestern side by excavating one side of the hill. In this way the lower floors, which had been proposed to be partially excavated, had a double loaded corridor with offices on both sides. The C.D.A officials required lighting and ventilation of the rooms facing the hillock. On this serious mistake the architect had to change the design and the revised drawing was submitted for approval (Khawaja, Zaheer-ud-Din, 1998g).

From the National Square the President's House rose as a tiered pyramid. The planning is such that an open rectangular court having colonnaded walkways on the right and left from the president's residential palace at the back, leads to the working offices and reception halls in the front. The front portion is eight storied high. The lowest levels accommodate the offices and other service areas, over which ceremonial lobby and the state banqueting and reception halls are planned. These spaces are also accessed from the open court. Below this level are President's own office, his personal staff and cabinet rooms. The uppermost tier contained suites for state guests (Khawaja, Zaheer-ud-Din, 1998h).

The entire complex was given a finishing coat of white cement and marble. Originally the main façade was supposed to be finished with arches, grills, and verandahs and topped with a dome but later on arches and domes were omitted from the original design. The President's residence itself is located in a separate block set well back behind the first block, and the two are linked by a formal garden and colonnades. The courtyard is also used for open receptions. The mosque of the President house is located at the back of the president residence at a contour further down from the main level. The total covered area is 30,193 square meters which include guest rooms, banquet halls and President Secretariat.

In his original design Edward Durell Stone was very conscious of the chairman's obsession to impart an "Islamic touch" to the buildings in Islamabad. Consequently the design of the Presidential Palace was dutifully produced with the domes surmounting the top and a series of arches for the window openings (Fig. 10). However, with the change of administrator who happened to be a General from the army and not particularly enamored of the so-called 'Islamic touch', the arches and dome were removed from the original design (Fig. 11). Consequently the present building was constructed without such elements (Mumtaz, Kamil Khan, 1976). It is however, duty of the architect to produce design according to need of the space and time fulfilling the requirements of the client and then stick to it and not to modify it every time to make the concerned personnel happy.

The President's House is a focal point of Islamabad. The resemblance of the Lutyens arrangement in New Delhi is striking and it is not limited to the external appearance only but it is also valid for the political reality on which the whole concept is based upon. By means of constitution adopted on 8th of June 1962, Ayub Khan became supreme ruler quite comparable with that held by viceroys in British India before the reforms of 1919: the president was not responsible to the National Assembly and he had right of veto (Vale, Lawrence, J., 1992b).

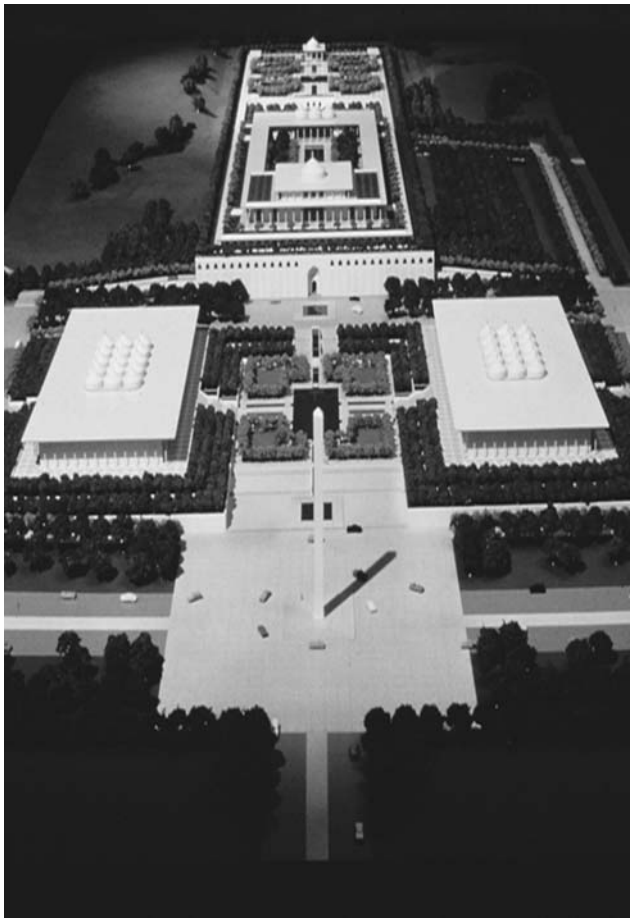

Figure 10: Model of President House, Parliament Building and Cabinet Building. *(Photo Credit: University of Arkansas Archives).*

Figure 11: Model of group of buildings around President House. *(Photo Credit: University of Arkansas Archives).*

The concept of commissioning international architects was to achieve such results where each architect analyzes the sensibility and potential of respective site and create buildings and environments having experiential qualities. It served as experimental laboratory for the masters of modern architecture. In a small site of about two square kilometer, each project represents design philosophy of each individual architect. Some of the designs could not be implemented for some obvious reasons which had already been discussed in the preceding pages.

LOUIS KAHN'S ACADEMIC VERSUS EDWARD DURELL STONE'S PROFESSIONAL APPROACH TOWARDS THE DESIGN OF CAPITOL COMPLEX AND THEIR IMPACT ON THE ARCHITECTURE OF ISLAMABAD

Edward Durell Stone had a rigid but preconceived approach towards design projects. He designed three simple box like structures of President House, Parliament building and Cabinet building as his final solution to the project. President house followed the form of Kennedy Centre for the Performing Arts at Washington D.C. It was designed adjacent to the hill to overlook the open space in front. Cabinet and Parliament buildings flanked the either side of open space making the plan symmetrical. These buildings neither have any sense of surprises from the interior nor do they have pleasant visual experience from the exterior. Being located adjacent to the hill, the interior spaces of President House are dark, so is the case of two other buildings. Dark long corridors and deep rooms without any view of Margalla hills made these building weakest examples of architecture executed in Islamabad. On the insistence of the government to give Islamic touch, Stone simply added domes on top of these buildings. He did not consider the experiential qualities of nature and landscape which the Mughal buildings had in the past in this region. His monotonous form was finally implemented, therefore, unattractive and unimaginative composition became the major reason for characterless architecture of the city. Louis Kahn proposed the master plan respecting the inherent qualities of the site. Each building had its own distinct form easily recognized from a distance. Therefore each building is designed respecting the function as well as demands of each individual site. With these considerations ,variety and unity in making one whole was the hallmark of design. The building of Louis Kahn had strong relationship with nature while the buildings of Stone were devoid of any such relationship. Louis Kahn considered the issues of sustainability and proposed brick as the principal building material. The use of brickwork in an innovative manner would have paid strong impact in building the architectural character of Islamabad.

After this important group of buildings, a large number of administrative buildings were commissioned to international and local architects. Edward Durell Stone took the major share. The characterless design produced by him did not produce satisfying results and therefore Islamabad could not produce its own architectural identity.

ACKNOWLEDGEMENTS

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IN SEARCH OF THE 'TIME-LESS' IN ARCHITECTURE

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ABSTRACT

While the use of geometry as surface decoration in Islamic architecture is evident and well documented, an aspect about which not enough is known and understood is the use of geometry in the design of the buildings themselves. This paper will, therefore, endeavour to focus on the use of geometry in the ordering and design of the architecture – plan, elevation and section. In addition it does so from the point of view of a practising architect attempting to develop ways of employing these methods in contemporary practice, based not only on a knowledge of their traditional use but also their artistic function – which is to create an architecture which reflects something of the 'time-less' quality of all great art.

This paper consists of an Introduction, briefly outlining the relevance of the study of traditional architecture and what we can learn from it. Part I gives the theoretical and philosophical background to the design principles of Islamic architecture. Part II offers a theoretical model for looking at traditional architecture in terms of a *language* with a *grammar* and a *vocabulary* in the context of which the *principles* of design and practical *methods* of geometry are employed. Part III gives a Historical Overview of the connection between Architecture and Geometry. Part IV consists of a presentation of geometric methods used in Islamic Architecture taking Timurid architecture of Iran and Turan as a case-study. In Part V, a Mughal building and a Master-mason's plan drawing of a mosque are analysed in the light of the methods discussed in the preceding section. In conclusion, in Part VI a contemporary project of a community mosque in Lahore is presented, where some of the methods studied are applied.

Keywords: Islamic Architecture – Geometry – Timeless

INTRODUCTION

It can be argued that the message and philosophy of traditional art is culturally relevant and appropriate as a valid artistic expression for our context. At the level of technology also, for us in the sub-continent, it makes great sense to learn from this tradition. Especially when we see that the technological solutions of traditional architecture are economically viable and environmentally sustainable for many types of buildings. But it is above all, the message of traditional art, whose harmony and beauty aim at reflecting something of the "time-less", which I believe is relevant and meaningful not only in our cultural context but at all times and in all places.

PART I: BACKGROUND – CONCEPT OF BEAUTY

The Traditional[1] **principles of design** within which traditional architecture works embody a concept of beauty and form based on a sacred understanding of the world and of the human being. This world-view sees both the created macrocosm and the human microcosm in relation to their common Divine Origin[2]. This metaphysical conception and its relationship

1 The word Tradition in this paper will be used to signify such cultures whose foundations are based on Principles and Truths of Divine Origin, which are then applied over time to various domains from metaphysics and cosmology to art and science.

2 Examples from Islam's foundational texts expressive of the idea that the cosmos is a reflection of God's Qualities are the Hadith Qudsi: "I was a hidden treasure and I loved to be known, so I created the world so as to become known;" and the Quran: "Wheresoever you turn there is the Face of God". There is also the famous Hadith from Bukhari: "God created Adam in His image".

with art is extremely well developed in the Islamic philosophy of art and aesthetics. An example from a classical source illustrating how the concept of proportion and harmony was understood within this worldview is Imam Ghazali speaking of the relationship.

"That exists between the essence of man's heart and the transcendent world, which is called the world of spirits (*arwah*). The transcendent world is the world of **loveliness** and **beauty**, and the source of loveliness and beauty is **harmony** (*tanasub*). All that is harmonious manifests the beauty of that world, for all loveliness, beauty and harmony that is observable in this world is the result of the loveliness and beauty of that world…." (Nasr, S.H., 1987. Pp. 168-169)

Another example is the words of a contemporary master mason *Ustad Haji* Abdul Aziz (1917-2002) discussing the proportioning of different types of domes:

"Everything should be proportionate. The way God has proportioned man, that if a person is tall his limbs and head are proportionate to his height and so on. If they are not we immediately know.... Thus if you decrease the height of the main dome by bringing down its center, you will accordingly have to reduce the proportions of the finial and so on."[3]

The forms of traditional art along with serving a useful purpose also aspire to formal perfection or beauty. The traditional concept of formal perfection sees it as having two aspects:

a. An aspect of *regularity* or *rigor*,

b. An aspect of *mystery* or *infinity.*

In other words a 'geometric' aspect and a 'musical' aspect. One can say, using traditional terms, that Perfection i.e. *Kamal* comprises a balance of *Jamal* (Beauty) and *Jalal* (Majesty).[4] It is these two complementary aspects which the traditional rules for artistic forms embody.[5] It can be argued that the principal means or method employed to achieve these design ideals in Islamic architecture is geometry or 'geometric harmonization'. *Figs. 1 & 2* are examples illustrating the use of both these design principles – 'regularity' and 'musicality'- from a contemporary craftsman's drawings. Behind the musicality and flow of forms – *Jamal* - exists a regulating geometry- *Jalal* – giving rise to formal balance and perfection i.e. *Kamal*.[6]

In the Islamic conception, geometry is linked to the concept of numbers – whose qualities and relationships it is seen to manifest. Numbers themselves are viewed as symbols of divine archetypes, rooted ultimately in the Divine Qualities. Regarding their treatise on music – music was considerd a part of mathematical studies – the Ikhwan al-Safa write: (Nasr. S.H., 1978)

'One of the aims of our treatise … [is] of demonstrating clearly that the whole world is composed in conformity with arithmetical, geometrical and musical relations….The world resembles…the unique system of a single man or a city which shows also the Unity of its maker.'

PART II: LANGUAGE OF TRADITIONAL ARCHITECTURE - GRAMMAR, VOCABULARY AND METHODS

Universally, across cultures and across time, for all traditional peoples, architecture was seen

3 Anjuman Mimaran, *Newsletter* 1, 2002. As part of Anjuman Mimaran's program to document, learn and publish traditional building methods and techniques used by hereditary Master Craftsman, a series of sixteen colloquiums were conducted by 83 years old master mason *Ustad Haji* Abdul Aziz from February to June 2000. Topics covered included, polygons, arches, domes, minaret, and geometric patterns.

4 These two aspects of formal ordering in the final analysis are a reflection of two complementary aspects comprised in the Divine Unity. The Islamic doctrine expresses this by dividing the names of God into those of rigor (*jalali*) and those of beauty (*jamali*). The Chinese Yin-Yang is another example of this complementary principles within the Divine Unity.

5 This complementarity of principles, according to the traditional doctrine, reflects the inner reality of the world itself, which comprises an element of geometry and an element of musicality.

6 It should be kept in mind that the geometry doesn't only serve a regulating function it is also needed as a practical tool for example to construct an arch or a dome.

both as reflecting a cosmology and as a symbol of Heaven (Bukekhardt, T., 2002). It is on this essential idea that the "Grammar" of traditional architecture is based.

Grammar of Architecture – the nine-square plan-form. A ground-plan (*fig.3*) that finds expression in various traditional architectures is the 'Nine-square Mandala' or 'Cosmogram', the *Vastu-Purusha Mandala* of Hinduism, the *Ming-tang Square* of Chinese architecture or again the *Hasht Bihisht* (Koch, E., 1991) (Eight Paradises) plan-form of Persianate Islamic architecture. As its name and significance in various traditions demonstrates this plan-form is ultimately a symbolic image of the Cosmos in its qualitative aspect.[7]

The archetypical form of this plan is a central square surrounded on the four major axes by four rectangles and in the corners by smaller squares. Geometrically this is derived by the intersection points of two rotated squares at 45 degrees to each other, which also give the regular octagon (see fig.3a & fig.3b.). In addition to playing a pivotal role in the organization of the plan (fig.4) the typical divisions of the elevation are also projections of this division of the plan (fig.5). This archetypical division is employed at all scales from the division of individual facades to elements within facades. The consistent application of this arrangement generates a sense of unity and wholeness typical of traditional architecture.

The Hasht Bihisht plan-form is often adjusted according to imperatives of time and place but its basic essence remains the same.

Vocabulary: Super-imposed on this universal grammar of architecture is the vocabulary of traditional architecture which defines its personality e.g. the dome, the parts of a dome, arches, columns and minarets and their parts which in their turn are organized according to a syntax and grammar.

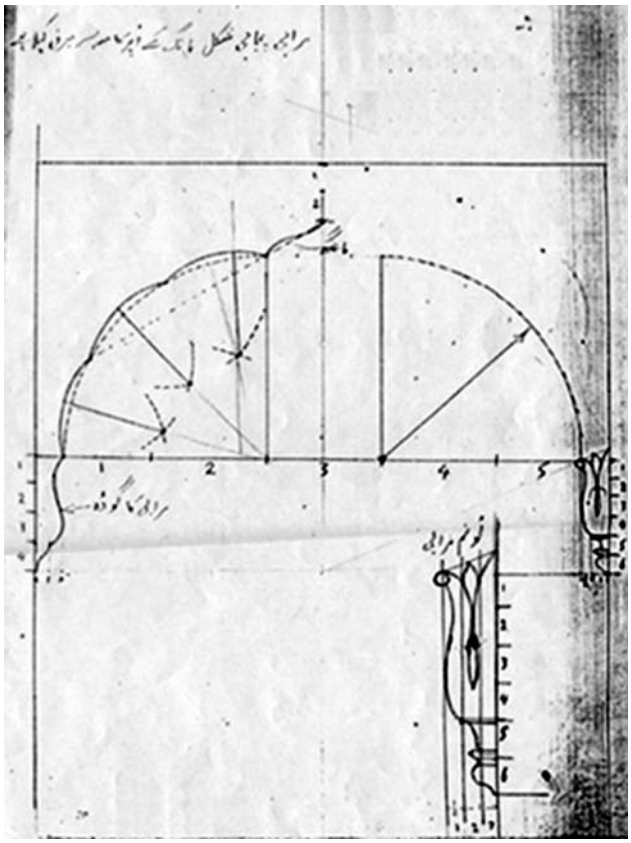


Figure 1: Pages from Ustad Rahim Bukhsh's unpublished manual, 1970s, Multan.
Source: Anjuman Mimran.

As we saw, it is within the framework of the grammar of the Hasht-Bihisht plan-form that the elements or vocabulary of architecture are placed. Similarly it is within the framework of this grammar and in part deriving from it that the aesthetic principles of design are situated. Finally there are the practical methods or tools of design used to give physical form to these principles.

7 The cosmos itself is seen as a reflection or manifestation of a Divine Principle, thus the architecture also ultimately reflects the qualities of the Divine Principle through cosmic symbolism.

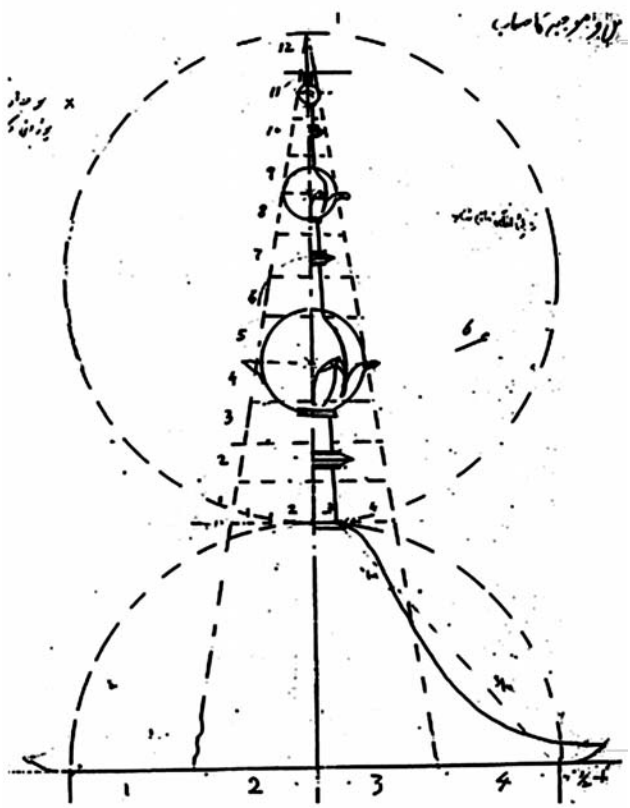


Figure 2: Pages from Ustad Rahim Bukhsh's unpublished manual, 1970s, Multan.
Source: Anjuman Mimran.

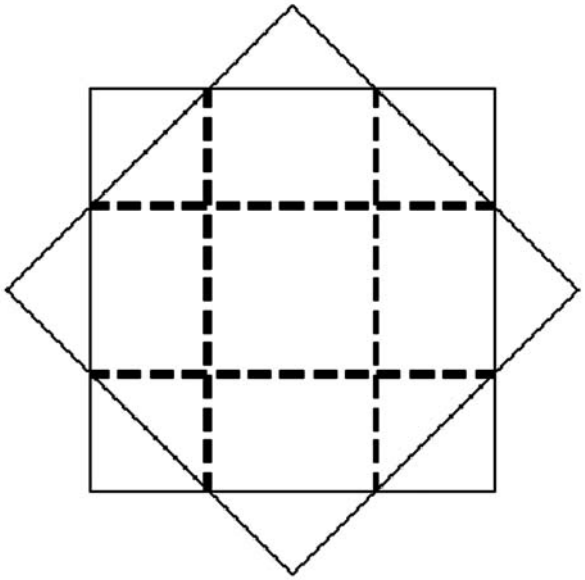


Figure 3a:

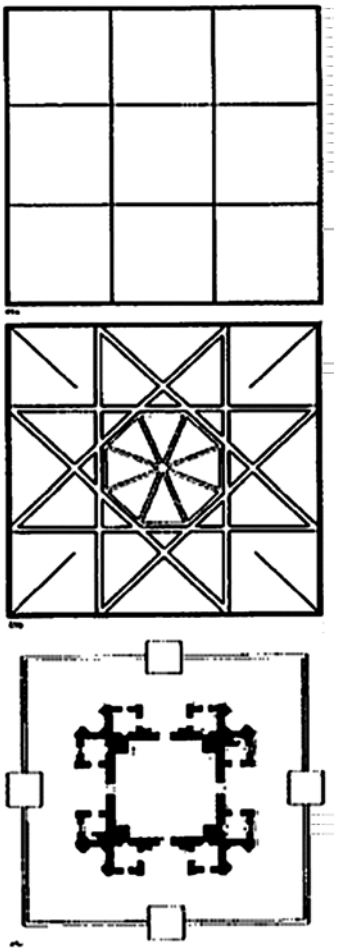


Figure 3b:
Source: Bakhtiar, L and Ardalan, N, - The Sense of Unity - the Sufi Tradition in Persian Architecture, Chicago 1973.

PART III: HISTORICAL OVERVIEW - ARCHITECTURE AND GEOMETRY

'According to the tenth century philosopher, Abu Nasr al-Farabi, the fundamentals of architecture belonged to the mathematical sciences.'(Golombek et.el, 1988. p. 137) As Golombek and Wilber state: 'Geometry was the foundation of an architect's training, and the highly skilled architect was known as a *muhandis*, a "geometer." (Golombek et. el, 1988. p. 137)

We know from historical records that architects were often highly skilled and learned not only in mathematics and geometry but also in astronomy, the classics, poetry, philosophy and

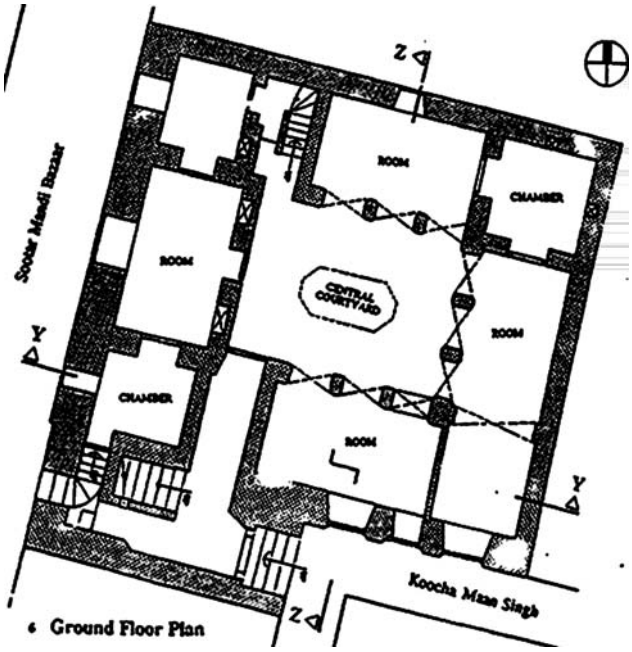


Figure 4: Lahore Walled City, House No. D/3264, Sooter Mandi Bazar, PEPAC 1993.
Source: PEPAC, Walled City of Lahore, 1993.

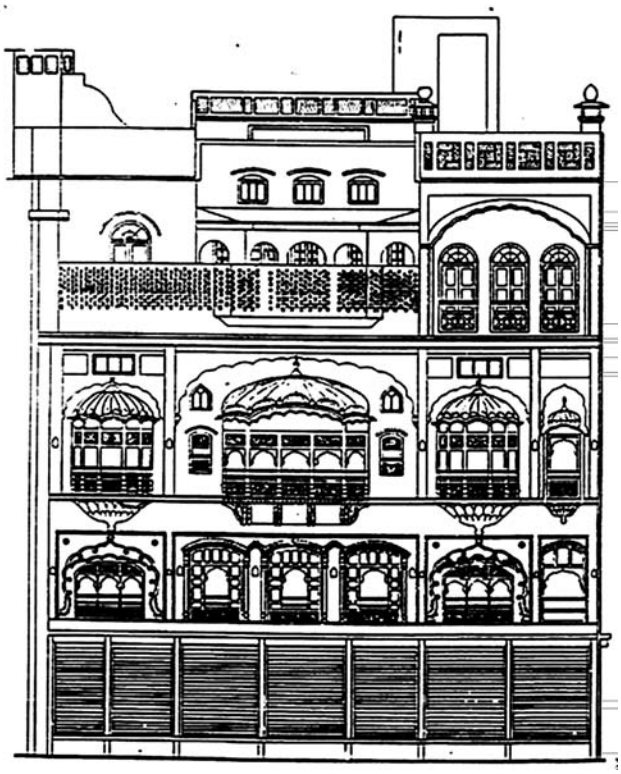


Figure 5: Lahore Walled City, Lal Haveli, Lohari Mandi Bazar, PEPAC 1993.
Source: PEPAC, Walled City of Lahore, 1993.

religious studies. Ustad Ahmed Lahori of the Shah Jahan period, Mimar Sinan of Ottoman Turkey and Qavam al-Din of Shiraz (15th century) (Golombek et el, 1988. pp. xxi-xxii) are amongst such well-known architects whose names have come down to us.

'Early Arabic treatises on mathematics pay special attention to the needs of the architect, and it is in these works primarily that the aesthetics of architecture are discussed…. There are texts dealing with geometry for the architect, geometric designs for the craftsmen, and comments throughout general texts on mathematics that are relatable to architectural practices' (Golombek et el, 1998. P. 137).

The connection of architecture and geometry, which is evident enough, is borne out by the existence of these texts. The same is confirmed, in the case of Timurid architecture for example, by the analyses of the buildings. In the words of Golombek and Wilber:

'… a pervasive influence of geometry on many aspects of the architecture: its plans and elevations, its vaulting, and its decoration. Through a system of proportions the harmony of a work of art could be achieved. This notion of harmony was central to the thinking of many Muslim philosophers, as Bolatov has noted' (Golombek et el, 1988. P. 211).

PART IV: DESIGN METHODS:

a) Design Process;
b) Geometrical Systems;
c) Mathematics & Architecture

The following presentation of geometric methods used in Islamic architecture is primarily based on the study of Timurid architecture of Iran and Turan, by (Golombek et el, 1988). Their comments in turn, are based on the monumental

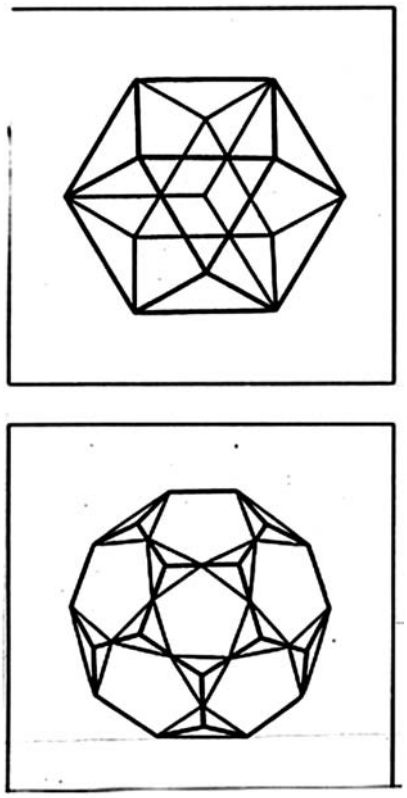


Figure 7: Abu-l Wafa 'al-Buzjani (940-98) from Holod, R (1988).
Source: Holod, Renata, in theories and Principles of Design in the Architecture of Islamic Societies, Cambridge, Massachusetts, 1988.

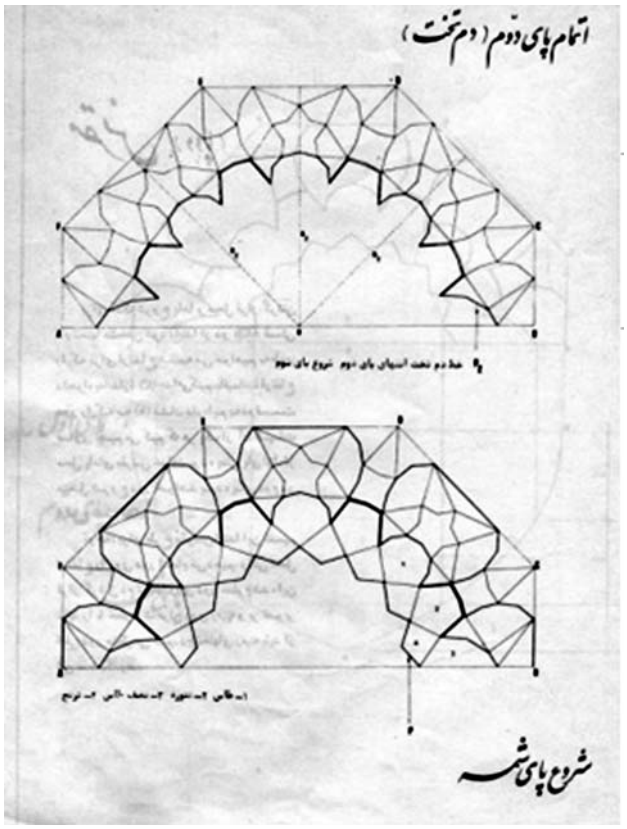


Figure 8: 'Muqarnas' plan by contemporary Iranian craftsman. From: Mehnaz Rais-Zadeh & Hssain Mufid, Ihya Hunari az Yad-i-Rafta, Tehran (1374 AH).
Source: Mehnaz Rais-zadeh & Hssain Mufid, Ihya Hunari az Yad-i-Rafta, Tehran (1374 AH).

work of Uzbek scholar M.S. Bulatov on the theme of geometric harmonization in Central Asian architecture from the 9th to the 15th centuries. (Bulatov, M.S., 1978) The reason I have considered their conclusions as representative of Islamic architecture in general is based on a couple of considerations. Firstly the obvious similarity of 'spirit' which Islamic architecture conveys universally, which I believe is due to the particular message of the Islamic tradition. Secondly, given the shared universe of intellectual and scientific discourse in the Islamic world, one can hypothise that similar design methods may have been used. This obviously has to be verified by further studies but a general survey of a few of the existing studies accessible to me support such a hypothesis (Jamshaid Iqbal, 1988), Yassen Tabba, 1988).

a) Design Process:

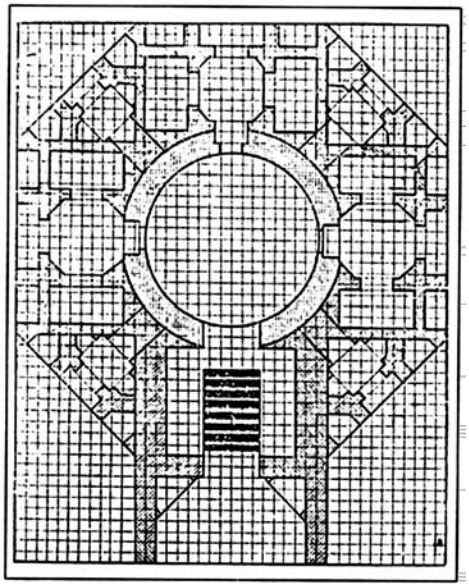
Typically the design process for a traditional Islamic building (Golombek et el, 1988), (Holod, R., 1988) would begin with the intent of a patron who would often, 'describe the ordering of buildings in terms of features considered most significant (Holod, R., 1988. p.11).

According to Golombek and Wilber the parameters for the architect included, 'the function of the building, its budget, often a schedule, and the scale of its most significant parts.' (Golombek et el, 1988. P. 138). The design of the building would utilise two processes simultaneously, namely '**geometric**' and '**analytical**' (Golombek et el, 1988. P. 138).

Thus, the design was first drawn more or less theoretically, according to geometric proportions. Then, the analytical process was applied, and one dimension within the design was selected as a module. This module would be equal to, or commensurate with the *gaz*.[8] In Timurid buildings the module was equal to the wall thickness. The module was sub-divided into units commensurable with it for details. The smallest unit was equal to brick size plus a rising joint. The architect could therefore specify measurements in terms of real numbers or number of bricks. Approximations of irrational numbers were also used. (Golombek et el, 1988. P. 139).

That two systems, analytical and geometric, were used is borne out by the analysis of buildings, which have both proportional and modular systems. The same is also attested to by the drawings of the so-called Bukharan master (*figs 9, 10 & 11*). (Golombek et el, 1988. P. 139), (Holod, R., 1988. P. 5). The use of graph paper shows that the draftsmen worked with compasses and straight edges (Holod, R., 1988. p. 6). Set- squares, adjustable set-squares and a devise for drawing ellipses were also used. (Golombek et el, 1988. p. 139).

In the system described by Bulatov, first a Generative Unit had to be chosen by the architect. This was a single measurement from the project and was often the most prominent feature in the building. All important dimensions in plan, elevation and section would be based on it and commensurable with it. Secondary Generative units were also used, which effected dimensions closest to them. Thus the over-all length of a façade would be derived from the main Generative-unit, whereas its elements, for example portal height, would be related to the length of the façade.[9]



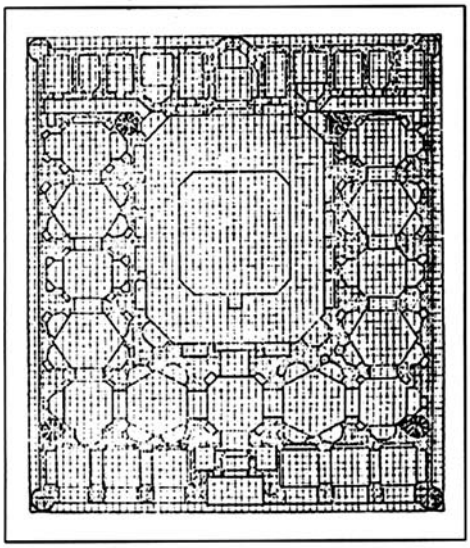


Figure 9&10: Drawing by the 'Bukharan Master' (Probably 16th C).
Source: Holod, Renata, in Theories and Principles of Design in the Architecture of Islamic Societies, Cambridge, Massachusetts, 1988.

8 The *gaz* in early Timuird buildings in Turan ranged from 60 to 66.18 cm, averaging 62 –63 cm, (Golombek et el, 1988. 139).

9 All remarks describing the Design Process are summarised from Wilber and Golombek, opcit pp 139-140, who themselves base their conclusions on, Balatov, *Geometricheskaiia Garmonizatsia*, opcit.

b) Geometric Systems Used:

The conclusion reached by M.S.Bulatov, (Golombek et el, 1988. P138), (Bulator, M.S., 1978),regarding the Islamic system of proportions is that it is a 'system of proportions which utilizes irrational numbers, … [and] is based on the geometric properties of the square, the double square, the equilateral triangle and the pentagon' (Golombek et el, 1988. P.138).

Bulatov's conclusions are based on his study and analysis of Islamic monuments of Central Asia, from the ninth to the fifteenth centuries. His work takes into account the views of the Ikhwan (Nasr, S.H., 1978. P.45), philosophical texts on aesthetics as well as mathematical treatises. (Golombek et el, 1988. Pp.137-173).

The geometric properties of these four geometric figures, give rise to 'four systems of proportion, or sets of ratios,' which could be mixed, 'although generally one system predominated.' (Golombek et el, 1988. P.138). Fig 11, taken from Bulatov's study, illustrates the use of these systems. In Wilber and Golombek's words:

'The geometric basis of design was, therefore, not comparable to Western[10] notions of proportion, which are concerned with the repetition of similar or related forms. The Islamic system, aside from its practical value as a working method, ensured a harmony of parts, whereby all parts were related to a single entity….' (Golombek et el, 1988. P. 140).

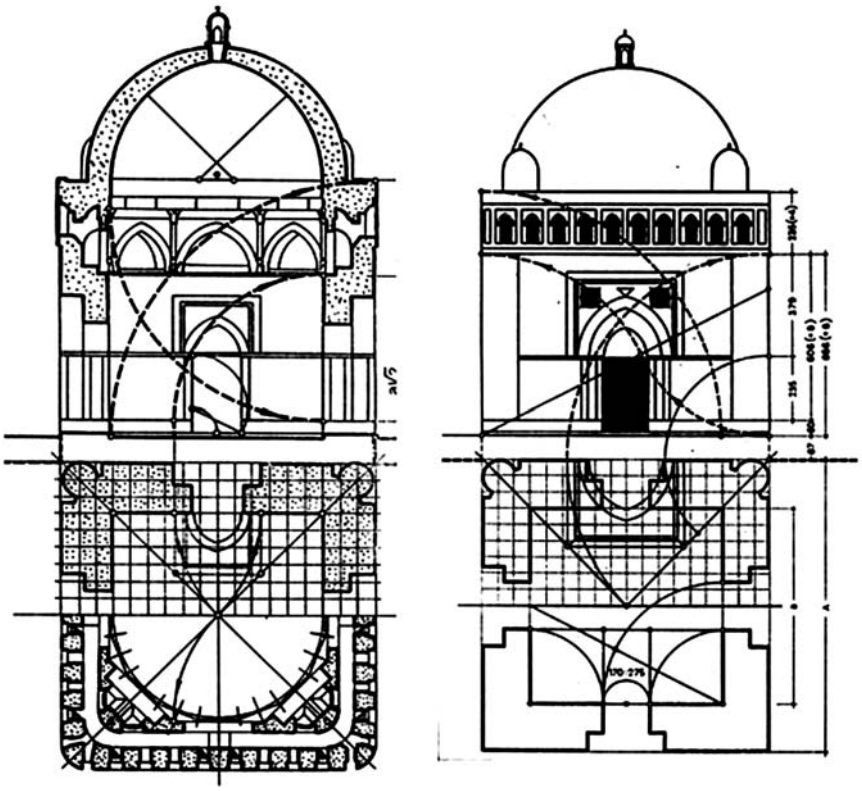


Figure 11: An example of the application of the Systems of Proportioning discussed by Bulatov in a Central Asian building - left: in section & plan; right: in elevation and plan (illustrations from Bulatov 1979).
Source: Bulatov, 1979.

10 Western here should be understood as 'Renaissance,' Cf. Wittkower, Rudolf, *Architectural Principles in the Age of Humanism*, Academy Editions, London 1973, where he categorically marks out the differences between the Renaissance approach to proportioning and that of the Middle ages. According to him the Middle Ages preferred the use of incommensurable ratios whereas the Renaissance preferred commensurable or whole number ratios.

c) Mathematics & Architecture:

A logical way of deciphering the traditional design process would be to look at the mathematical and geometric knowledge and tools prevalent at the time. As an example a method of converting irrational root functions into whole number ratios which seems to have played an important role in architectural design is discussed below.

The Diaphantine Method and the generation of whole number ratios approximating incommensurable functions**.**

'In several pre-Euclidean mathematical texts a method is given which allows for the expression of these root powers [i.e. 2, 3 & 5] as a succession of whole number ratios.... These successive ratios approach nearer and nearer to the root value with each alternation' (Lawlor, R., 1994. P. 39).

This method is attributed to the Greek mathematician Diaphantus, but is probably part of a much older mathematical knowledge' (Lawlor, R., 1994. P. 67).The works of Diaphantus were translated into Arabic by Qusta ibn Luqa in the 10th century (Nasr. S.H., 1987., p. 140).

One such method of generating the roots 2, 3 & 5 is through the use of 1:2 and 1:3 progressions. Below is the use of progressions 1:3 and 1:2 to generate approximations for 2.

Diagonal Numbers:

Origin 1:3 1 3 7 17 41 99

Lateral Numbers:

Origin 1:2 1 2 5 12 29 70

In both series a number is doubled and the previous number is added to it to form the next number. From the 1:3 series diagonals of successive squares are generated and corresponding sides from the 1:2 series (Lawlor, R., 1994. P. 68).

A similar progression is observable in the *Gaz* dimensions of the Taj Mahal as analysed in *fig 12* where the 'geometrical' proportioning is based on the properties of the square and the rotated square which involves 2.

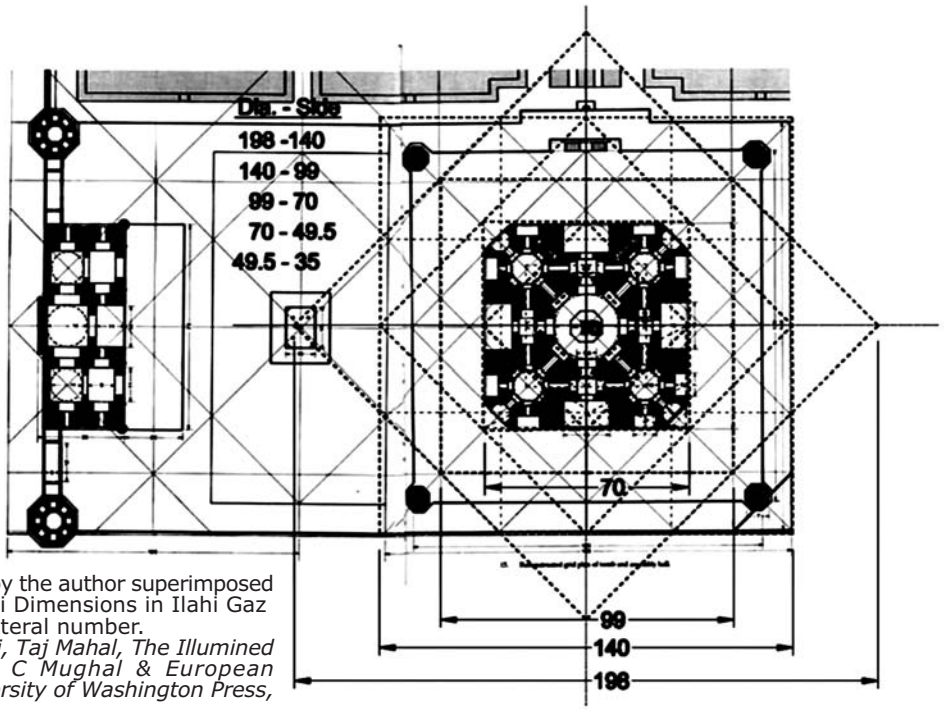


Figure 12: Geometrical analysis by the author superimposed on an analysis by Begley & Desai Dimensions in Ilahi Gaz show the use of Diagonal and Lateral number.
Source: W.E. Begley & Z.A. Desai, Taj Mahal, The Illumined Tomb, An Anthology of 17th C Mughal & European Documentary Sources, The University of Washington Press, Seattle & London, 1989.

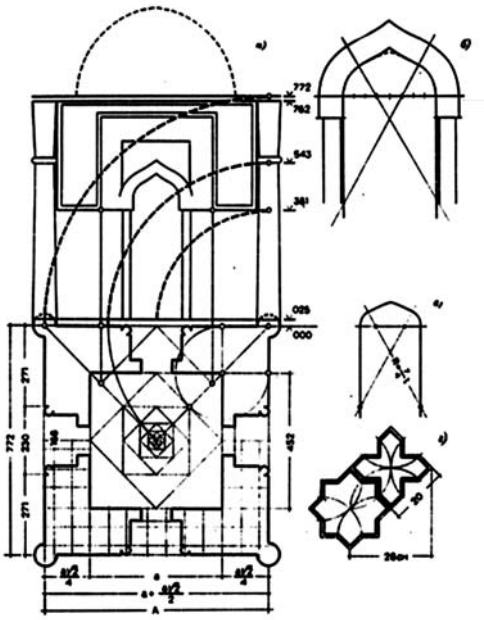


Figure 13: Grid as approximattion of irrational numbers. *Source: Bulatov, 1979*.

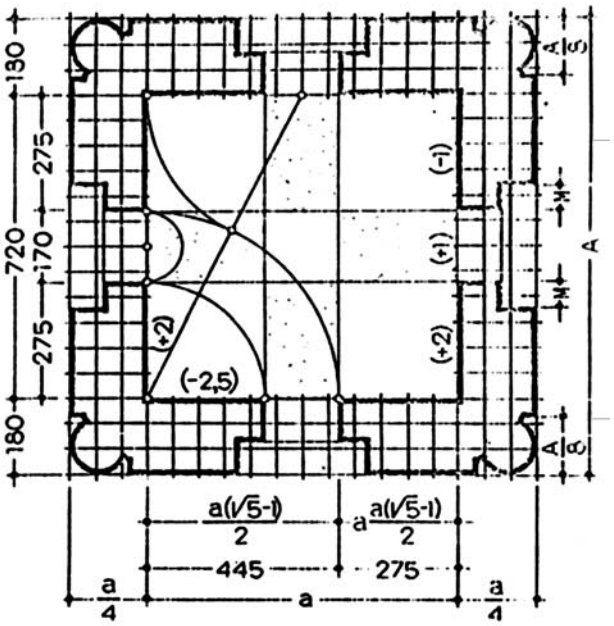


Figure 14: Grid as approximation of irrational number. *Source: Bulatov, 1979.*

In Bulatv's analyses, as for example in *fig. 13* where the 2 system and *fig.14* where the Golden Ratio is rationalised by the use of these concepts in terms of the module and its subdivisions.

These examples and methods show the use of irrational numbers as well as their whole number or fractional approximations – termed the 'geometrical' and the 'analytical' methods by Golombek and Wilber.[11] Discussed above in section a) Design Process. This points to a direct link between the methods discussed above and the mathematical training of the traditional architect.

PART V: EXAMPLES FROM THE SUB-CONTINENT - PAST AND PRESENT

Sheesh Mahal, Lahore Fort (1631-32 AD) As in other Islamic lands, Mughal buildings too were designed and constructed by highly skilled professionals. For example in *Tarikh-i-Akbari* (1580-84 AD) Muhammad Arif Qandahari while describing the *Buland Darwaza*, Fatehpur Sikri (1573-74 AD) mentions that 'Skilled engineers (*muhandisan*) and incomparable masters (*ustadan*) laid its foundation … and dextrous masters (*hunar varan*)' were employed in the project (Brand et el, 1985. P.56), (Muhammad Arif Qandhari, 1580 – 84).

Similarly a standardised system of mensuration is evidenced through historical sources, for example, Jahangir's descriptions of the Fatehpur Sikri buildings built by his father Akbar, give detailed measurements of various parts:

'The length of the mosque from east to west, including the width of the walls, is 212 yards. Out of this, the *Maqsura* (the chancel) is 25-1/2 yards broad, the middle is 15 yards by 15, the portico (*pishtaq*) is 7 yard broad, 14 yards long; and 25 yards high….' (Nur-ud-Din Muhammad Jahangir, 1624), (Brand et el, 1985. pp. 60-61).

11 Discussed above in section (a) Design Process.

My calculations show that the size of the *Gaz* in Akbar's *Buland Darwaza* (Fatehpur Sikri) and Shah jahan's *Sheesh Mahal* (Lahore Fort) are exactly equivalent i.e. 813mm or 32 inches. This shows a remarkable consistency in the measuring unit, the *ilahi gaz* from Akbar to Shah Jahan. This matches Ebba Koch's assertion that the ***Gaz*** or the Mughal linear yard (also called *zira'*) was the *Gaz-i Ilahi* introduced under Akbar which varied from 0.81 – 0.82 m i.e. 31 - 7/8" – 32 – 9/32" (Koch, E., 1991).

Figs. 15 & 16 show the 'Geometrical' and '*Gaz*-grid' analyses respectively, of the *Sheesh Mahal* built by Shah Jahan in the Lahore Fort in 1630-31 AD. The Geometrical Analysis (*fig 15*) shows that all the main divisions of the plan are derived from a series of rotating and inscribed squares.

In the *Gaz*-Grid Analysis shown in *fig 21,* the grid is of 2.5 *gaz;* the over-all length 62*gaz*; the width of the court 40*gaz*; the central Veranda of the Sheesh Mahal 20*gaz*; the side double storey verandas 10 *gaz*; the inter-columnar distances for the two verandas 6*gaz* and 3*gaz* respectively; length of the *Naulakha* Pavilion in the West 10 *gaz;* the round portion of the central pool 13*gaz*.

CONTEMPORARY CRAFTSMAN'S DRAWING (1977)

A page from *Ustad* Rahim Bukhsh's unpublished hand-book of assorted drawings, consists of traditional design elements. These drawings have been drafted by the *Ustad* himself in the 1970's. *Ustad* Rahim Bukhsh was a well-known master-mason from Multan in the Punjab province of Pakistan.

The final drawings in the hand-book dated 22 - 4 -77 are a plan drawing (*fig.17*) and a sectional elevation (*fig.18*) of a mosque. These mark a logical conclusion to the folio, for all the elements illustrated in the rest of the folio – arches, domes, *minars, chatris*, etc - metaphorically come together, to make a whole – a mosque.

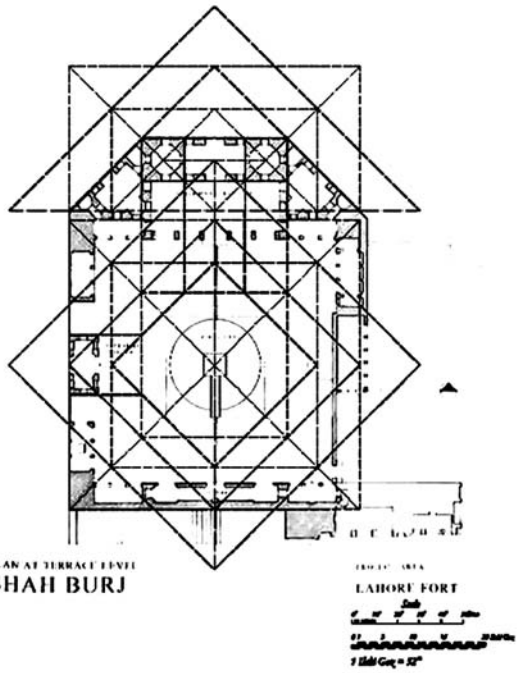


Figure 15: Geometrical Analysis (Analysis by the Author)
Drawing Source: M. N. Mir, M. Hussain, James L. Wescoat (eds), Mughal Gardens in Lahore - History & Documentation, by Dept. of Architecture, UET, Lahore, 1996.

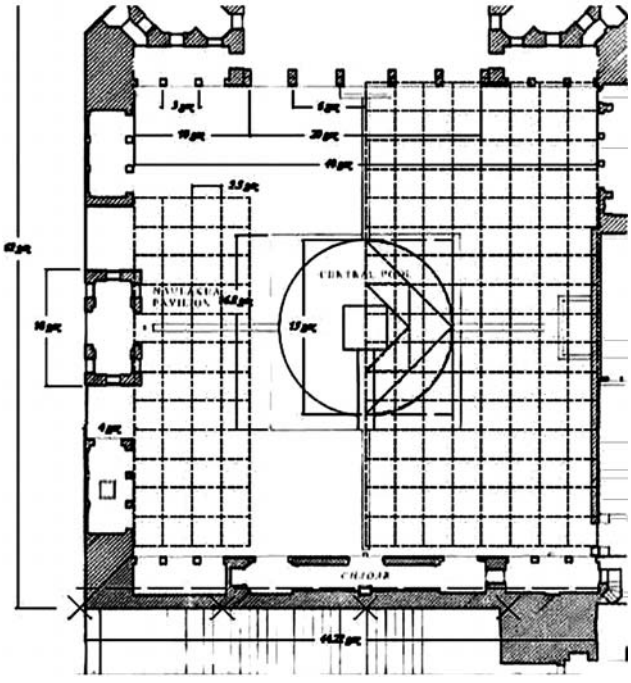


Figure 16: Gaz-Grid Analysis, Sheesh Mahal, Lahore. (Analysis by the Author)
Drawing Source: M. N. Mir, M. Hussain, James L. Wescoat (eds), Mughal Gardens in Lahore - History & Documentation, by Dept. of Architecture, UET, Lahore, 1996.

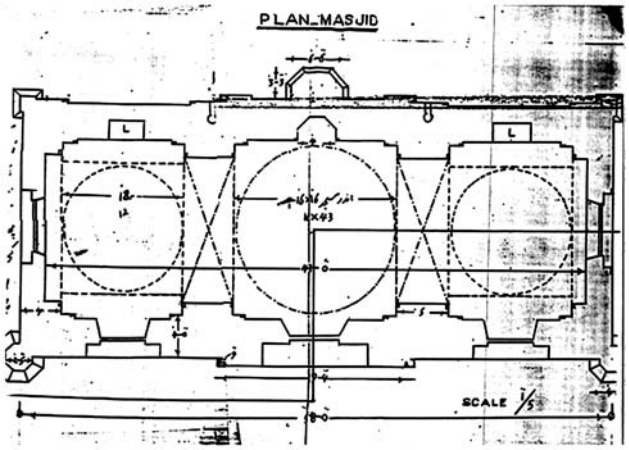


Figure 17: Plan of Mosque drawn by U. Rahim Buksh.
Source: Anjuman Mimran.

In the margins of the ground plan is a note of instructions, which is translated below:

'As many feet as is the length of the mosque, half of that much in inches, should be the base of the Minar. [i.e. the base of the Minar is 1/24th of the length of the mosque]

The central bay -Taj - should be one-third of the length of the mosque.

As many feet as is the Taj, half of that much in inches, should be the base of the small-minar. [i.e. the base of the small-minar is 1/24th of the length of the Taj, which itself is 1/3rd of the total length of the mosque].

What the width of the mosque is on the inside, one-fourth of that should be the thickness of the walls.

The two interior walls should be one-fourth more than the outer walls. The foundation should be one-third of the interior width.

To state the main observations on the drawing (illustrated in fig.19) in the light of the design process outlined by Bulatov, one can see that for the interior organisation of spaces, the side of the central prayer room acts as the 'Generative unit'. The mihrab, side rooms, and wall thicknesses are all related to this 'Generative unit.'

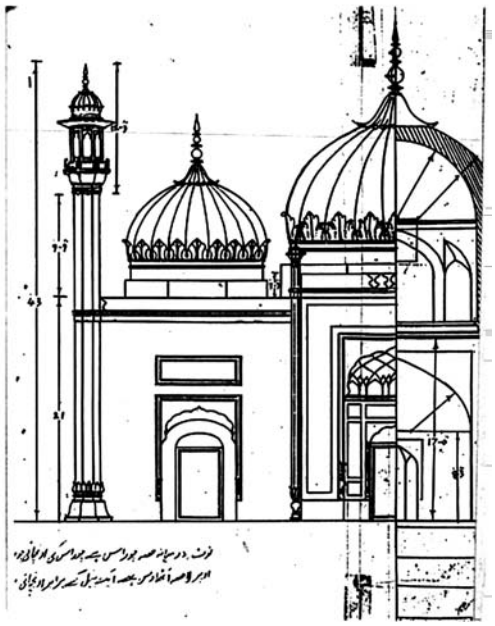


Figure 18: Elevational Section of Mosque (Part) drawn by U. Rahim Bukhsh.
Source: Anjuman Mimran.

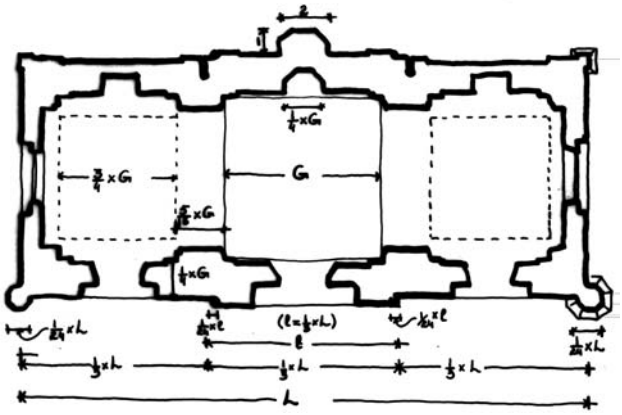


Figure 19: Analysis of Ustad Rahim Bukhsh's marginal note regarding the mosque proportions.
Source: MA Dissertation. De Montfort University, Leicester, UK. 1999.

For the elevation the ratio of the bays to each other is 1:1:1, although the central bay is raised to mark it out as the Taj. What is more subtle is that the ratio of the base of the main Minar to the total length of the mosque is the same as the ratio of the small minar to its own bay i.e. the Taj. This is an example of relating a 'microcosm' to a 'macrocosm' through the use of a discontinuous ratio, of the type a : b : : A : B.

It is extremely interesting to note that the ratio between the overall length and width of the Mosque 58ft : 24ft, accurately expresses the relationship A : A (v2 – 1) which is the ratio between the side of a square – in this case 58ft - and the side of an Octagon inscribed in it – which becomes the width of the mosque. Geometrically this can be arrived at by two rotating squares as shown in *fig 20a*. The square on side 24' and its rotated square give a few more elements: the size of the main opening and the approximate size of the main chamber. The plan also follows a whole number modular grid of 2ft (*fig 20b*).

The above analyses of the Sheesh Mahal and Ustad Rahim Bukhsh's drawings illustrate a remarkable continuity of principles and methods well into the 20th century. These analyses also point to a commonality of design principles and methods between the Subcontinent and Central Asia. By the same token it can by hypothised that this commonality can be extended to Islamic architecture in other Islamic lands as well.[12]

One aspect of these on-going studies by the author is to show the methods described by Bulatov can be used to study the methods of design used in the Mughal Architecture of the subcontinent.

PART VI: METHODS OF DESIGN - CONTEMPORARY APPLICATION

Figs 21 and 22 show the geometric scheme for a small community mosque designed by the author in Sally Town, a new housing development in Lahore. The overall design of the mosque was based on a survey of the various taditional and historical mosque-types in Lahore. The plan geometry was inspired by the Mughal period Bhangianwali Mosque; the elevational scheme is based on the now demolished Chinianwali Masjid and the domes, on the Shah Jahan period Tibbi Bazar mosque.

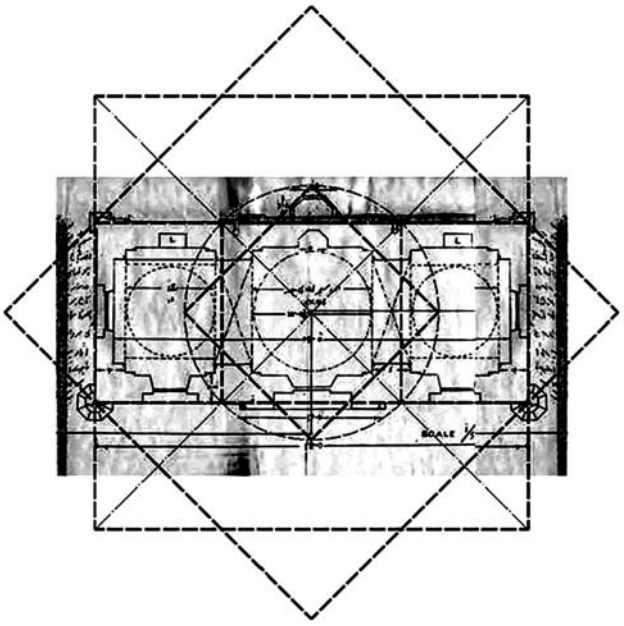


Figure 20a: Geometrical analysis of U. Rahim Buksh's Mosque Plan. Analysis: Author.
Drawing Source: Anjuman Mimran.

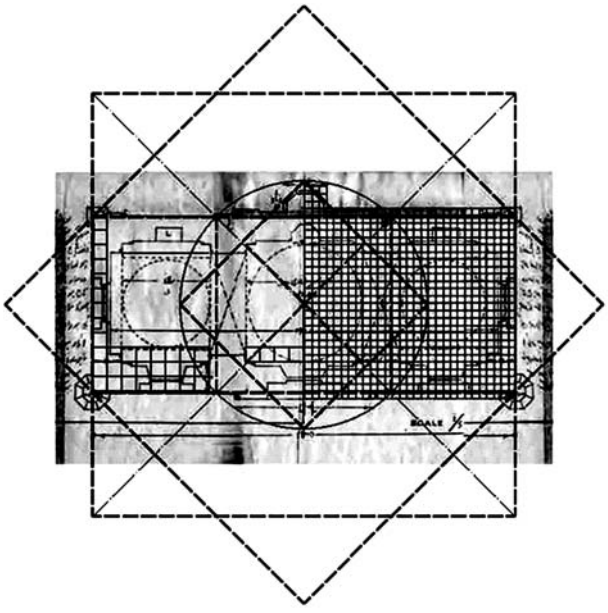


Figure 20b: Modular analysis - 2ft grid and 1 ft grid - of Mosque Plan by U. Rahim Buksh.
Drawing Source: Anjuman Mimran.

12 As discussed earlier in Part-IV: Design Methods.

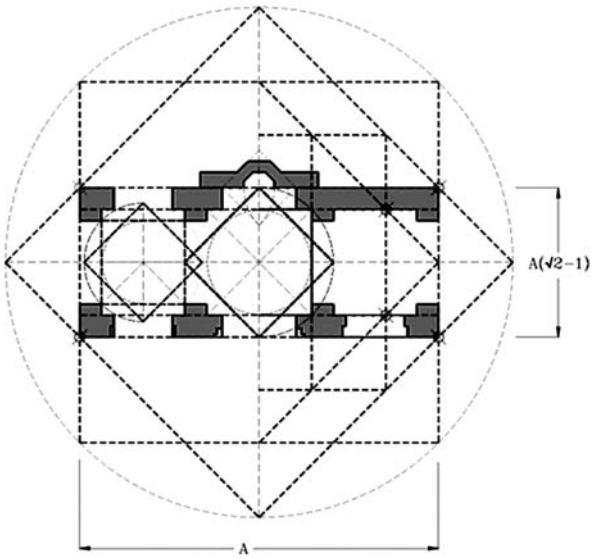


Figure 21: Basic Geometic proportions for Sally Town Mosque based on rotating squares.
Drawing: Author

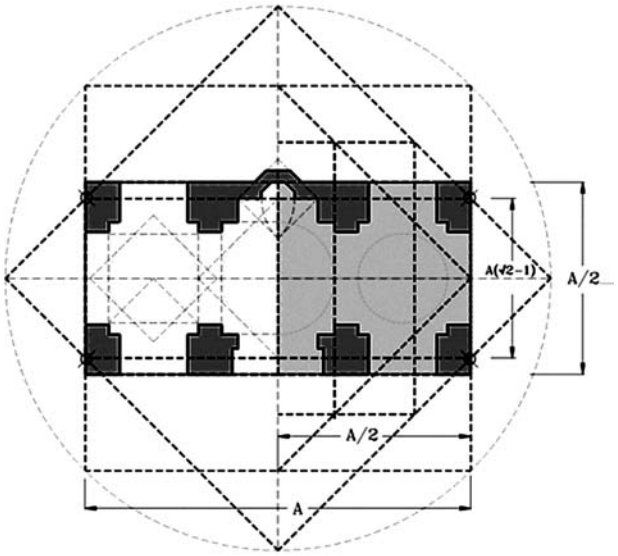


Figure 22: Final Geometic proportions for Sally Town Mosque with depth increased to 1/2 of length (A).
Drawing: Author

The elevational geometry of the Sally Town Mosque was based on an analysis of the historic and now demolished Chinianwali Mosque (1669 AD), Mohallah Chabaksawaran, Walled City Lahore. The geometrical analysis was reconstructed from a published plan and a photograph of the elevation in Abdullah Chughtai's book on the mosques of Lahore (Chughtai, Dr. M. Abdullah, 1976). The central archway is arrived at by the use of the Golden Cut as shown by the thicker dotted lines while the rest of the divisions are derived from this cut coupled with various cuts derived from rotated and inscribed squares with the length of the façade as starting point.

CONCLUSIONS

In the context of our[13] design practice we have been exploring and applying the theoretical frame-work of traditional design on all types of projects, including residential, religious and institutional. The motivating factor behind undertaking studies of traditional design methods is to creatively apply these methods and principles in our contemporary design work with the aim of achieving something of the 'time-less' quality of traditional architecture.

In the beginning of this paper we designated the constituent elements of traditional Islamic architecture as: 'Grammar of Architecture' as embodied in the Hasht Bihisht nine-square Mandala plan-form; 'Principles of Design' which include symmetry, harmony and emphasis on the centre; 'Vocabulary of Elements' like arches, geometric patterns, domes etc.; and finally 'Methods of Design' which include geometrical proportioning, as discussed in this paper.

In our practice we have been able to employ the traditional 'Principles of Design' to all aspects of design from the organization of the plan to the ordering of elevations / section and their constituent elements.

'The Grammar of Architecture' embodied in the Hasht Bihisht nine-square Mandala plan-form, is also always used in our designs. Although in residential projects it is interpreted in the context of contemporary living, building by-laws and construction methods which often do not allow

13 Kamil Khan Mumtaz Architects.

the traditional spatial typologies. But the essential idea of organizing the building around a national centre remains, translated often to a central double-height atrium space figures 28 & 29 illustrate such a space in a Karachi house designed by our office (see also figure 26 & 27). In buildings which perform traditional functions like mosque or tombs we are able to use the traditional grammar in a purer form. On the other hand we find that we are using the traditional 'Vocabulary of Elements' more and more freely in all buildings types. These include designs for doors, ceilings, floor-patterns, jharokas, arches, lattices etc.

Lastly, in the case of applying traditional 'Methods of Design' we usually have a modular grid which works both in plan and in elevation / sections. In the use of geometrical proportioning we have so far found it easier to apply these in the more traditional buildings like mosques and tombs (see figures 23, 24 & 25 for Sally Town Lahore and figures 29 & 30 for a Mazar in Karachi). This is so because in these buildings, we have been able to successfully use traditional buildings materials, methods and vocabulary. Although as we get a better understanding of the traditional methods of proportioning through our on-going research, the challenge now is to apply these methods creatively to all categories of buildings.

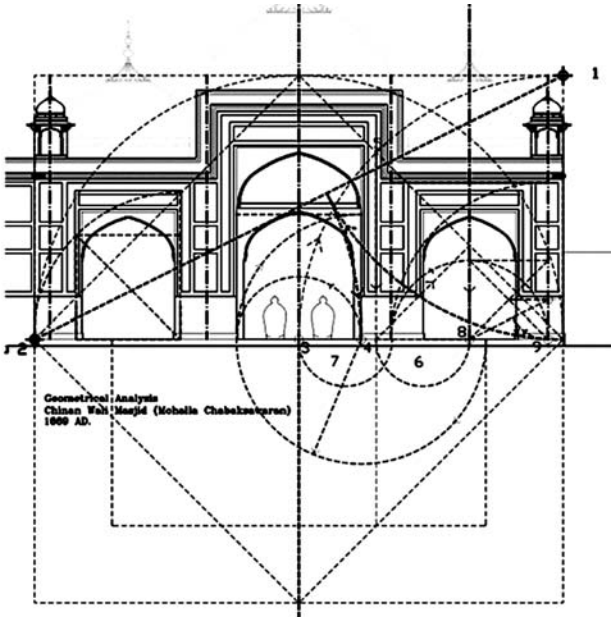


Figure 23: Partly hypothetical Analysis of Chinianwali Mosque (Mohallah Chabaksawaran 1669 AD). *Drawing: Author.*

Figure 24: Front elevation Sally Town Mosque Lahore, 2009. *(Photo: Author).*

Figure 25: Interior Sally Town Mosqe, 2009. *Source: Iqbal Alam's photos on Flickr.*

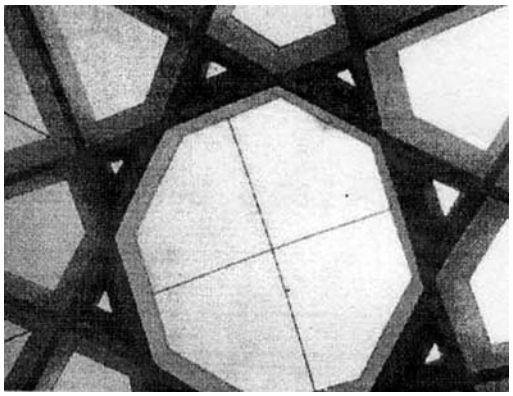
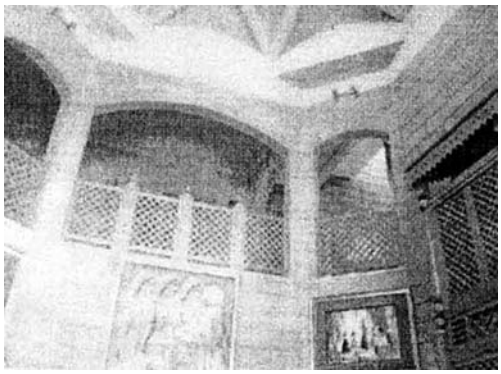
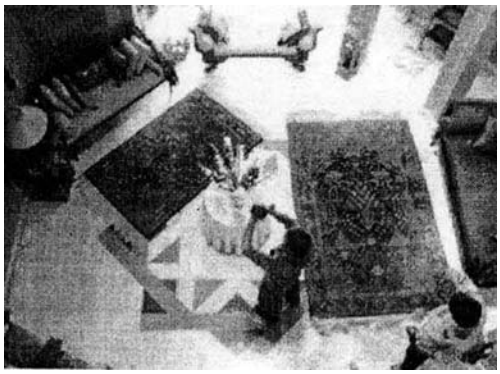





Figure 26 - 29: Azra Shaheen House, Khayaban-e-Hilal, Phase-VI, DHA, Karachi. finished in 1998. Organized around a central atrium. Fig 28 & 29 the house uses fair-faced load-bearing concrete block walls and pyramidical domes supported by concrete beams. *Photos by Hassan Abbasi, 3rd Year, Dept. of Architecture, NED.*

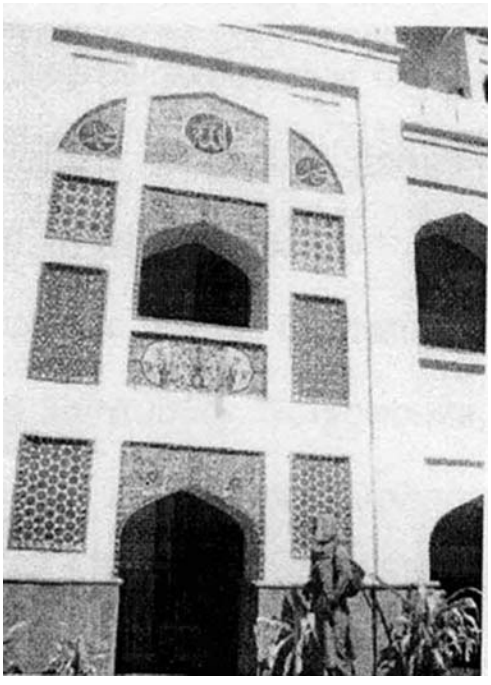



Figure 30 - 31: Hazrat Ahmed Sahib Mazar in Sakhi Hasan Graveyard, Karachi, finished in 2010, utilizes Geometrical Proportioning methods along with traditional vocabulary and elements. The tile-work was manufactured by traditional craftsmen from Nasrpur, Sindh. *Photos by Hassan Abbasi, 3rd Year, Dept. of Architecture, NED.*

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RE-CONSTRUCTING A PUBLIC HERITAGE BUILDING CASE STUDY: Western Wing of Lahore High Court Building, Lahore

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ABSTRACT

Violating the Punjab Special Premises (Preservation) Ordinance 1985, Lahore High Court (LHC) authorities demolished an enlisted, protected public building i.e. Western Wing (W.W.) of Lahore High Court (LHC) Lahore in year 2004. The argument for demolition of 90 years old colonial building was based on "The Law of Necessity"[1]. To fulfill the immense need of accommodation of eight-number court rooms, LHC Administrative Authorities decided to raze the existing single storey heritage building of W.W. and construct a double storey structure. Architects, Archaeologists and Civil Society representatives launched an aggressive agitation to stop the demolition but authority proclaimed, *"LHC building is not a shrine that can not be demolished or re-constructed"* (Daily Times, 2004a).

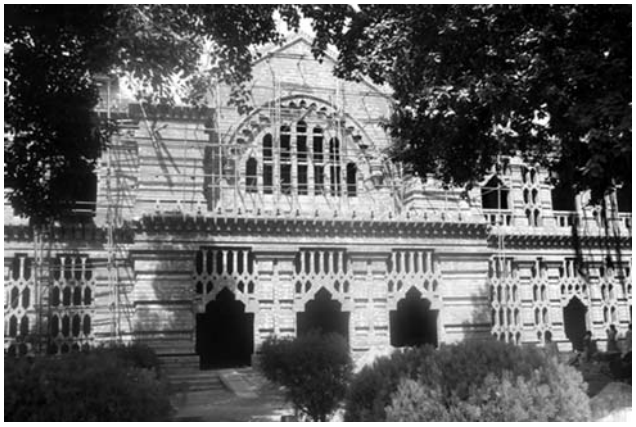


Figure 1: Eastern Elevation of Newly Constructed W.W. of LHC Building

Lahorites approached Supreme Court who passed stay order against demolition and directed LHC authorities to re-construct the razed building, following the ditto architectural features in its true spirit and using the similar construction materials. Supreme Court further desired to appoint an experienced Resident Architect for such specialty job of intricate nature.

This study reveals the integrated-coordinated efforts of administrative authorities of LHC,[2] technical and professional input of Communication & Works Department,[3] concern of architectural professional bodies[4] and supervisory role of Resident Architect working under government conventional system of execution, having expertise in re-creating the historic building of Colonial period having heritage value.

Study also presents a comparison between conventional methodology of execution of a public heritage building as practiced by Communication and Works (C & W) Department, Government of Punjab (GoP), and the integrated-coordinated design approach where Resident Architect and Client Department had played a vital role while working with the Contractor and Engineers of C & W Department.

Key Words: *Colonial Building, Heritage, Lahore, Architecture, Archaeology, Restoration, Public Building, History, Lahore High Court. Brick Masonry.*

1 The term is used in its popular idiom as defined by the LHC in its judgement whilst replacing the elected Prime Minister and imposition of Army Chief as Chief Executive of Pakistan.
2 Administrative Authorities of LHC mean Registrar, Chief Justice, Judges' Committee as constituted by Supreme Court in its decision.
3 Offices of the Chief Architect and the Chief Engineer, Punjab.
4 Pakistan Council of Architects & Town Planners and Institute of Architects Pakistan, Lahore, Islamabad and Karachi chapters.

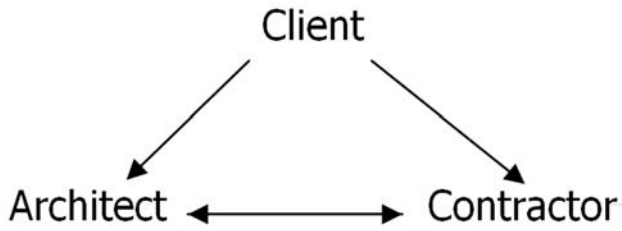
ACRONYMS

A. A.: Administrative Approval[5]
C & W: Communication & Works
D.D.C.: Departmental Development Committee[6]
GPO: General Post Office
GoP: Government of the Punjab
IAP: Institute of Architects, Pakistan
LHC: Lahore High Court
P & D: Planning & Development Board[7]
RCC: Reinforced Cement Concrete
T. S.: Technical Sanction[8]
W.W.: Western Wing[9]

INTRODUCTION

W.W. of LHC building has been re-constructed truly following the architectural features of existing main building, using the cement-*surkhi* mortar and fair-face masonry work. It has become a state of the art building, internally loaded with all modern facilities and interior design component.

In private sector, architectural designing and building construction activity is envisaged and implemented by three key actors, linked mutually with a strong triangular relationship as under;



Contrary to the Private Sector, in Public Sector the whole activity revolves around the engineers of C&W Department who dominate because they hold the financial control of the project since its inception till handing over. In fact, Engineers have purposely minimized the role of above mentioned three actors. This has resulted in shabby form of public buildings, having the only merit that these buildings have no architectural merits. One can recognize these public buildings distinctly because of the poor aesthetics and lack of rich architectural details. But in case of newly constructed W.W. of LHC building, such impression stands no more.

Before going into details of the project, it would be appropriate to know briefly about the annals of earlier construction of LHC building during the late decades of 19th century, in Lahore.

BRIEF HISTORY OF LAHORE HIGH COURT

The British annexed the Punjab in 1849 A.D. and for its management immediately constituted a Board of Administrators comprising three members (en.wikipedia.org). The Board was empowered as a *Sudder* (Chief) Court of Judicature and Board of Revenue. After passing of four years (in 1853 A.D.), Board of Administrators was dissolved and two Principal Commissioners separately, one for Judiciary the other for Administration, headed by a Principal Commissioner, were appointed. The Judicial Commissioner was the Chief Judge of Appeal and his court was the final appellate court. The Chief Court Act IV of 1866 conferred powers upon the Chief Court of the Punjab to act as the ultimate Court of Appeal for Civil as well as Criminal Courts in the Province. It was upgraded as Lahore High Court, Lahore, on March 21,

5 "Administrative Approval" means an allocation of funds in fiscal year for particular project planned to be executed under set pattern of C & W Department, Government of Punjab.
6 D. D. C. is a Departmental Development Committee headed by chief of any Government Department i.e. Secretary to Government, Medical Superintendent, District Coordination Officer, etc. and other members representing Finance Department, P & D Board. Executive Engineer
7 Planning & Development Board is provincial Department where budgeting and allocation of funds for all the development works is approved before the Annual Budget of province.
8 The term "Technical Sanction" is used for the estimates of the works where scheduled and non-scheduled item rates are approved by the Executive Engineer, Superintendent Engineer or Chief Engineer according to ones' competency, well before the advertisement of tenders in the daily newspaper.
9 Western Wing means the Western Wing of the main LHC building.

1919 A.D. Presently, other three High Court Benches in Punjab are functional at Rawalpindi, Multan and Bahawalpur Divisions.

The main building of LHC, previously known as Chief Court was constructed during 1880-1889 at the cost of Rs3,81,837/ (en.wikipedia.org). Its architectural style is Anglo-Indian, designed by the English Architect Brossington and constructed by Hilton being Executive Engineer. In 1919, Eastern and Western Wings were constructed when the High Court was established. It has now become a symbol for Justice. Brick masonry, *kankar*-Lime mortar with partial use of *Noshehra* Pink marble and Terra-Cotta *Jali* were the main building materials used.

DEMOLITION OF WESTERN WING OF LHC BUILDING

It was in early 2004 A.D., when Administrative Authority of LHC desired a new building to accommodate eight number LHC Judges' court rooms. No space was available as on southern side, new blocks were already constructed in 1973-74. On eastern side, across the road, behind the State Bank Building, the government land was vacated from encroachers and buildings for Advocate General Office and multi-storey parking was started. Under such circumstances, LHC authorities decided that the single storey W.W. of LHC may be replaced by a double storey structure, accommodating the eight-number court rooms that were of the immense requirement, according to their point of view.

Chief Architect Office of Communication & Works Department was asked to prepare the preliminary architectural plans and elevations following the decorative features of the existing building. The office submitted the plans and elevations in March 2004. In principle, it was further decided that in the second phase, Eastern Wing of LHC building would also be re-constructed following the same pattern.

Contract to the tune of Rs1.50 million dispose was awarded to the contractor to raze the old single storey structure and dispose off the debris. When first hammer dropped on the enlisted-protected building of LHC's Western Wing, its resonance was heard all over the country. Archeologists, Architects, Civil Society and *Lahorites,* all took notice of it and started agitation to stop the Law-protection institution from such illegal action, but it was ignored by the authorities.

AGITATION AGAINST DEMOLISHING THE HERITAGE BUILDING

In an annual Architects' Convention held at Lahore in year 2004, Institute of Architects, Pakistan (IAP), Lahore Chapter, took first notice of demolition of an enlisted-protected heritage building of LHC. A resolution was passed in which the point of view of the Chief Architect Office, Punjab, was condemned for his words, *"When cancer is spread in a part of body, it becomes essential to cut it off".*

When demolition started in August 2004, Architects, Archaeologist and Civil Society started agitation on the roads, in press and electronic media. The slogans such as, "Save our Heritage", "Stop demolition of our 100-years old landmark", "Retain Lahore's Structure" etc. were inscribed on the placards raised by the demonstrators (The Daily Times, 2004a). Protesters criticized the LHC authority's statement in which they had said, *"it is not the building but the function performed that is significant*". IAP passed another resolution to condemn the acceleration in demolition work instead of stopping. Architects across from the Pakistan gathered outside LHC building on September 6, 2004 but could not succeed in persuading the authorities to stop demolition. The LHC authority refused to hear them and asked them to make an official request for meeting (The Daily Time, 2004b).

On September 11, 2004, an advocate moved against razing of W.W. of LHC building and sued LHC through its Registrar, Building Committee through LHC Registrar, Federation of Pakistan through Secretary Culture, Information & Youth Affairs, Punjab Government through Chief Secretary Punjab, Archaeology Department through D.G. Archaeology and LHC Bar Association through its secretary (The Daily Times, 2004). The petitioner said that the LHC building had immense historical value since

Quaid-e-Azam had appeared for Ghazi Ilm al-Din Shaheed in the murder case of a Hindu for passing sacreligious remarks about the Prophet Mohammad (peace be upon him). IAP Lahore, Islamabad and Karachi chapters passed resolutions against this act of demolition and demanded to immediately stop the further razing of heritage building.

HIGH COURT PROCEEDINGS

After agitation of the architects, archeologists, Civil Society etc., Chief Architect Office Punjab refused to provide the architectural drawings to LHC authorities. A writ petition (W. P. No. 5775/2005) was filed in the court of Justice Abdul Rashid, LHC Lahore, where it was pleaded that in the W.W. of LHC building, the room-size were too small to serve the purpose of court. That's why it was decided by the LHC to re-construct the block accommodating the eight-number court rooms.

On approaching the President of Pakistan, a special committee was constituted to resolve the controversy. Committee was headed by Federal Secretary Law, Justice (R) Mansoor Ahmed, along with other two members Professor Dr. Anis A. Siddiqi[10] and Dr. Muhammad Aslam[11]. The objective was "to develop a consensus by which the concern of the Institute of Architects, High Court Bar and general public may be addressed and simultaneously meet the needs of the High Court".

From September 18 to December 20, 2004, Committee held several meetings with the stakeholders. The Structure Engineers of Engineering University, Lahore, on request of the committee visited the under demolition building and gave their expert opinion. In the last meeting of committee as held on December 20, 2004, following consensus emerged out:

"In view of the report received form the University of Engineering, the present structure of the western wing of the Lahore High Court is capable of bearing the construction of six court rooms by adding an inter floor. The façade of the western wing from the courtyard side which stands partly demolished shall be restored by utilizing, as much as possible the material available at site or by the use of compatible raw material. As regards the façade from the Bar room side, the setback can be aligned to create additional space. The height of the different panels as has been indicated in the documentation prepared and presented by the Chief Architect shall be maintained as far as possible".

Committee also made following recommendations;

i. The Chief Architect, Government of the Punjab, may be asked to prepare a fresh layout and line-plan for construction of 6 Court Rooms, 3 on Ground Floor and 3 on First Floor in the light of above decision.

ii. Auction contract of demolition of western wing of the High Court shall be cancelled and the amount deposited by the Contractor in the Government Treasury, shall be refunded, with compensation considered appropriate.

iii. The High Court may undertake the new construction within a parameter of the principle already settled with consensus between High Court and Principal of the Civil Society. In that case the High Court may give a fresh contract for new construction with credit whole material.

Recommendations of the committee were presented before the authorities of LHC but they did not agree and initiated case against the Secretary C & W and Chief Architect office, to provide the architectural drawings. Several hearings were held in High Court on 12-04-2005, 13-04-2005, 16-05-2005, 23-05-2005, 30-05-2005, 02-06-2005, 06-06-2005, where various stakeholders were called by Justice,

10 Chairman College of Arts and Design, University of The Punjab Lahore.
11 Urban Planner/Engineer, Lahore

LHC, and their point of view was registered by the court. On 06-06-2005, Registrar LHC presented his point of view as under:

1. The Punjab Special Premises (Preservation) Ordinance, 1985 is not applicable to the W.W. of Lahore High Court.

2. For technical reasons, the existing structure cannot be renovated to make out functional court rooms.

3. In view of above, the existing structure is to be demolished for constructing six or eight court rooms (double storey structure – three/four on ground floor and three/four on first floor) which shall be symmetrical with the veranda of the court room No. 3, to maintain the height and features of the said block.

Secretary C&W Department expressed his reservation whilst taking stand on the basis that the LHC building has been declared as Special Premises within the preview of Punjab Special Premises (Preservation) Ordinance 1985.[12]

In the judgment, it was said that the portion of the LHC building which is required to be reconstructed is flanked, rather surrounded by other buildings within the LHC premises and is not visible from the road side which runs around LHC i.e. Shahra-e-Qaid-e-Azam, Nabha Road, Turner Road and Fane Road. Further It was revealed that in the past, construction work within the High Court premises had been undertaken in which entire wing comprising several court rooms had been constructed on the pattern of the old High Court building, design and structure wise.

Further, court deliberated "The High Court building is not to be viewed purely as a monument for its designs and architecture but it has to serve a purpose which is to provide court rooms. Reconstruction of W.W. of LHC building is required to serve the prime purpose of provision of court rooms. Therefore, to serve the prime purpose, if some minor portion is to be demolished and then reconstructed on the design and pattern of the old building then it can not be held violation of any Law or public policy". Finally, Justice LHC gave 10 days time to Secretary C&W Department to prepare architectural drawings for eight number court rooms. He was further directed to prepare estimate of the said proposed building and come up on June 17, 2005 for further proceedings.

SUPREME COURT PROCEEDINGS

Professionals, Civil Society and *Lahorites,* by joining hands, approached Supreme Court and finally succeeded in getting stay order against the demolition of W.W. of LHC building. On direction, Advocate General Punjab prepared and submitted a report before a Three-Member Bench of Supreme Court where it was mentioned that W.W. of LHC building was in a dilapidated condition (The Daily Times, 2004d). Its verandas were about to collapse. These were the reasons that authorities of LHC decided to demolish this part of the building despite the opposition of custodians of cultural heritage. Report also mentioned that various changes in building were made in 1974 and in 1999 for its repairs and upgradation.

After hearing the arguments of both sides, Bench of Supreme Court issued directions for constitution of a Committee comprising two LHC Judges[13] who would be entrusted the mandate of ensuring the re-construction of the demolished part of the building in its previous form, following the earlier architectural features of the building after consulting the architects and engineers (The Daily Times, 2004d). LHC asked the Ministry of Law Islamabad to appoint an experienced Resident Architect having expertise of restoration of Colonial period buildings. Whole of this process

12 Section 5 says, "No alteration in or renovation, demolition or re-erection of such portion of a Special Premises as it visible from outside, or any part of such portion, shall be effected without the prior permission in writing of the Government or a Committee."

13 Justice Hamid Ali Shah and Justice Tariq Shamim of LHC were members of the Construction Committee constituted by Chief Justice LHC in compliance of directions of Supreme Court.

took two years and re-construction of W.W. of demolished LHC building started in November, 2006.

GOVERNING LAWS

In Punjab, following three governing laws protect the heritage buildings and prohibit additions, alterations, and reconstruction within special premises of the protected-enlisted monuments:

a) Antiquity Act 1975 (as amended in 1992)

b) The Punjab Special Premises (Preservation) Ordinance, 1985

c) Tajdeed-e Lahore Board Ordinance 2002

a. Antiquity Act 1975 as amended in 1992

Before 1985, preservation and restoration of the archaeological monuments, buildings, and sites was purely Federal subject, under Antiquity Act 1975 as amended in 1992. Antiquity Act imposes restrictions on repairs, renovation, reconstruction, etc. of protected immovable antiquity (Antiquity Act, 1975a). It enacts punishment for a term which may extend to six months or with fine which may extend to five thousand rupees or with both (Antiquity Act, 1975b). The Act empowers Director General to arrest any person against whom there is reasonable ground to believe that he has committed an offence.

b. The Punjab Special Premises (Preservation) Ordinance, 1985

Ordinance 1985 restricts from changes, renovation, demolition or re-erection as visible from outside, without permission in writing of the Government or a Committee (The Punjab Special Premises (Preservation) Ordinance, 1985a). Ordinance restricts the authority, the local body from approving any plan in relation to a Special Premises without prior permission of the government or a Committee (The Punjab Special Premises (Preservation) Ordinance, 1985b). It does not allow any development or scheme or new construction on or within a distance of two hundred feet of a Special Premises except with the approval of government or a Committee (The Punjab Special Premises (Preservation) Ordinance, 1985c). Ordinance authorizes imprisonment for one year or fine or with both, on contravening (The Punjab Special Premises (Preservation) Ordinance, 1985d).

c. Tajdeed-e-Lahore Board Ordinance 2002

Tajdeed-e-Lahore Board Ordinance 2002 was promulgated "to maintain, preserve, and restore the Buildings, Heritage, and Monuments and to keep them in original and presentable condition". Ordinance jurisdiction was limited to the district of Lahore. Ordinance authorizes a magistrate to punish against such offences following the procedure as laid down (Tajdeed-e-Lahore Board Ordinance, 2002). On violation, a person can be penalized for one month imprisonment or fine for one hundred thousand rupees or both. Main content of the Ordinance deals with the powers of Board and Secretary of the Board instead of protecting the monuments declared as heritage buildings.

CRITICAL APRAISAL OF GOVERNING LAWS

Lahore High Court building is placed at Serial No. 64 on the list of protected heritage buildings as approved by the Government of Punjab. It is protected under all the three Ordinances/Act as given above. It is very surprising that in the presence of these laws, how a law enforcing agency decided to demolish the protected building. After going through the whole case, following reasons for demolition of W.W. of LHC Building come on the surface:

1. There were ample funds under Access to Justice Programme[14] for construction and upgradation of the judiciary buildings in Punjab in year 2004-05. LHC authorities were keenly interested to carry out some

14 Access to Justice Programme was launched by Federal Ministry of Law Islamabad with the financial support of Asian Development Bank to improve, upgrade and constitute the laws and infrastructure of judiciary in the four provinces.

remarkable development works in the premises of Lahore High Court. So they decided to reconstruct the Western Wing.

2. The room sizes of W.W. of LHC were small and not of any use for the offices or court rooms. It was thought to reconstruct the larger size rooms for better utilization.

3. It seems that the Chief Architect Office of Communication & Works Department was not aware of the protection of enlisted-heritage buildings. When Chief Architect Office was asked to demolish and reconstruct the W.W. of LHC building, nobody pointed out to the LHC authorities regarding the sensitivity of the matter. Previously it was a routine practice of C & W Department to add, reconstruct or repair the buildings within the premises of LHC.

4. Since promulgation of Punjab Special Premises (Preservation) Ordinance 1985, not a single case has been brought in the notice of Lahore High Court by the Archaeology Departmentwho are resp onsible for restoration and protection of heritage buildings. There is a long list of enlisted-protected shrines and mosques demolished and reconstructed by Auqaf Department[15] but Archaeology Department has never served any notice to the Secretary/Chiefl Administrator Auqaf.

5. All these ordinances made a provision for Committee or Board headed by Chief Minister, Governor, Chief Secretary, and Director General Archaeology. These authorities are directly responsible for this violation as they never took stand against these violations.

6. In Ordinances/Act, there is provision for constitution of rules but no one has made comprehensive rules defining the various terminologies, conditions, etc. This gives free hand to violate the restrictions.

RECONSTRUCTION OF W.W OF LHC BUILDING – VARIOUS ACTORS

A. Client Department Role: (LHC authorities)

i. Initiated the project
ii. Approved Architectural Drawing
iii. Approved PC-I in D.D.C. meeting
iv. Issued Administrative Approval

B. C&W Department Role: (Executing Agency)

i. Prepared estimate and issued Technical Sanction
ii. Allotted work and got it executed
iii. Prepared Structural Drawings
iv. Made Payments to the Contractor

C. Contractor Role: (Construction activity)

i. Execution of the Project
ii. Management of labour and building materials
iii. Maintenance and defects liability

D. Judges' Committee Role: (Project Monitoring)

i. Ensured quality and pace of work by visiting twice daily.
ii. Coordinated between Contactor, C&W Department, Resident Architect and LHC authorities.

E. Resident Architect Role: (Detailed Supervision)

i. Prepared & revised architectural Drawings
ii. Detailed supervision during construction
iii. Construction details as per site requirements
iv. Interior designing of court rooms
v. Ensured quality and pace of work

15 Punjab Auqaf Department has demolished and reconstructed mosques at shrines of Hadrat Ali Hujwiri and Baba Farid and the shrines of Badshahan Khoshab, Sakhi Saiden Shirazi, Bulleh Shah, Baba Kamal Chishti, Abdul Salam Chishti, Shah Hussain etc. All these mosques and shrines were en-listed protected monuments.

CONCERN OF STAKEHOLDERS DURING EXECUTION

The recommendations made by the Committee headed by the Federal Secretary as emerged with the consensus of all the stakeholders were ignored and never implemented by the LHC authorities. These include;

I. The present structure of the western wing of the Lahore High Court is capable of bearing the construction of six court rooms by adding an inter floor.

II. The façade of the western wing from the courtyard side which stands partly demolished may be restored by utilizing, as much as possible the material available at site or by the use of compatible raw material.

III. As regards the façade from the Bar room side, the setback may be aligned to create additional space.

IV. The Chief Architect office may be asked to prepare a fresh layout plan for construction of 6 Court Rooms, 3 on Ground Floor and 3 on First Floor.

In fact it was responsibility of the Chief Architect office to prepare a revised plan with three court rooms at each floor, including the setback, exiting towards the Bar room side. LHC authorities implemented the previously proposed plan of Chief Architect Office, accommodating the eight-number court rooms and not including the setback to widen the plot size. This resulted into smaller size court rooms lacking the ancillary requirements.

There is another side of the story also. When Director General Archaeology prepared a petition against demolition of protected building, he could not find a single professional architect to sign as petitioner. Every body, being a government employee or private practitioner was having his own reservations.

When execution started at site, no one among the stakeholders turned back to check and inspect the work under construction. The committee comprising the professionals, constituted by the Supreme Court was required to submit interim reports regarding the progress of work but not a single visit was paid by the committee during construction. Chief Architect office remained aloof during construction, never visited the site and did not give their professional input.

RE-CONSTRUCTING HERITAGE PUBLIC BUILDING - CHALLENGES

In pursuance of the directions of Supreme Court, it was a different type of experience to re-construct heritage public building, particularly using the existing features of brick-masonry on facade. For engineers of C&W Department, it was off the routine matter. The temperament, experience and approach of the government contractor were not of re-constructing the heritage building following the architectural details, perfectly and accurately. Judges' Committee was under pressure to meet the Supreme Court set criteria and was not having any experience of construction. Every one was worried to meet the targets of in time completion and to achieve the quality of work. All these stakeholders placed numerous challenges before the Resident Architect.

LHC authorities approved plan for double storey building (Fig. 02), each floor accommodating the four court rooms with Judges' Chamber, Secretary Room and attached washing rooms. The plan was prepared within the same area where building was demolished. The site limitations and fixation to provide the eight number court rooms left no choice for the architect. This resulted into square shape court room (31'-3" X 30') and comparatively smaller Judges' Chamber (11'x13'-3"). Provision for 10'-0" wide veranda on eastern and western sides of the building was another functional requirement to accommodate the petitioners whilst waiting for their turn to appear in the court. Each floor was having almost 11000 Sft. covered area. There was no capacity to enlarge the court room size unless court numbers were reduced from eight to six, but LHC authorities were not ready to accept any change in their requirement.

After excavation, foundations were laid down following the approved plan with minor adjustments in washroom and by adding the negative space of Dias area in Judges' Chamber and hence enlarging its size.

As proposed by Chief Architects' Office, the Eastern and Western Elevations were monotonous, simply composed of the repetition of one arch-element throughout the western façade (Fig. 03). The demolished structure was single story with veranda on one side but proposed W.W. of LHC building was double storey with 10'-0" veranda on both sides; this further reduced the useable space for court rooms.

CONTRIBUTIONS OF RESIDENT ARCHITECT

Appointment of Resident Architect on the project set precedent for the other public buildings to be constructed under a set pattern of C & W department. His presence not only controlled quality and pace of the work but also made certain at-site changes in proposed design which added to its functional and aesthetical values. Following are the few of the contributions made by the Resident Architect;

1. Chief Architect Office normally provides standard architectural drawings i.e. plans and elevations to the engineers. Resident Architect provided construction details of brick work, its pattern and minute details. He also provided As-Built Drawings. These detailed drawings left no option for the contractor and the engineers to deviate from the design, their specifications and construction details.

2. Keeping in view the time constraints, Engineers of C&W Department with the consensus of contractor and Judges' Committee decided to construct the double storey building by using the RCC frame-structure. Resident Architect did not agree and straight forwardly rejected the modern construction system and cosmetic treatment of fair-face brick on façade of building. He insisted for load-bearing masonry walls with stepped-footing for foundation.

3. In the eastern & western facade, C&W Engineers recommended inducing concealed RCC beams inside the masonry walls but Resident Architect insisted to cover the span of openings by using segmental-arch in brick masonry, in the traditional manner.

4. On the parapet of Ground and First Floors, there were 14" cantilevered brackets composed of brick projections (Fig.13). Engineers and contractor desired to mould the required shape in concrete and place it over the wall while embedded in horizontal RCC beam to take the load. Resident Architect refused to introduce such interventions. One specimen from the existing masonry projection was dismantled carefully and samples of special molded bricks were provided to the brick manufacturing agencies to fabricate required special size and shape of the bricks. Because of larger size and thickness of the bricks, there were de-shaped while cooking. Great patience was required to find out the proper person for making the moulds and the proper brick manufacturing agency, to manufacture.

5. On the western facade, an arch composed of stone-segments and balustrade along with terra-cotta Jali was used as an element (Fig.15). For specific quality of Noshehra Pink marble, stone markets in Northern areas were visited and selected. No mechanical device was available to cut the stone into curve shape. So archs' curved part was made manually.

6. Judges' Committee desired the "muqarnas on flat surface"- an element used in facade of the main building, to replicate on western facade of W. W. of LHC building. Study revealed that seven-types of molded-bricks were used to compose that muqarnas shape on flat surface. The shape of single mehrabi was prepared first in true size by using Plaster of Paris in sculpture technique. Then it was cut into required brick-form in a way that bricks' courses may be laid down, following their proper bonding.

7. To construct a large size arch, that was centrally located in eastern facade of W.W. of LHC Building, along with small brick-arches in masonry technique, was another challenge (Fig.08,09,10). In 1974, when extension was carried out, this element was molded in concrete but this time, it was decided to make it in brick-masonry like the original. This arch was dismantled twice to get its final appropriate shape, under strict guidance of Resident Architect.

8. Resident Architect through integrated-Coordinated design approach, laid down the infrastructure component along with the masonry work. He ensured in-time laying of various services i.e. electricity, air conditioning ducting, sewer and water supply piping, etc. It was very important to protect the fair-face brick work from damaging while providing these services.

9. Resident Architect also designed and supervised the interior of the court rooms as per actual requirements (Fig.16). The proposed layout of furniture made possible for maximum seating capacity.

10. Engineers and Contractor were of the view that the northern and southern elevations which were not directly visible from the road side and from normal eye-level, may be left unfinished. Resident Architect did not make any such compromise and insisted to give equal importance to all the four elevations.

11. For first floor, an intermediate slab for storage of court record was proposed by Chief Architect Office. The limitation of height did not permit enough space for storage of record. Resident Architect convinced the Committee to delete this inter-floor. This resulted into saving of an amount because of deletion of an extra slab of 11000 Sft and it also enhanced the ceiling height of court rooms at first floor from 11 feet to 17 feet at the ridge level.

12. Parallel to the W.W. of LHC building, construction of Advocate General Office across the road started. Sub Divisional Officer, Executive Engineer and Contractor were the same for both projects, but the quality of product came with visible difference. The reason was only that, on W.W. of LHC building, a Resident Architect was deputed to take care of all the construction and design related issues whereas Advocate General Office Building was designed by Chief Architect office as a routine matter.

CONCLUSION

The experiment of construction of W.W. of LHC-Building was different in many aspects at Administrative Level, Execution Level, and Supervision Level. It was totally different from the routine construction pattern as practiced by the government engineering department for public buildings.

a. Administrative Level

Normally, engineers of C&W Department are given free-hand for technical matters regarding the construction of public buildings following the government set pattern. But here, Client Department i.e. LHC fought against the professional community of Architects, Archaeologists, Conservationists, Punjab Bar Council, Civil Society andby using its Judiciary powers to get execute the building after demolition of an heritage building. Registrar Lahore High Court became party against the agitators. The court explained and interpreted the word "facade" as "Road-Side Elevation" and since there is no road passing from western side of Western Wing, so this does not fall under that particular clause of Ordinance.

b. Execution Levels

Although the tendering process, work allotment procedure, billing etc every thing was carried out under Punjab Government pattern but there was difference in role of engineering staff. Decisions were made by the Resident Architect with the consensus of Judges' Committee. Engineers were asked to implement the decisions in true spirit. Engineers were not given free hand to change the specification, to select the finishing materials, to avoid the traditional way

of construction for brick-masonry building or to introduce the RCC beam or columns in walls and footing. Engineers purely performed their duties, managed the site problems and controlled the contractor for its function. Every thing was done under strict guidance of the Resident Architect.

c. *Supervision Level*

Chief Architect Office of C&W Department usually provides the architectural drawings to the engineers who prepare the estimates, and issue Technical Sanction for the project. It is claimed that at various stages, architect visit during construction but in reality, architect role is very much minimized. When budget constraints come, engineers without consulting the architect change the specifications and finishing items. This practice badly damage the project conceived by the architect in original.

For this particular case, in pursuance of the direction of Supreme Court, Federal Ministry of Law appointed a full time Resident Architect who was available round the clock. Resident Architect not only made changes in plans and elevations, also provided details of architectural feature for construction, guidance for specific type of brick masonry construction.

W.W. of LHC building is an integrated effort of Contractor, Resident Architect, engineers and Judges' Committee. This close supervision of Resident Architect has produced a remarkable building of W.W. of LHC.

FINDINGS

The role of architect in Public Buildings if strengthened may result in visible improvement in quality of work. Such buildings will carry their identifiable architectural character resulting in good visual impact. During construction, it is only the architect who can evaluate the necessity of change in actual requirements to cater successfully the purpose of the building constructed for.

The close supervision of the building during construction makes it more efficient, functional and aesthetically congenial. This is the only way to change the visual impact of public buildings; the engineers who focus only at the cost of the project, in fact lack aesthetics and sensibilities. They mentally accept to spend profligately to cover the risk of structural instability but do not give any weight to the efficiency, function, and aesthetical value of the building.

The governing rules for enlisted-protected heritage buildings for restorations, alterations and additions may be reviewed and reframed comprehensively so that no authority can manipulate and maneuver its meanings for achieving malicious objectives.

RECOMMENDATIONS

- In public buildings, although chief architect and chief Engineer offices work independently under a Secretary to Government of C&W Department, yet the role of architect is required to be strengthened during construction. The project may be finalized only after detail inspection report of the project architect.

- For restoration, conservation and maintenance of the enlisted-protected buildings of governmental institutions that are of Colonial period, an independent cell may be created for in the Office of Chief Architect, C & W Department where expertise may be inducted.

- The present hierarchy of Service Structure may be dissolved and architects should be allowed to work on basis of their capability and creative potential. The hierarchy may be re-structured on specialty of the job, based on nature of buildings rather than the bureaucratic system of seniority.

- For buildings of heritage value as well as for large scale buildings worth above Rs50.00 millions, an office at site, headed by Project Architect may be established with infrastructural support of subordinate staffing. For such cases, Resident Architect maybe appointed on contract for the project till its completion. The role of Chief Architect Office

may be supervisory for such cases after preparation, approval and issuance of basic architectural drawings. During preparation of estimates, an amount may be reflected in PC-I under head of project-cost to meet the expense of Resident Architect office, established for particular project.

- Legislation may be made to bar the Engineers to change the specifications and finishing items as recommended by the Project Architect. Engineers use their powers to decrease the project cost under directions and guidance of Planning & Development Board. Before issuance of Technical Sanction by the Engineers, estimate would be vetted and recommended by the Project Architect in regard of its specifications and finishing items, where Schedule Rates are followed. For non-schedule items, Project Architect may be consulted for ensuring the architectural merit, functional and aesthetical requirements of the project.

REFERENCE

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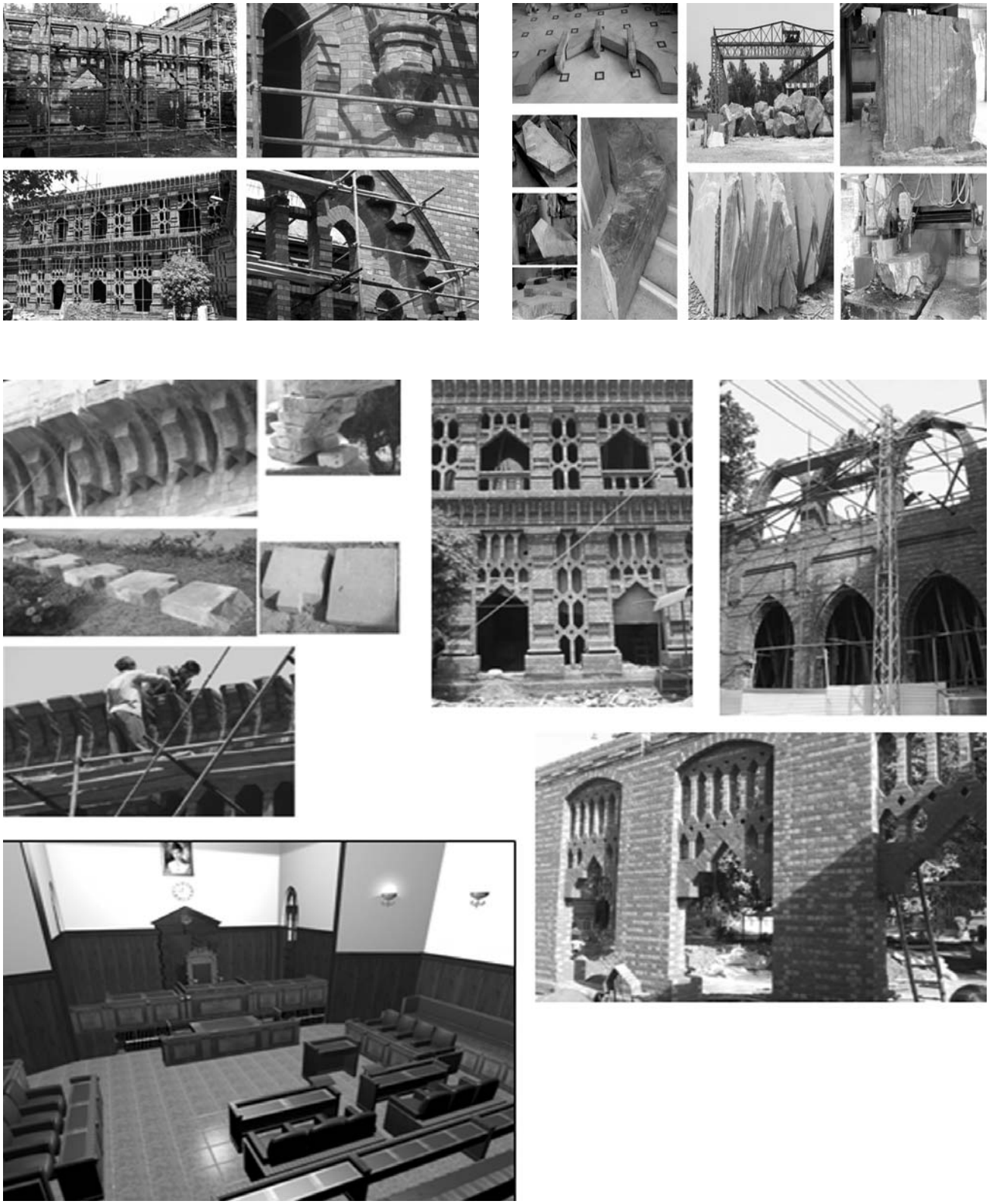

Figure 2: Images of LHC Building, Lahore.

EXPLORATION FOR A VIABLE SEQUENCE OF DEVELOPMENT FOR THE PROVISION OF LOW-INCOME HOUSING IN PAKISTAN

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ABSTRACT

Conventionally the formal low-income housing projects follow a sequence that could be broadly classified as planning-servicing-building-occupation (PSBO), following the tracks of a "top-down concept", which means that all costs and details are worked out and settled in advance, leaving very few choices for the urban poor and no possibility of access for participation by them. While the process may suit the upper income groups, it definitely does not favour the urban poor, thus leading them to opt for "illegal" solutions usually by using the reverse sequence of occupation-building-servicing-planning (OBSP). The present sequence of development (PSBO) adopted for provision of low-income has failed to bring about any significant change. This paper argues that there is a need to re-examine this approach and at the same time presents an alternative approach which is likely to produce better results.

Keywords: *Low-income housing; sequence of development; incremental planning*

INTRODUCTION

"Housing" in itself is a very complex issue, and becomes further complex when it comes to the provision for "low-income'. This is true for the whole world and for the developing world, in particular. We continue to write and debate on this issue, nationally and internationally, while the magnitude of the problem continues to grow with an ever increasing gap between the supply and demand. One could deduce that either the problem is ill formatted or the solution is inconsistent with the ground realities. A number of "experiments" in Pakistan have been conducted in the past, by successive governments, but no significant change has resulted in the situation. There remains an urgent need to re-examine the basic premises (the sequence of development) within the issue rather than to continue with the same remedial measures or actions taken in the past.

VARIABLES, THEIR NATURE AND THE SEQUENCE OF DEVELOPMENT

There are many variables in this issue, with each one of them equally important. The vast list includes provision of land, services, material, finance, legislation, political will, etc. None of these variables can be ignored; however it must be noted that all of these interlinked variables are dynamic in nature, constantly changing not only their own attributes, but also influencing each other and eventually changing the final outcome at any given point in time, thus advocating a more rapid and varied approach to the problem in question. This is in stark contrast to the rigid "top to down" approach which has normally been adopted and is being adopted in almost all the projects (area development schemes) related to the provision of housing for the low-income. The poor beneficiary / recipient is never asked or consulted, rather completely ignored in the whole process, giving rise to gross mismatches often ending up in delays and failure of the whole effort by missing the target group and up-floating of resources. One finds large tracts of serviced lands unoccupied for years waiting to be inhabited. It was reported in 2004, to the then Chief Secretary of Punjab, that out of the 224,342 plots developed in Public and Private Sector housing schemes in the metropolis, as many as 118657 (52.89%) are lying vacant (Dawn, 2004). The latest figure is estimated at 150,000 plots (Secretary Excise and Taxation, Government of Punjab, 2007). One could imagine the difference this number could make once the

plots are available in the market.

Technically translated, the current approach for land development results in a linear flow of activities Planning – Servicing – Building – Occupation (PSBO), which may suit households with a regular source of income usually associated to the formal sector of the economy, but definitely not to households linked to the informal sector. In developing economies, informal sector forms a significant portion of the economy and this is normally where the low-income families are linked for their livelihoods. If one closely examines the development of Katchi Abadis (squatter settlements), where majority of low-income families find shelter, the process of development is diametrically opposite and follows Occupation – Building – Servicing Planning (OBSP). The primary reason for this is the urgent need of shelter but with limited resources and being unable to raise any additional finance from secondary sources, they have to start with the minimum affordable and continue adding / improving with the passage of time. This not only includes the building structure itself but the services also. It is not being argued that OBSP be adopted instead of PSBO, as the former has its own limitations and is likely to be a costlier option, but that the low-income households be provided more flexibility by adopting a varied sequence Planning – Occupation – Building – Servicing (POBS), which is more or less nearer to the incremental approach. The POBS might look simpler and easier on the face, but in practice will require much greater effort in the beginning at least, as, at present, all the "structures" are geared and adjusted to PSBO at all levels.

IMPLICATIONS OF THE OBSP SEQUENCE

As mentioned earlier, the OBSP sequence has some serious implications, such as encroachment on agricultural land, environmental degradation of metropolitan areas, urban management problems and larger costs than a planned development to upgrade the existing uncontrolled development. Besides, if the government is just to react and follow-up spontaneous development, it would distort a desirable "pattern" of urban development, preventing opportunities for necessary expansion of roads, commercial areas and open spaces (United Nations, 1988). Churchill (Churchill, 1980) also argues that improving existing settlements "may have the disadvantage of being ultimately costlier and less efficient. Control over the location of settlements and the way in which they are developed, for example, can mean lower costs of servicing. There are many instances of existing settlements that were difficult and costly to improve because of their location on hill sides, on tidal flats, or in ravines. Improvement after settlement, though often inevitable, is a second best solution". This is verified by the findings of Qutub and Richardson (Qutub and Richardson, 1980) who note that "upgrading Katchi Abadi is inconsistent with efficiency. Providing services to haphazardly developed, unplanned settlements is relatively expensive compared with a land development-cum- minimum-services strategy for newly settled areas". Often such programmes fail to make a major impact and the case of "Regularization of Katchi Abadis" in Lahore initiated in 1986 is an example of that. Only 73 Katchi Abadis were regularized uptil the year 2008 out of 308 Katchi Abadis.

Apart from this, the change in tenure conditions may also have a number of adverse effects, which may be quite unpredictable. Angel (Angel, 1983) discusses only three possible consequences due to limited experience with changes in land tenure:

- The first important consequence is that once a satisfactory measure of informal tenure security exists, the willingness to obtain and to pay the price of the official legal titles is considerably reduced.

- The second possible consequence is the displacement of the original lower-income population.

- The third possible adverse effect of the legalization of the land tenure may be the implicit sanction given by the government to continuing illegal incursions into new unoccupied sites.

Expanding on this Payne (Payne, 1984) points

out that formalizing of the "illegal process" consolidates the powers which were the root cause of this process. But Linden (Nientied and Linden, 1985) draws on a much wider frame. The very aversion of demolition threat causes land prices to rise. This trend is reinforced by the ***defacto*** recognition of the settlement through the provision of services. Thus legalization leads to the dissipation of difference between the legal and illegal market. To conclude, the low-income families may encounter four sets of problems while pursuing the OBSP development process according to Baross (Baross, 1990):

- Access to land (possession--- location and development suitability),

- Access to development rights (tenure--- the right to develop land parcels),

- Access to development assistance (servicing--- the most serious implication of the absence of the development right is that it restricts access to development assistance),

- Access to development protection (eviction--- the displacement through the gentrification process or abruptly under urban renewal and redevelopment pressure).

THEORETICAL LINKAGE OF THE PLANNING APPROACHES AND THE SELECTION OF STRATEGY

All the approaches for the provision of housing (PSBO, OBSP, POBS) have a strong link with distinct schools of thought in planning. PSBO is an outcome of the "top-down" approach, also termed as rational planning governed by procedural planning theory and much of it could be found in Faludi's (Faludi, 1973) work. On the other hand OBSP is linked to advocacy planning seeking maximum involvement of people in order to formulate goals (Davidoff, 1965). Finally, POBS is linked to incremental planning and addresses two critical issues: what is the most rational way to proceed and how to connect decision making methodologies to the context in which they are used (Lindblom, 1973). The three approaches have entirely different set of requirements and adoption of any approach is highly dependent on the nature of the problem, as has been demonstrated by Braybrooke and Lindblom (Braybrooke and Lindblom, 1963), Cartwright (Cartwright, 1973) and Christensen (Christensen, 1985). Thus there exists a relationship between the nature of the problem and the most appropriate strategy to be adopted. Ignorance of this relationship may lead a planner into positions where there is a serious "lack of fit" between his problem and the strategy he is using. Thus a planner may find himself in a position trying to solve a problem he does not actually have.

The relationship between the nature of the problem and choice of strategy must be clearly understood in theory and consciously applied in practice. If this is not done, then, on one hand, problems will be forced to confirm to the assumptions of the chosen strategy, while on the other hand, a wastage of resources will be incurred in looking for impossible precise solutions instead of possible ones. Avoiding such pitfalls is precisely what planning is all about. "It is one thing to build cities for those who have steady incomes and can pay for the houses and services they use. It is quite another to build cities for those with less or with unstable incomes but who nonetheless can pay modest amounts for housing and services. But it is a completely different matter to have people who can afford to pay little or nothing for housing and services, who have little alternative but to build their own houses and neighbourhoods and who subsist on quite inadequate and unstable incomes all of which goes on goods, such as food, on which their survival depends" (Hardoy and Satterthwaite, 1987).

EXAMPLES OF POBS

One example of the POBS model is the Incremental Development Scheme of Hyderabad Development Authority (Pakistan), which is sometimes also referred as "government promoted squatting" (Siddiqui and Khan, 1994). This innovative scheme was an attempt to formalize the informal sector, by providing the poor with regularized, though initially unserviced

plots at a price they could afford. The initial development included only street layouts and community services. Other services like water supply, sewerage, roads and electricity were then developed incrementally with monthly instalments paid by allottees. These were undertaken on a co-operative basis at the level of each lane in the scheme.

The other diversified form of the model is the case of Sudan, where low-income residential areas are designated as "fourth class areas", in which plots are leased but no standards with regard to buildings, are demanded. In third class areas, longer leases are given, plot sizes are larger and some infrastructure and services are provided. The second and first class areas get longer leases, better infrastructure and services and larger plots. Fourth class areas can be upgraded to third class areas, as households there find ways to improve their houses; this also entitles them to better infrastructure and services (Hardoy and Satterthwaite, 1986). This is possible only if the government so decides. In the meantime, no upgrading is permitted. On the other hand, once upgraded, no 'sub-standard' construction is permitted. Secondly, before construction, all houses are removed and the site replanned.

A broader guiding equation is also suggested by Gilbert (Gilbert, 1990), according to which, public policy in a city with high levels of disparities in wealth, ought to plan to make available different kinds of land/ service packages. This could range from complete services, large suburban plots, expensive, with formal/ private construction on one end, while at the other end, there could be no services, small fringe plots, cheap/ free with self help construction. Details of this suggested equation are given below in Table 1. Though this equation is very rigid in its existing form, but it does have room for improvement, besides the wider implications it may have on the urban/ social fabric.

These examples bear a close resemblance to what Peattie (Peattie, 1982) had earlier argued in case of sites-and-services, calling for "destandardization of services", or to put more positively, allowing the maximum choice in the "services package", meaning that sites-and-services projects initially furnish only rock-bottom minima of services, but establish mechanisms by which groups of households organize themselves to purchase additional services of the type most suited to their social and economic needs and fiscal resources at that time. Thus each providing agency of any type of urban services, has to publish a price list for the construction of all types of facilities and to calculate a total price for furnishing any level of service to the neighbourhood upon request. The construction would only begin when the

Table-01: Alternative Packages of Land and Services (Bross, 1990)

Services	Plot	Location	Social Status	Land Cost	Construction
Complete	Large	Suburb	High	Expensive	Formal / Private
Complete	Medium	Suburb	Middle	Moderate	Formal / Private
In-complete	Small	Fringe	Middle / Low	Moderate	Co-op. self help
Minimum	Small	Fringe	Low	Cheap	Self help
None	Small	Fringe	Low	Free	Self help

households have raised a certain percentage of the total cost and demonstrated that they had a reasonable collection system for the remainder. All of this is to be introduced in stages, and with careful evaluation at each stage. The subject of flexibility is also argued by Hamdi (Hamdi, 1991). According to him, "flexibility gives recognition to the concept of a better fit among people, territory, services and costs – not as tailor-made responses to normative projected needs but as variable interpretive opportunities to package programs and interpret standards so that services, space and/or cost are variable".

CONCLUSION

Plans and policies should be designed to enable the poor not only to continue to survive but also to improve their own situation. "This implies reducing the burden of bureaucratic regulations imposed upon them, opening up the decision-making processes to greater participation, improving access for the poor to public services, and creating the situations in which the poor can make optimum use of their own efforts and resources. Two elements are particularly important. Firstly, ensuring the availability of affordable land on which the poor can build their own housing. Secondly, a regulatory framework which allows them to construct the sort of housing which matches their resources, and which allows them to build incrementally as their circumstances permit" (Devas, 1989). In later works one finds similar suggestions by Payne (Payne, 2001), arguing for lowering of the ladder in terms of regulatory framework for sustainable development.

This demands a change in orientation of the practising architects and planners in the country, who have generally learned and have been trained from the institutions linked to the European and U.S traditions and with similar courses, tailored to meet the building needs of those countries. This is quite opposite to the building needs of a developing country / society. As a result, most architects have tended to isolate themselves from the mainstream of building activity undertaken by the low-income communities. They have confined themselves to designing a handful of large prestigious buildings, such as high rise hotels, office blocks and government projects normally located at important sites in the city. These projects are expensive but constitute only a small fraction of the construction activity in the country. Thus two parallel interconnected urban histories are emerging. The official, represented by the government and the major firms, giving details of construction and management of the city form part of the official statistics. The second one is that of the low-income groups which is very little written about. It is fragmented, unrecorded and different from the official version. This represents the experience of anonymous masses who must find immediate solutions for their survival, and is a more accurate description of present city development (Hardoy and Satterthwaite, 1989). Learning from the past and making the right choice by selecting the most appropriate approach solely remains our choice and responsibility before it's too late. POBS sequence thus remains a viable model if implemented progressively and properly.

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DIGITAL ARCHITECTURE PRAXIS AND ITS STATUS IN PAKISTAN

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ABSTRACT

Some frequently asked questions (FAQ) amongst the local architects of Pakistan is that what is Digital Architecture? What we need to know? Can we practice it? Why should we practice it? This article aims to answer these FAQs. The methodology adopted to answer these questions is through Desk Research, including case studies of projects of two prominent architects viz. "Frank Gehri" and "Peter Eisenman" who are pioneers of Digital Architecture, and interviews with some relevant local practitioners and academia, personal observation and experience of working in the architectural profession locally. The objective of this study is to present various dimensions of Digital Architecture to the local architects, also highlighting the issues of local praxis and some suggestions for their consideration for the future.

Keywords: *Digital Architecture – Pakistan – Architectural Praxis*

INTRODUCTION

By the late seventies and early eighties the application of computers had changed the design methodology of architectural offices. Many manual tasks of making 2D and 3D drawings have been replaced by computers working with various available software designed for such tasks, the most common of which is AutoCad. With the communication revolution (the use of internet etc.) the working of Architectural praxis changed worldwide. The task of making 2D/3D drawings, storage, retrieval and editing by computer became a norm. Using computer for above tasks as a tool is understandable for most of the architectural communities, even to those who could not operate computers, but some resistance is still there in architectural schools where manual methods are still given preference.

The new projects done by Frank Gehry, Peter Eisenman whose creation of amazing forms and spaces with the help of computers, created a new debate in the architectural community regarding new methodologies of design, documentation ,construction and manufacturing methods by computers and its impact on architectural praxis and societies.

WHAT IS DIGITAL ARCHITECTURE?

"Frank Gehry and Peter Eisenman designs like "Museum" at Bilbao, the "Concert Hall at Disney land" and the "Cultural City" at Galicia are the sample Designs of Digital Architecture which are produced by the combination of new architectural efforts and digital technology." (Tung, 2000). In another instance Eisenman et.el in the Charter of Zurich (Barzon et. el., 2002) defined "Digital Architecture is also that whole combined group of construction engineering technologies, new materials production and construction processes, that the computer has allowed, facilitated and discovered". Tung argues "If the digital technology does not influence the design thinking, design method and spatial theory then it can be treated as merely a new tool." In the following sections I have picked up some information on the praxis of Frank Gehry and Peter Eisenman to explain digital architecture in more detail.

HOW FRANK GEHRY DOES IT?

According to www.wired.com Frank Gehry is an American Architect who started fabricating through digital medium in the 1990. He used new technologies to make complex buildings which were not possible before.

Gehry Partners begin the design process by creating hand-built models in order to capture the design intent. Once these models have been reworked and refined, they are digitized to create three-dimensional computer models, also known as building information models (BIM) or master models.

Small SLA (Stereo lithography Apparatus) models are used to physically verify the digital geometries to Gehry Partners and their consultants and accurately represent the design intent to clients.

Frank Gehry supervises every project personally. He is assisted by his very experienced partners in his design endeavors through technical advancement and construction management. The firm uses "Digital Project", an advance 3D modeling program to thoroughly document the designs to help the building, fabrication and construction processes.

In a conference at the European CATIA forum Gehri explained how he enterered the digital wold of CAD.

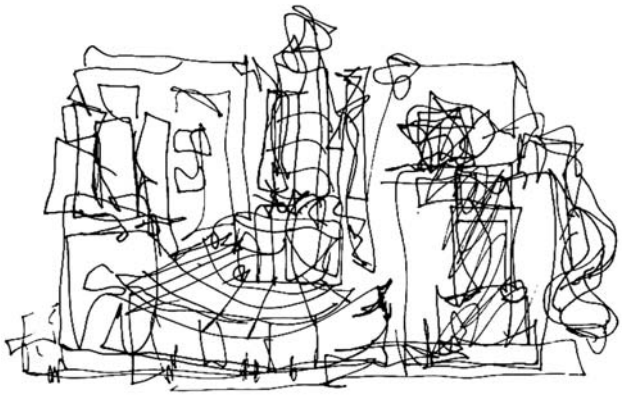

Figure-2: Sketch of American Center in Paris.
Source: Progressive Architecture 01:92.

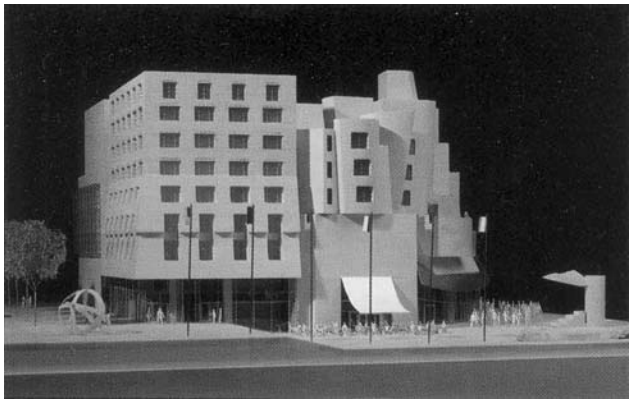

Figure-3: Model from the West. American center in Paris.
Source: Progressive Architecture 01:92.

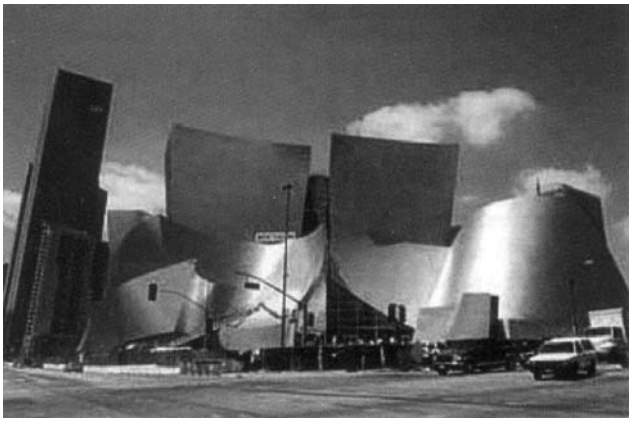

Figure-1: Disney Concert Hall in Los Angeles.
Source: Archi Times, February 2005.

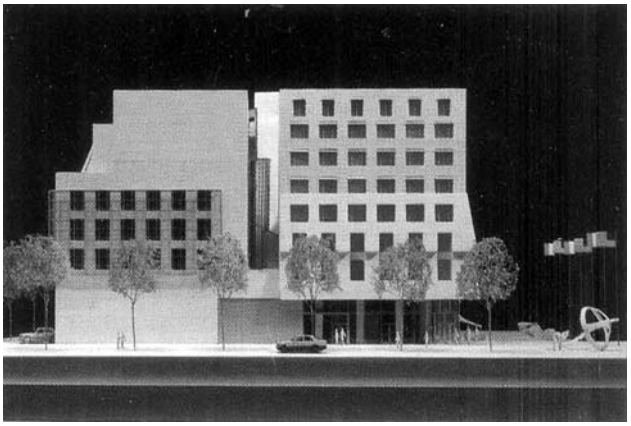

Figure-4: Model from the North. American Center in Paris.
Source: Progressive Architecture 01:92.

"I started making shapes that were hard to draw. That led us to the computer and to Catia software which made me realize the possibilities and the level and degree of accuracy you could create in your documents and your relationships because of the software."

HOW PETER EISENMAN DOES IT?

Peter Eisenman is an American Architect, theoretician and a teacher. He has also done some pioneering work in Digital Architecture. Although Eisenman do not claim himself to be a deconstructivist his fragmented forms identifies him with that group.

Eisenman does experiment with the forms and tries to liberate them from all meaning. As digital media can be very helpful in this regard, he has done a number. of projects which can be categorized as Digital Architecture. One such project is City of Culture of Galicia, Santiago De Compostela, Spain.

CITY OF CULTURE OF GALICIA SANTIAGO DE COMPOSTELA, SPAIN

The "City of Culture" is a new culture center for the province of Galicia in western Spain.

The design methodology according to "Arcspace.com is the superimposition of 3 sets of information. The street plan of the medieval center of Santiago is superimposed on the topographic map of the site. Then a Cartesian grid is laid above the previous two maps then through computer modeling topography of hill side is allowed to distort generating a topographical surface combining the old and new geometries.

There are six buildings in the project. These six building are designed in pairs of three. A winding street connects these buildings culminating in a square.

Figure-5: City of Culture, *Galicia, Spain*.**.**
Source: www.CityofCulture.com

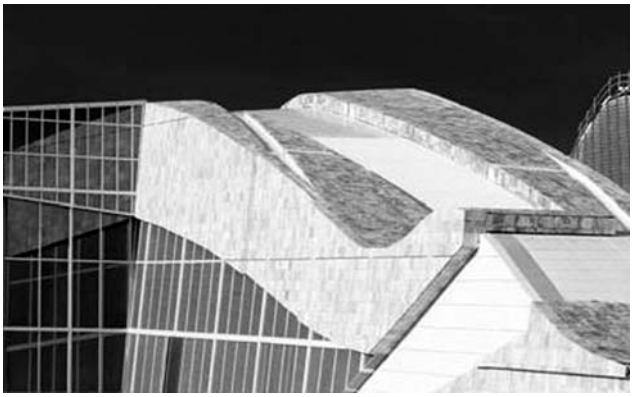

Figure-6: City of Culture, *Galicia, Spain*.**.**
Source: www.CityofCulture.com

Figure-7: City of Culture, *Galicia, Spain*.**.**
Source: www.CityofCulture.com

Figure-8: City of Culture, *Galicia, Spain*..
Source: www.CityofCulture.com

STATUS OF DIGITAL ARCHITECTURE IN PAKISTAN

Computers were introduced in the studios of Pakistani architectural praxis in the late seventies and early eighties. Autocad/Adobe Photoshop have been the most popular software for creating 2D/3D presentation and working drawings. Most other allied consultants like Civil, Mechanical Electrical and Plumbing consultants also started using it and data can now be shared among consultants on a storage device and can now be saved, edited and retrieved as and when required. Training centers for Autocad are found everywhere. Architecture schools also made it part of their pedagogy. Thanks to the easy availability of pirated copies of AutoCAD and trained people, Autocad has become a must skill for employing young architects and draftspersons. So we can see that digital architecture as a tool is in practice now for quite some time in Pakistan.

When we started, we tried to speak to local architects regarding digital technology and its application in Pakistan beyond its present use, they questioned how does one use the technology when there is no demand for it., Exploratory exercises do not exist in architectural practice in Pakistan and also there is no statutory requirements so we don't see a change in the near future especially on the construction side.The only reason that Pakistani architects can work on it is to get work in more advanced countries of the region like UAE and Malaysia etc. Some even suggested that it's the gap that we don't have architects with that type of expertise, but after studying Frank Gehry I think it's not about the expertise of architect but the mindset of architect which is open to exploration and collaboration with other disciplines that can bring about the change. There exist a fair expertise of making 3d architectural models on Autocad, 3DMax, Accurender and Revit in the big and medium offices of architectural practices and for those who cannot afford in house there are individuals/consultancies who can offer them services on project to project basis. A recent publication (Mankani, 2009) gives a quite clear picture of the state of practice of Digital architecture in Pakistan. In this article Mankani has identified the following:

"Building Information Modelling has not taken root as a design approach in Pakistan. Building models are used for representation and to some extent for design review and do not contain any information beyond spatial relationships, materiality, colours etc."

This article makes it clear that In Pakistan, Digital Architecture is understood as a Design Approach where data sharing among consultants is done through a 3d model but although architects have this ability, other consultants like civil and MEP consultants do not use this approach. Talking to faculty members of civil department of a public University, it was clear that the 3D ability of these professionals is at a very initial stage. So is the case with Mechanical, Electrical and Plumbing profession.

The form making, design methodology, construction and project management aspects and use of Digital architecture as done by Frank Gehry and Peter Eisenman, is neither explored nor understood. Mankani has also reinforced that BIM is gaining ground in Pakistan due to the outreach factor.

As the energy issue is gaining more importance, a very few practices are trying to explore the energy and other environmental issues through the Software "Revit" through experimental studies but it is yet to be established as a norm.

One constant complain that is heard by the architects who are trying to explore the above issues, is the time factor involved in such experimental work.

The other factor is that these data base software demand too much information at the design development stage.

Some architects also complain that by spending too much time on model making, one is distracted from developing the real design content.

GAPS IDENTIFIED

- Lack of awareness like potential of computer (Artificial Intelligence etc.)
- Lack of communication between digital generation and the existing generation. The gap exists in all the world.
- Architecural schools focus more on arts, history, sociology, psychology and culture and less on technology.
- Lack of statutary demands.
- A lot of time is required.
- All software are not accessible at affordable price.
- Lack of experimentation and research.
- The sharing platform is not there with allied professionals.

BENEFITS OF DIGITAL ARCHITECTURE

- Computers can resolve forms consisting of complex curves etc.
- 3D documentation can be very accurate for documentation, bidding, manufacturing and construction processes.
- Building Infrastructure Modeling can resolve conflicts with services at an early stage.
- Environmental performance of buildings can be generated at design and preconstruction stage.
- New aesthetics can be developed for the society.

CONCLUSIONS

If we try to analyze the underlying causes of the failure of such attempts in Pakistan we will come to the following conclusions:

We are at a transition stage and we, as architects, are ending up using both the paradigms of 2D and 3D and also doing other consultants' works, and treading into the domains for which we have neither the expertise nor the support. In Pakistan the structure of practices is mostly private practices with limited manpower according to work in hand. So we are bound to have such problems .I would like to make following suggestions to these issues:

1. Architectural design consultants should concentrate on design contents and presentations. More exploratory approaches are required for better design contents incorporating digital forms etc to make more interesting designs.
2. Separate consultancies can be established for having other domains like environmental issues, energy and acoustics etc. If the clients want to address these issues they would be charged for it accordingly.
3. As the environmental issues have become very crucial, the PEPA should make statutary requirements of environmental analyses for at least large consumers of utilities like electricity, water and fuel etc.
4. As "REVIT" is the only software available now for environmental analysis and BIM, other software should also be explored like "Ecotech" etc which may be more user friendly and affordable.
5. Civil, Mechanical, Electrical and Plumbing education institutions should create enough ability in their students to make 3D drawings

of their respective works.

6. Civil and MEP consultants should train their personnels to give them this ability.

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INTELLIGENT ARCHITECTURE: The Way to Design Intelligent Buildings

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ABSTRACT

With the enhancement of Informational Revolution, the transformations in our lifestyle demand the space around us to have interaction modalities that support new as well as old communicating ways. Therefore, it becomes a challenge for the designers to blend the informational space with the physical space through technology inspired architecture, which helps to incorporate the design application in the digital as well as real world context. Intelligent Architecture is a new design process that perceives and interacts with the built environment by applying recent advances and implementing new technologies to architectural practice. The concept of Intelligent Architecture started as an interest in the latest integrated building systems and technologies which can communicate and exchange information.

The paper is based on the conceptual research done to give the overview of Intelligent Architecture in general, its application in the world of information system with all of its multi-dimensional viewpoints and explore the criteria determining intelligent building technologies. The focus of the paper is to gain an insight phenomenon of Intelligent Architecture and its responsiveness to fulfill the demands of human needs and to understand the technologies through which Intelligent Building systems can be achieved. The selection criteria of case studies are based on the advance technologies which are used to promote the idea of Intelligent Architecture.

Keywords: *Informational Revolution, Intelligent Architecture, Intelligent Building, Built Environment*

INTRODUCTION

Since the 1970s, computer and telecommunication technology have been changing human life. These changes have outpaced the theories guiding such technologies. Also the concept of physical spaces and their definitions, as human aspects, have also been affected. Meeting rooms, for example, have become *virtual*[1] as their physical elements have been computerized. This is simply integration between the computer's abilities and the physical world.

In late 70s, the technology of HVAC systems controlled with the computer chips and localized by sensors were enabled to fast and more precise response to changing environment conditions. This electronically enhanced technology had led to the initial development of an Intelligent Building. The word *"intelligent"* was initially used to describe architecture at the beginning of the 1980s, when the automation of occupant-safety, security and lighting systems was followed with refinement in coordination of components within individual systems (Chan and Wong).

Intelligent Buildings simply represented an attempt to portray and exploit the prevailing trend for incorporating increasing quantities of information technology into buildings. The new development of *Intelligent Building* is the idea to use the information technology and control

1 Virtual is a concept defined in philosophy as that which is not real but may display the salient qualities of the real. (http://en.wikipedia.org/)

system to make the functioning of the building more useful to its occupants, in relation to its management, and in respect of the building's operational purposes.

With the rise of global hazards[2], the impact of architecture on the global environment became a matter of concern and the recent trend of Intelligent Building design is concentrated on both economic and environmental sensitive developments. Flexibility and low energy become the issues to cope with the fast growing technology, which promote the concept of *Intelligent Architecture,* to contribute in the environmental quality and hazards prevention. (Youseef and Khaled, 2005).

INTELLIGENT ARCHITECTURE

With the advancement of technology, the perception and interaction of human mind with the built environment can be defined as *Intelligent Architecture*. Intelligent Architecture cannot be defined by any single definition. There are a number of concepts introduced under the title of Intelligent Architecture.

The concept of Intelligent Architecture is not very new. The definition of Intelligent Architecture has been evolving with different emphasis, mainly driven by the development of relevant technologies and the changing needs for the built environment. In 1980s, the building was considered to be Intelligent when it had the latest building systems and it accommodated the high-tech installations and latest technology. Mainly, three broad phases can be associated with Intelligent Building concept. First phase (till mid of 80s) emphasized that the Intelligent Buildings are collection of innovative technologies and automatically controlled to function. In the second phase (till 90s), emphasis was on responsible buildings, and Intelligent Buildings were supposed to be capable of responding to the changing needs. Third phase focused on the buildings with features effectively satisfying the changing needs (Intelligent Building Concept).

According to EIBG[3], "Intelligent Building is one that maximizes the efficiency of its occupants and allows effective management of resources with minimum life costs". According to IBI[4], "Intelligent Building is one that provides a productive and cost effective environment optimization of its four basic elements – structure, systems, services and management and the interrelationships between them" (Smart Accelerate Project).

With the rise of Informational Revolution[5], the technological systems brought changes and easiness in human life. Along with high comfort and safety levels, the technological systems integrated into building systems such as, communication system, security system, system which supplies energy control, building automation system, etc.

Information is the central theme of new sciences, which emerged in 1940s, including Shannon's[6] (1949) Information Theory and Wiener's[7] (1948) Cybernetics[8]. Fang Irving[9] (1997) also identified that the term, Informational Revolution is used to describe trends in communication media. People have been also introduced to new abilities and efforts to draw the first idea of Cyber Space[10] had been initiated.

2 Global hazards include climatic change, loss of diversity, changes in hydrological systems and the supplies of fresh water, land degradation and stresses on food-producing systems which may effects human health. (http://www.who.int)
3 European International Building Group.
4 The International Building Institute, USA.
5 The term Information Revolution describes current economic, social and technological trends beyond Industrial Revolution, having social, economic and technological role of information as the main features. (http://en.wikipedia.org)
6 Claude Shannon: (1916-2001), an American electronic engineer and mathematician, known as the father of Information Revolution.
7 Norbert Wiener: (1894-1964), an American and founder of Cybernetics.
8 "Cybernetics is a theory of machine and deals with all forms of behavior in so far as they are regular, determinate or reproducible". Ashby and Ross, 1957).
9 Dr. Fang Irving: is a Professor in the School of Journalism and Mass Communication at the University of Minnesota.
10. Cyberspace, the term was coined by science-fiction novelist and author William Gibson (1948) in his novel "Neuromancer" (1984), means the entire world of computer networks especially the internet. (http://www.britanica.com)

In 1990s, the term *Intelligent Architecture* was used to embrace creating architecture in an anti spatial context to be accessed via networks, celebrating the concept at a global scale such as The *"Network Society"*[11] criticized by Manuel Castell's[12] and *"e-topia-lean, green cities work smarter not harder"*[13] by William J. Mitchell[14].

CHARACTERISTICS OF INTELLIGENT ARCHITECTURE

The circumstances of a global economy, require blending of knowledge of specific values and beliefs with 21st Century to understand that how human intelligence affects the artifacts i.e. buildings and places that we create. Intelligent Architecture depends upon the human Intelligence that how one can relate and interact with the built environment. By uncovering how the foundations of the architectural experience through science lead towards the process of human cognition and intelligence, the discipline of Intelligent Architecture has been discovered. Intelligence is not an exclusive domain for architects. This is about which process the information to make it meaningful, provide an integral link between humans and physical reality. This is all about the knowledge that is essential for architects to have to know how the built environment connects to humans (Salingros et.el. 2oo4).

Intelligent Architecture needs to be supported by three forms of intelligence. First is the "perceptual intelligence" which captures people's presence and movement in the space in a natural way. Second one is the "interpretive intelligence", which understands people's actions and is capable of making informed guesses about their behavior. And the third is the "narrative intelligence", which presents us with information, articulated stories, images, and animations, in the right place, at the right time, all tailored to our needs and preferences (sparacino, 2005).

Initially, the concept of Intelligent Architecture was considered as futuristic and fanciful. Now it is a reality. During the last century, till 1900, buildings had static structure. Till 1945, electric appliances were improved and having electric machines inside buildings started to become common. After 1945, the number of appliance and electronic systems, from automation to communications, has been increasing continuously (Intelligent Building Concept). Different control, monitoring and supervising strategies have been implemented, directly associated with the improvements at the electronic devices level. The concept is much more than lighting and temperature control automation.

To the user, an Intelligent Building offers economic and efficient environmental systems: heating, lighting and air conditioning. Also, it enhances safety and security. Moreover, it improves business potential with integrated data communication systems. To the manufacturer, Intelligent Buildings offer a profitable market, particularly if they are able to exploit both the commercial and consumer markets (Morsy and Sahar, 2007). Intelligent Architecture suggests buildings which are capable of making "intelligent" decisions or respond "intelligently" to changes. For example smart home or intelligent home are the terms commonly used to define a residence that uses a control system to integrate the residence's various automation systems. Integrating the home systems allows them to communicate with one another through the control system.

In short, the Intelligent Architecture is the one which is designed with intelligence and talent

11 According to Manuel Castell, Networks have become the basic units of modern society based not only on technology but also on cultural, economical and political factors that make up the Network Society. (http://www.geof.net)

12 Manuel Castell: (1942), Professor of urban geography in Barkley, is a sociologist, especially associated with information society and communications research.

13 The theory describes that by five basic principles i.e. Dematerialization, Demobilization, Mass Customization, Intelligent Operation, Soft Transformation, we can potentially meet our own needs without compromising the ability of future generations to meet theirs. (E-topia by Wiliam J. Mitchell available at http://homepage.mac.com)

14 Dr. William J. Mitchell: a Professor of Architecture and Media Arts and Science, Dean of the School of Architecture and Planning at MIT.

i.e. a building which is safe and secure which can automatically adjust to naturally varying light, temperature and humidity changes, where occupants can customize themselves to individual preferences and finally a building which operates efficiently and assists with its own maintenance—a building of distinction that reflects its owner's character. Therefore, ideally, a building is judged intelligent when the building subsystems provide the occupants with productive and comfortable conditions by responding to and enhancing the workplace environment.

CLASSIFICATION OF INTELLIGENT ARCHITECTURE

There are a number of viewpoints related to the term Intelligent Architecture, applying a wide range of knowledge to architectural theory and practice. *Smart Architecture, Smart Cities, Intelligent Cities, Digital Cities, Soft Cities, Smart Communities, Intelligent Buildings, Smart Buildings* etc. are the related terminologies used. There is not one standard definition of Intelligent Architecture.

The first viewpoint describes *Virtual Architecture*, which defines the first broad perspective of Intelligent Architecture. Virtual Architecture redefines architecture in anti spatial and soft terms, promoting stimulated environment. Virtual places and e-activities take the priority over spatial peers. Unlike a simple 3D model on a computer, the Virtual Building contains a great deal more information about the building's materials and characteristics. It is a 3D digital database that tracks all elements that make up a building (Balogun and Odeyale, 2006). Virtual Architecture exploits Information Technology and the connectivity to broad band networks to create anti spatial, Tele-served, soft architecture, promoting the idea that the physically built environment be supplanted by e-activities, supported by e-agents, and closely integrated with networks in a global context (Youssef and Khaled, 2005).

The second viewpoint promotes the concept of *Automotive Architecture*. This concept enhances physically built spaces in terms of improving performance, saving energy, minimizing cost, supporting users' comfort and productivity via high tech installations and automation system. Automotive Architecture enhances the physical architecture in terms of self-responding to external changes and internal demands, improving performance, saving energy, minimizing initial and running cost, and supporting users' comfort and productivity, by means of technical installations, cabling solutions, and automation systems (Youssef and Khaled, 2005).

Third viewpoint introduces *Sustainable Architecture*. According to this group, the outward aspect of Sustainable Architecture is to achieve durable, green and environmentally responsible architecture that exploits free, renewable and recyclable resources. Sustainable Architecture creates durable, green, environmentally oriented and responsible architecture that exploits free, passive, sustainable, renewable, bio-degradable and recyclable energy resources, to guarantee the environmental quality, the intergenerational equality, the quality of life and the intended symbiosis with nature (Youssef and Khaled, 2005).

By reviewing all the viewpoints regarding Intelligent Architecture, the main common aspect which covers all the concepts is the technological advancement and application of computer systems. The variety of concepts shows the gradual technological advancement and its impact in human life. The advance technological applications which are used in Intelligent Building arrange the relationship between humans and environment.

In 1980s, the buildings which accommodated the high-tech installations were termed as Intelligent. But in late 90s, after Informational Revolution, the concept of Intelligent Architecture, related to creating architecture in an anti spatial context and promoting the informational mode as an integral part of the architectural Intelligence. This shows the shift of technology from automation towards digital. With the rise of global hazards, the pressure on energy resources and massive environmental degradation have occurred and the foot print of architecture on the environment became the

matter of concern. This shows the travel from digital to sustainable approach. Therefore, there is no single definition and single application which is sufficient to define Intelligent Architecture. In recent developments, all viewpoints need to be brought under one roof and should acknowledge and support each other.

CRITERIA FOR INTELLIGENT ARCHITECTURE

Intelligent Architecture is not prescriptive. It is responsive to human needs and sensibilities through adaptation to existing buildings and nature. It represents evidence based result rather than expressing visual ideology. The science behind Intelligent Architecture supports distinct new developing architectural movements and practices. It provides common theoretical support for Sustainable Architecture, New Urbanism, Environment Friendly Architecture, and Automotive Architecture throughout the world. In short, this is a new way to view the world i.e. the way of connecting it to ourselves.

Intelligent Architecture applies technologies to improve the building environment and functionality for the benefit of their occupants or tenants while controlling costs. The benefits were touted to include cost savings for cabling and long term maintenance, plus a future potential for inter operability between systems. It also improves user safety, comfort and accessibility. The vision was to share building telecommunication as backbones with energy management systems, fire alarms, security systems and even office automation (Morsy and Sahar, 2007).

Various ideas are presented and discussed about the features that give buildings intelligence, the building has potential to serve future generations, maintain the sustainability or adaptability over its life cycle and safeguarding the earth and environment resources. A series of design criteria which include elements like site planning, settlement decisions, building form, building envelope, space organization, usage of ecological materials, usage of ecological energy resources and waste control direct the design phase (Smart Accelerate). Therefore, the built environment should be productive, safe, healthy, thermally, aurally and visually comfortable.

TECHNOLOGY AND INTELLIGENT ARCHITECTURE

Intelligent Architecture applies technologies to improve the buildings' environment and functionality for occupants or tenants controlling costs, improving end user security, comfort and accessibility help user productivity and comfort levels. An efficient integrated system enables a modern comprehensive access and security system to operate effectively and exchange information with other building systems. The information is used to manage the local environment and the resulting energy usage. An effective energy management system, for example, provides lowest cost energy, avoids waste of energy by managing occupied space and makes efficient use of resources, through centralized control and integration of information from different sources (Technology Roadmap for Intelligent Buildings, 2002). Widespread use of computer-based processing enables the automation of all basic building systems. These systems primarily support and operate its infrastructure including lighting, heating, ventilation and air conditioning (HVAC), energy management, security, elevators, life safety systems and building condition monitoring.

RESPONSIVENESS OF INTELLIGENT BUILDINGS TO HUMAN NEEDS

The strategy to proposed application of Intelligent Architecture, is firstly, to point out the current unsustainable trends in architectural practice to justify the objectives needed to achieve sustainable future development and secondly, to explore the selective alternatives to refine the architecture theory and practice.

The most important business driver for Intelligent Buildings is the ability to reduce cost, optimize manpower utilization and improve service levels by the use of latest technologies in building management to control environment, access, safety and costs. The energy efficiency of buildings combines many technologies including:

1. Passive heating and cooling
2. Efficient daylight
3. Efficient appliances that reduce the electricity consumption and cost
4. Increased thermal insulation
5. High efficiency windows
6. Natural ventilation for indoor air quality
7. Improvements in building services of HVAC technologies
8. Building Energy Management and Control (Morsy and Sahar, 2007)

The use of these technologies may open the presence, in architecture, of a new spatial, temporal and wider spatial environment that allows you potentially to connect with the rest of the world, gain information that may have value to you in your present surroundings or lets you to act back upon the physical space by changing it to soothe your needs. Architects used to consider the following characteristics of the building in order to define it as an Intelligent Building:

1. Provide Spatially Flexible Environment
2. Provide Individually Conditioned Environment
3. Provide Individually Connected Environment
4. Provide Social Environment
5. Provide Healthy Environment
6. Ensure Low Energy/Low Resource Environment

From the above it is obvious that in order to grasp features of individuality and sociality, the Intelligent Architecture must be flexible and adaptable. Flexibility secures the appropriate environment for diverse needs while adaptability caters to changes in needs or occupants. Third main sustainable feature of Intelligent Architecture is cost efficiency. Productivity is highly linked with comfort which affects human performance and also productivity (Morsy and Sahar, 2007).

CASE STUDIES OF INTELLIGENT ARCHITECTURE

1. The Rotating Home

The concept of Rotating Home (Figure 1), is initiated by Al and Janet Johnstone, who are the owners of RotatingHome.com. Al designed and researched the house, as well as founded or built all the special parts required to make the house rotate. To fulfill the concept of Rotating Home into reality they hired several different engineers to verify and sign off Al's work (Johnstone and Janet, 2002).

Rotating Home can be built in any size or shape in which all or part of the home rotates. A Rotating Home can also be multi-level, with the ability of all or any of the stories to rotate. By using a motor, the building rotates 360 degrees. The speed of rotation varies from one revolution in 30 minutes to one revolution in 24 hours and can be selected by direct control concept where rotation starts and stops by using a switch. Conceptually, all walls in this house can change their location to change the view. Sensors rotate and change bedroom location to avoid sun, heat or light; noise on the other hand can be avoided and view at certain time can be seen from specific spaces in the house. A Rotating Home is perfect for an upscale beach house or large mountain cabin. Steep mountain terrain is not a problem as the Rotating Home can be built up on a central steel column (Figure 2). The building can take any shape in design (Johnstone and Janet, 2002).

2. The Environmental Building (BRE), Watford, UK

The Building Research Establishment (BRE) (Figure 3) is a former UK government establishment, now a private organization, funded by the building industry that carries out research, consultancy and testing for the construction. Environmental Building provides a model for offices for the 21st century. The new Environmental Building has been built as a demonstration building for the Energy Efficient Office of the Future. Innovative and environmentally advanced, it demonstrates the way for the future based on a platform of new low-energy targets. The building aims not only to provide a working office with low energy consumption in use, but also to serve as a large-scale experimental facility for evaluating various innovative technologies (The Environmental Building).

To make maximum use of available daylight the building has a large glass area which optimizes to provide high light levels but low heat loss and solar gain by moveable external louvers (Figure 4). The use of a novel ceiling slab (Figure 5) allows the building to be flexible in terms of space layout without hindering the natural ventilation pathways. A fully integrated, intelligent and efficient lighting system has been installed which automatically compensates for daylight levels and occupancy, controlling each light separately. The operation of the building systems is controlled automatically using the latest integrated technology (http://projects).

The most striking feature of the building when seen from the south side, is the five distinctive ventilation shafts running up the façade (Figure 6). These form a key part of the energy-saving natural ventilation and cooling system. Air-conditioning has been avoided by exposing the ceiling slab. The slab absorbs heat during the day and is cooled down by ventilation at night. Pipes embedded in the floor can provide additional cooling utilizing groundwater (The Environmental Building) (Figure 7). Occupants also have a high degree of control over their local environment by overriding automatic control of the lights, louvers, windows and heating. In addition they can manually open mid-level windows.

The 47 meter square Building Integrated Photovoltaic (BIPV) array incorporated in the Environmental Building provides non-polluting electricity directly to the building (Figure 8). Utilizing thin film amorphous silicon cells, the array seeks to explore issues associated with the integration of photovoltaic into vertical walling, building on previous demonstration installations within the UK (http://projects).

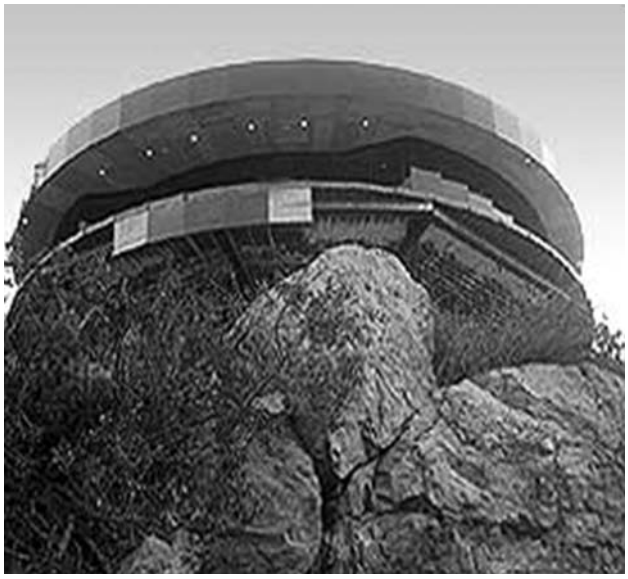

Figure 1: The Rotating Home.s
Source: A. and Janet, 2002, Maximize your view with rotating home available at http://www.rotatinghome.com/

Figure 2: The Rotating Home on Central Steel Column.
Source: A. and Janet, 2002, Maximize your view with rotating home available at http://www.rotatinghome.com/

3. Blur Building, Switzerland

The Blur Building (Figure 9) is a media pavilion for Sixth Swiss National Exhibition 2002, designed by the New York architectural team of Richard Scofidio and Elizabeth Diller, in Switzerland (Diller and Scofidio, a, 2002). It's a beautiful concept; the primary building material is water, pumped from the lake and vaporized around the promenade deck. The attempt to construct a 60x100x20 meter metal building that sprays countless tiny drops of lake water from thousands of jets. The building can approach via 400 feet long ramped bridge which deposits visitors at the center of the fog mass on to a large open air platform where movement is unregulated (Figure 11).

Figure 3: Building Research Establishment, Watford, UK.

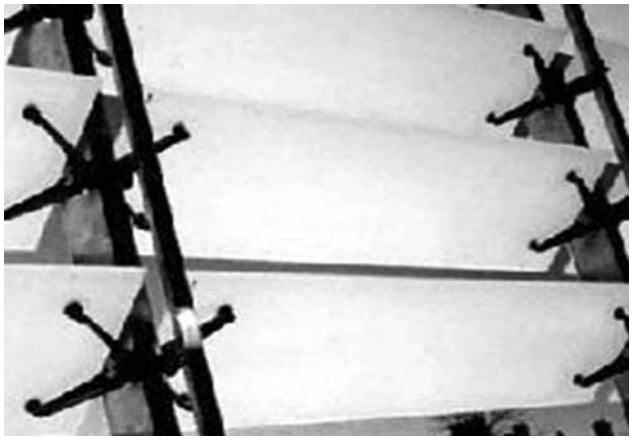

Figure 4: Moveable External Lourvers can also operate mannually.

Figure 5: Good level of daylight is achieved throughout the day.

Figure 6: Ventilation Shaft.

Figure 7: Low energy cooling system.

Figure 8: The South facing photovoltaic facade.
Source for Fig 3 to 8: The Environmental Building: A Model for the 21st Century, manual by BREEAM).

Prior to entering in the clouds the visitors received a brain coat i.e. smart rain coat which was used as protection from water environment. The space was surrounded by glass on six sides so that visitors could experience a sense of physical suspension. At the top of the structure was the Angel Bar, serving glacier water as well as commercial and municipal water from around the world (Diller and Scofidlo, b, 2002).

The Blur Building gave the basic idea of liquid form in architecture that is supposed to respond and be formed according to its users' needs. They used computers to adjust spray strength according to the different climactic conditions of temperature, humidity, wind speed and direction (Scofidio, Ricardo and Diller, 2002).

4. Topotransegrity – Non Linear Responsive Environments

Topotransegrity (Figure 13) is an award-winning and widely published research design project, designed by 5subzero, a building group of architects from London. The Barbican Arts Center is used as a testing ground to explore how an adaptive spatial organization can be introduced to public spaces and challenges long held assumptions about architecture as a passive spatial arrangement. Since the public spaces are the only place where all different programs connect, it became an ideal testing ground for Topotransegrity (http://5subzero).

Figure 9: The Blur Building

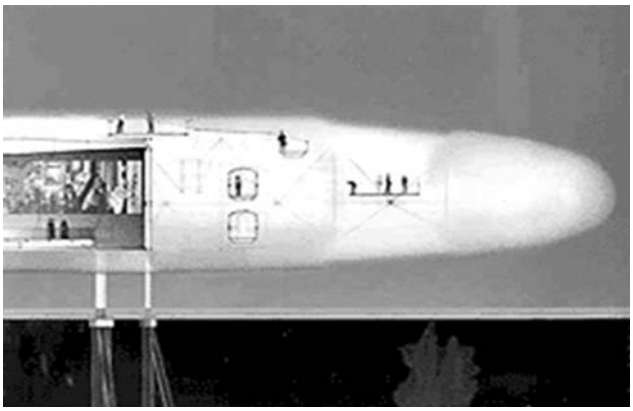

Figure 10: The Longitudinal Section

Topotransegrity is an inhabitable interface running in a constant feedback loop which can react to and interact with the users and anticipate and adapt to their behavioral patterns. It relies on contextual and internal parameters derived from its environment and works according to different modes of operation that influence different parts of the structure and add up to a series of emergent user dependent spatial configurations (Senagala and Mahesh, 2005).

Topotransegrity constantly evaluates its surroundings and reconfigures according to the changing conditions. It investigates today's networked ways that enable architecture itself to operate as an intelligent interface that connects spaces, users and performance criteria (Figure 14). Topotransegrity is a pneumatic piston driven system. The possibilities and limitations of this system were examined in a series of physical and virtual models. The

Figure 11: Aerial view of the ramped bridged.

Figure 12: The basement.
Source for Fig 9 to 12: Diller & Scofidio: The Blur Building available at http://www.designboom.com/

structure is capable of various transformations, which range from small-scale surface articulations to large surface deformations, which can generate temporary enclosures. Sensors, input devices and wireless networks are integrated into normally dead building materials to transform architectural space into complex intelligent operating systems (Neumayr, 2006).

Different types of responses are superimposed on the structure but act in different time frames, operating in three parallel modes. These three modes of operating act independently but are always interrelated since they are based on the same data input. The entering movement of visitors is recorded and displayed through the memory mode. The crowd mode also interprets this data and influence the temporary structures established by the program mode which acts in relation to the given event schedule. These three parallel modes of operation run simultaneously and add up to the structure's complex, unpredictable user-dependant spatial configuration. The constantly changing three-dimensional space envelope, interacts with its visitors in a permanent feedback loop, where the users' reactions to spatial adaptation are fed back into the system to update the spatial arrangements and individually customize the built environment to requirements at any given moment for any given pattern of use (http://5subzero).

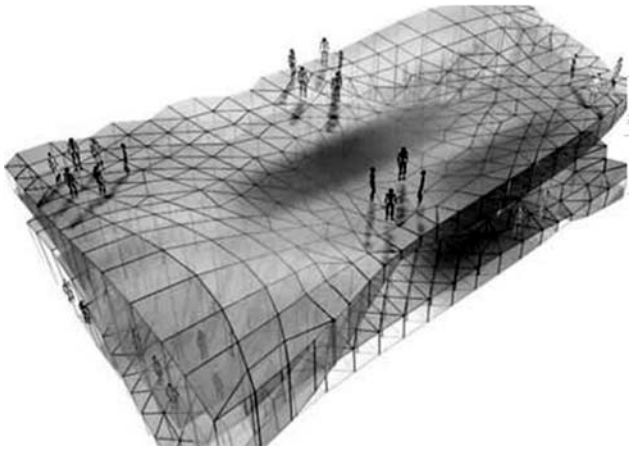

Figure 13: Topotransegrity

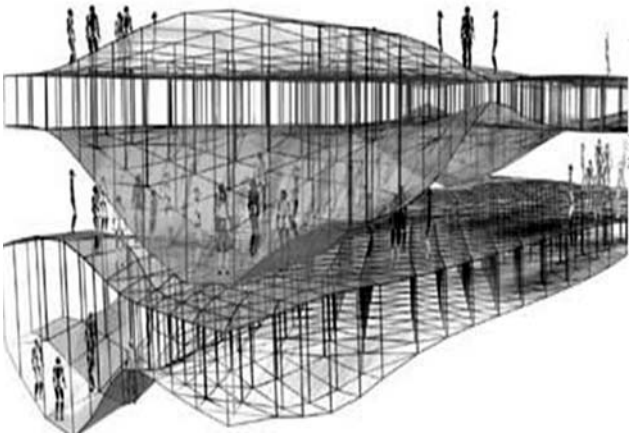

Figure 14: The non linear envrionment.

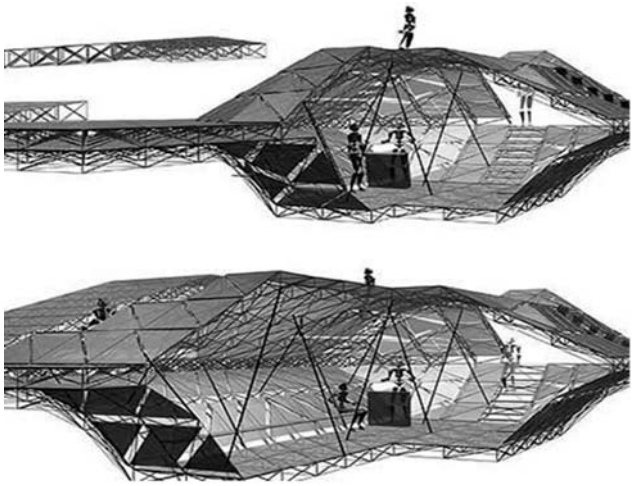

Figure 15: Visitors movement inside the topotransegrity. *Source for Fig 13 to 15: Neumayr, Robert, 2006, Topotransegrity - Non-Linear Responsive Environments, available at http://www.interactivearchitecture.org/*

CONCLUSION

Figure 14: the non linear environment.

As a result, new definitions and identities will appear in connection with the technological improvements in buildings. Nowadays integration of technology systems into a standard building which has been designed without analyzing the physical and social systems of the project field carefully is not enough to describe a building as "intelligent". The major "actionable" conclusions to promote intelligent architecture are:

1. There is a significant number of intelligent building technology products currently in the international market that are capable of automating and integrating all major building systems.

2. Building automation systems can both reduce costs and increase productivity and comfort.

3. The degree of confidence in intelligent building technologies is inadequate largely because of a lack of awareness and understanding, of its value.

4. There is a lack of properly assessable intelligent building technology reference projects.

5. Reduced energy costs are seen as a major benefit of intelligent building technologies equated to HVAC. However, other benefits, e.g., reduced staff levels and improved occupant satisfaction, are often overlooked.

6. Economic analysis of intelligent building projects are often flawed. Typical errors: construction cost increases but not the savings, incorrectly reflecting operational cost savings over the project's expected life, and ignoring additional rent and sales revenues.

7. Widespread use of the Internet and wireless communications improves worker productivity and increases the cost effectiveness and market of intelligent technologies.

8. Air quality measurement and other sensors work well to control HVAC and other building automation systems.

9. There is a significant shortage of trained, knowledgeable and certified professionals in the design, installation and integration of intelligent building systems.

10. Intelligent building technologies require the co-operation of the entire design team including owner, developer, architect and engineers.

11. An integrated communications infrastructure is the essential foundation in the effective deployment of intelligent building technologies.

12. New and evolving technologies enable the gradual enhancement of functions and features, via upgrading of the electronics, throughout the life of an intelligent building.

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THE GLORY OF SPACES

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ABSTRACT

The "Glory of Spaces" is the study of space in its philosophical and sociological framework. This vision of study has become important in order to understand how the space, either social or private, behaves in its axis. How the impact is cast differently, and how it behaves after such impacts.

Hence, in the discussion, the focus is on the space, directly or indirectly based on the perceptual space image and the physical space image. The study creates interest on when and where both images interact and cast effect on the viewers. The space in Mughal architecture has been discussed and analyzed.

The perceptual space seems clear as it links with the percept of the user. There are as many perceptual spaces as the observers. However, the perceptual space of one observer differs from that of the other which produces variety. Basically, the perceptual space also acts as the private space of the observer. It is always personal or private when it lies in the mind of the person and when it comes out in any art form, it becomes social or public.

Keywords: *Moghal Architecture – Perceptual Space – Physical Space*

INTRODUCTION

When the idea of space being perceptual and physical in nature, is introduced in Architecture, its meaning and context gives multi-dimensional vision to the viewer. The human being has a very deep affection towards his space, and he sometimes uses it for religious purposes, sometimes for leisure activities and sometimes for residential purposes, and moreover in the case of Monarchs, for their mausoleums and Fort activities (Russel, 1979).

Figure-01: Vision of Infinity

In general the perceptual space image in Egyptian pharoas gives the world a strong space mythology and its interpretation in a divine way. i.e. "that the pyramidical form of structure highlights the soul of king soaring up to the sky for his convenient assent to God" (Gombrich, 1940).

This unique idea of space mythology transforms the character of space as finite and / or infinite in nature. The idea of infinity and finiteness has created such a relationship where the perceptual space seems directly proportional to the physical space in the form of a pyramid. However the elevated vision of pyramid strongly proves the perceptual image of Egyptians. Here the emotion and logic act simultaneously at equal ends, by highlighting the existence and reality of the theme.

Mughal dynasties have cast their miracle impact over centuries. The vision of physical space which they produced in their Mosques, Mausoleums and in their Forts has cast an unforgettable impact on the people, starting from India to Pakistan and upto Kashmir.

DISCUSSION AND ANALYSIS

Mughal mythology of space was based on delicacy, both in details and in spaces. The architectural Era of Mughal dynasty covers three generations' vision (Akbar, Jahangir and Shahjehan). The space impact in the building was the intellectual impact of their evolutionary process. Looking at spaces either interior space or the exterior space, the space developmental process gives a clear change in the state of mind in time and space.

Space appearing in Red Fort OR Lahore Fort, whether they are Dewan-e-Aam or Dewan-e-Khas or other space-visions, all have the same quality of clarity, simplicity and the idea of integration by showing the basic spatial formula. The architectural identity based on a series of progressive spatial and material use in their space relationship, seems very clear while moving through all these buildings. The perceptual vision of the aforesaid trait unfolds the understanding of its function and meaning.

Comparing the spatial analysis of Humyun's tomb with Taj Mahal, it becomes clear, that the plan develops the theme of Humyun's tomb by an arrangement of a central chamber with four corner chambers and corridors connecting their axes on the single central focal point, whereas in Taj Mahal the tomb is raised on a podium balanced by four detached minarets. Again in Taj Mahal, besides four corners it is also accompanied from both extreme ends by tomb Mosque and the identical reception hall, showing the sandstone cladding and contrasting with the white marble tomb. The same situation also appears in the Lahore Fort format, where the space division highlights the same impact. In general the perceptual space image among them does not give the basic diversity of their vision, but shows the homogeneous vision of their basic plan idea. "Though, the architectural characters vary from place to place by showing the age difference of dynasties." (Thomas and Hudson, 1984).

In Mughal architecture, the perceptual space image lies on delicacy through the symmetrical forms coordinated with open and closed spaces.

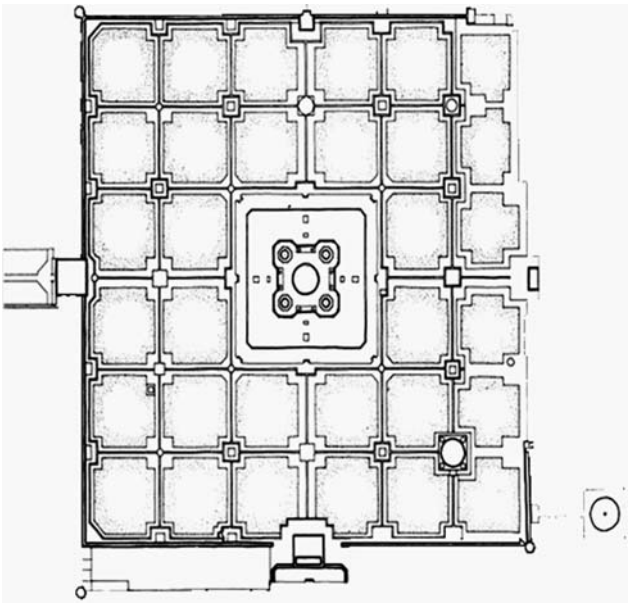

Figure-02: Humayun Tomb

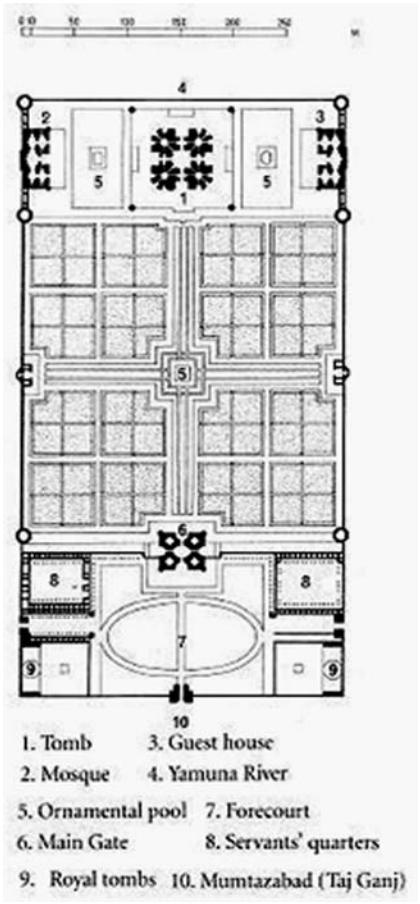

Figure-03: Taj Mahal showing basics theme plan of Humayun Tomb

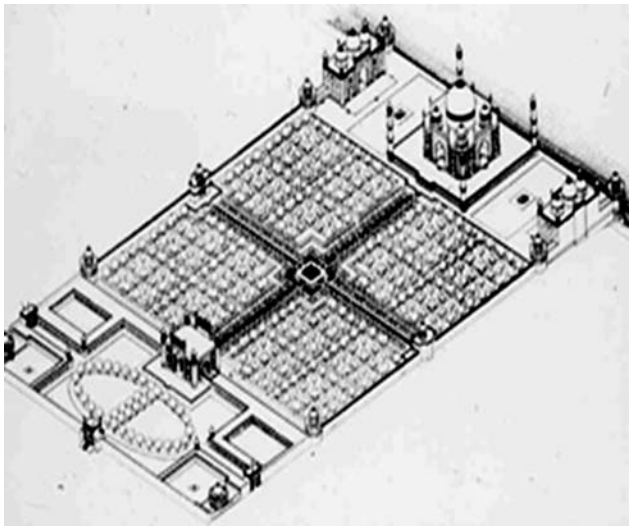

Figure-04: Taj Mahal Plan

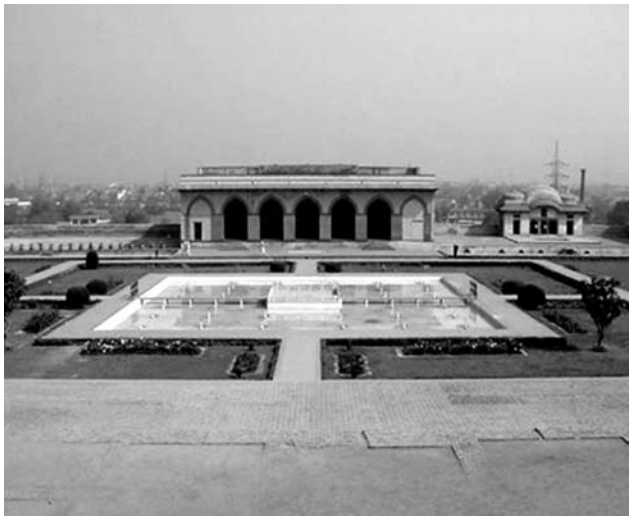

Figure-05: Interlocking Space Vision (Lahore Fort).

In the perceptual vision the idea of human scale with reference to the open and closed spaces casts a dramatic effect over the user; here through their vision, they develop a clear scale difference between themselves and the ordinary man. This can be easily seen from the pavilions of Dewan-e-Aam. The single structure building composed of series of cusped Arches flanked by huge gardens and other buildings. This tells us how they enlighten their highness before the layman through scale and through elevated impact. In architectural mythology, the space and movement in Mughal Architecture, leads the attention of the beholder towards the intellectual insight of the perceiver, whereby the combination of these two new relationships seems to develop a sequential experience, which means the symmetrical interdependence or one can say, the relationship of one space to another.

In all the above cases the space distribution depends on the need and sequence of relation. It should also be noted that buildings here are not only based on geometry and proportion but also on experience and functions (as seen from the Dewan-e-Aam and Dewan-e-Khas). The experience and function in all such Forts show the successive refineness in their character.

In the Red Fort, where Hindu influence casts very different impact over the building, the profile seems different from that of Shahjehan

Figure-06: Interlocking Space Vision (Red Fort).

and Jahangir. Akbar seems to be influenced by other religions. However, the hybrid product appears in a very rich and massive way, and the Hindu character of central courtyard has carved brackets in serpentine vault and steps, curves and massive rectangular piers (Klingelhofer, 1985).

In Jahangiri Mahal, Jahangir also tried to incorporate the fusion of Hindu culture in the era of Fatehpur Sikri (made by Akbar). This fusion of Hindu and Islamic design and detailing made the building massive as compared to Islamic Architectural characters. His vision was to create architecture of conspicuous power. It also displayed an expression of imperial interaction and ambitions in its aesthetics.

Figure-07: Fusion of Hindu Culture in Jahangiri Mahal Red Fort (Delhi).

Figure-08: Royal Pavilion - The Vision of Space Clarity (Lahore).

The square pavilions and the underneath water channels were the Mughals favourite character of designing. Looking all over Mughal dynasties, this architectural feature enhanced the beauty of the environment. The idea of such experiences creates curiosity among the tangible and intangible space in Forts.

In Mughal Fort designing, the pavilions like Dewan-e-Aam and Dewan-e-Khas both have a key role in their functions. In both cases the perceptual space appears very mature.

The design formulation in both cases highlights their expression differently where Dewan-e-Aam through its single storey structure with series of cusped arches flanked by huge garden showing the social space image. On the other hand the Dewan-e-Khas (and other buildings) highlight the space for special purposes not for public but for royal use. Its environment does not cross the buildings but lines within the enclosed space. The construction in both cases has a clear difference of their imagination.

The symmetrical interdependence of Dewan-e-Aam in Red Fort, Delhi and in Lahore Fort has the same image. But the striking difference in Dewan-e-Khas is the flow of water channels and the huge central courtyard. This private pavilion was the sitting zone of the Royal family. In both

Figure-09: Dewan-e-Khas (Lahore Fort).

Figure-10: Dewan-e-Khas (Red Fort).

cases the symmetrical interdependent space was based on experiences and needs and was according to functions. However, the unbalancing attitude of any one of them causes asymmetrical interdependence.

CONCLUSION

Mughals, through their vision, developed a definite image by means of perceptual analysis about the tangible and intangible environment. This whole phenomenon unfolds their perceptual image. The basic concept of their perceptual space seems identical but verifies expression perceived by their experience and through time and place. Looking in detail we find that the whole phenomenon was based on their symmetrical interdependence doctrine which was a part of their perceptual space. It was the seasoned philosophy of their sequential experience, which later on appears in Taj Mahal as a wonder of world heritage.

Figure-11: Dewan-e-Aam (Lahore Fort).

Figure-12: Dewan-e-Aam (Red Fort).

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BOOK REVIEW

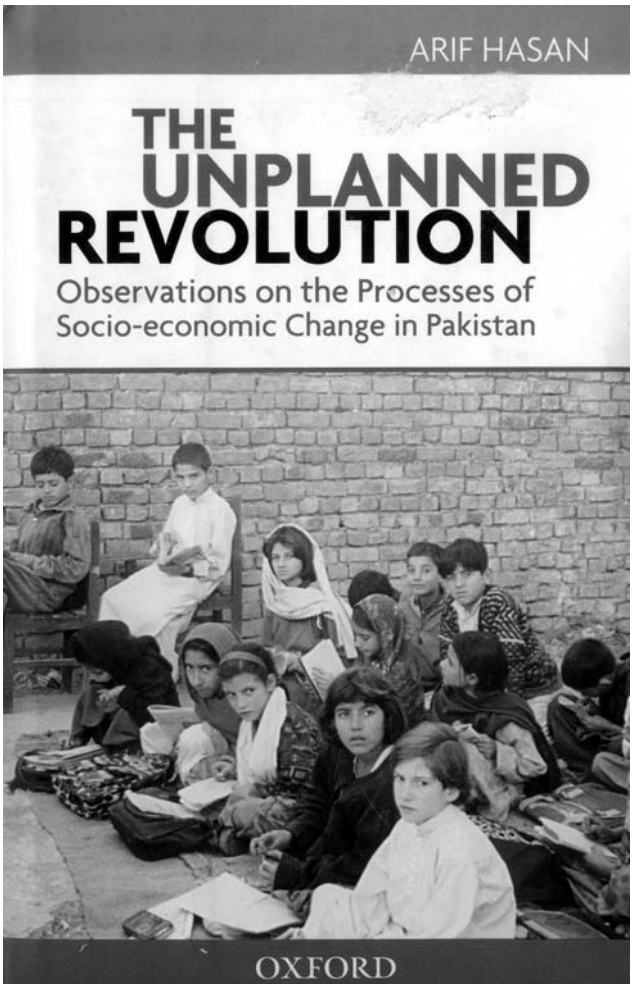
THE UNPLANNED REVOLUTION*

By

Arif Hasan
Published by Oxford University Press, Karachi
307 Pages, 2009

Reviewed by Dr Noman Ahmed

The societal changes that have taken place in the Pakistani context ever since independence constitute an interesting subject of research and interpretation. Several scholars have approached the topic from various intellectual standpoints. One finds the Pakistani society examined from the perspectives of developmental economics, anthropology, sociology, urban and rural dichotomies, historiography and many other disciplines of learning. The present volume by Arif Hasan is a valuable addition to the body of knowledge that helps both the ordinary souls and researchers to comprehend the nature and intensity of transformations in the Pakistani society. The author is an eminent development practitioner with a very rich experience of the contexts and case studies that he has included in this book. He has scouted the remotest nooks and corners while pursuing the various advisory, consulting and advocacy assignments for different national and international agencies. These experiences afforded him numerous opportunities to keenly observe the sociology, culture and economics of communities across the country. In this work, Arif Hasan has used a mixed methodology of information gathering to structure his arguments. The documentation of change in its multifarious dimensions has been cited from factual records, first person accounts from selected informants in various locations, feedback from the groups of people he met during his professional sojourns across the territories, works of his co-researchers and students, educational institutions where he worked and supervised research work and the interface with innumerable men (and women) who mattered in state craft and societal direction setting. With his avid diagnostic foresight, the author has been able to interlace what is normally regarded as ordinary and mundane into arguments of extraordinary substances and relevance.



The book is organised around regional case examples to explore the labyrinths of change in Pakistan. These choices have emanated from the authors' direct experiences at various time

intervals. In the opening account, the general indicators of change are outlined. These dimensions pertain to commonly discussed concepts, often studded with populist references. Thus the otherwise complex narrative of sociological metamorphosis is described with relation to simple variables such as 'go-getting culture' and '*Shia Fiqh*', both of which have sophisticated nomenclature. Whereas the simplicity of narration may be frowned upon by the traditional academics, the general readership may find it easy to assimilate. That said, it is however apparent that some statements merit substantive qualification in order to establish the specific inferences implied by the author. In dealing with Zia era, the author could have been specific in relating the various doctrines and concurrent implications. The section needs more clarity as the sequence of paragraphs does not represent the evolutionary process through which the repercussions took the form which made them conspicuous for the times to come. As this section sets many opening questions, articulation of variables along with the inter-relationship may have given strength to the arguments that emerged.

Northern areas are the first context covered in the book. The works and outreaches of Aga Khan Development Network institutions are meticulously highlighted as a major contributor of social, economic and cultural change. With simple and short case studies in development, the process of changes in social relations is documented. Gradual attitudinal changes towards development and self improvement, catalysed by the AKDN, become visible through the viewpoints of individuals covered in the work. The chapter on women education raises many questions which need more detailed response than what is provided in the text. Gradual emancipation of women folk, their comparative independence about usual decisions of life and the societal attitude towards female education in Northern Areas as a whole are probably questions that have been paraphrased for focused studies by concerned scholars.

The diary like fashion of writing adopted by the author in most sections of the book sketch the scenes and sounds in an effective way. The anecdotes cited in the text are often produced in a dialogue form to capture the strength of individual characters. In other words, the opinions of stakeholders have been enunciated without intellectual frills or academic jagon to retain the spirit of actual discussion. The readers can draw their respective conclusions from these candid narratives.

The discourse may have become more effective with additions and insertions of some points. It may have been useful to present the making of social and physical geography of the contexts in order to establish the transformational settings of case examples. In the sections on the river in Sindh and the coastline, this description could have added value to the narration. The photographic documentation around key developmental changes is a sorely missing aspect. Besides, the sections in the present structure read in isolation from one another. The introductory lines of each section may have provided a connection with the preceding write-up to maintain continuity. The maps inserted in the book are illegible, to say the least! Contemporary atlas or an electronic repository may have provided with better options. An overall section must have been added to sum up the opening questions, findings and analysis to a research finale. However despite these missing aspects, the book is a must read for those who wish to understand the contemporary society of Pakistan with its expanded fall outs, diversities, contrasts and unpredictabilities.

A shorter version of this review has also been published in Monthly Herald, April 2010.

BOOK REVIEW

UNRAVELING MYTHS - KARACHIWALA - A SUBCONTINENT WITHIN A CITY*

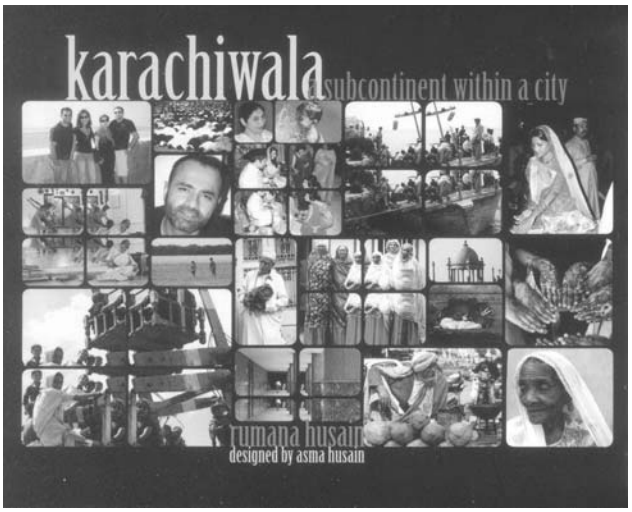
By

Rumana Husain
Designed by Asma Husain
Published by JAAL, 2010
336 Pages

Reviewed by Dr Noman Ahmed

The The making of cities is a complex process. It happens in the mills of time and space with the interplay of several ingredients. Locational features, components of built environment, entrepreneurship, inhabiting communities and their evolving linkages with themselves and external milieu are some distinct mentions. If one may intend to pick one ingredient from this diverse array, it is the people that become the most powerful proponent in the metamorphosis of a city. Despite its short lifespan, Karachi has been able to absorb and subsequently display the polychromatic reflections of her inhabitants in a vivid manner. And the well researched treatise by Rumana Husain lives up to its title. Karachi truly mirrors the social and cultural shades of the sub continent in an unmatchable way. This volume provides us the unique opportunity to stop and take notice of the colours and fragrance that are stretched through the existence and lifestyles of people the make Karachi its worth.

The contents of the books are comprehensive in coverage and illustration. Resorting to academic jargon, the writer has adopted a non-linear methodology of profiling the subjects of her research. For this reason the interest of readership from different backgrounds shall remain alive, despite browsing it several times. In other words, there is an element of surprise which lurks around the corner of every page ending. The double folds pop out to enrich the text and texture, adding the pleasure of exploring the book. Despite the fact that the book introduces sizable new information adds significantly to the body of knowledge about Karachi, the style of writing is simple which



makes it digestable to the most common of the Karachi wallas. An element of diversity is added by the well known personalities who contributed their essays. A note of epilogue by the learned author may have been useful to stamp the work for a final view and directions for the way forward.

On a profound note, Karachi wala is about recognition. A quick browse unveils many familiar characters, families and personalities. While the descriptions about the celebrities is understandable, it is the mirroring of images about the common Karachi wala that catches the attention of any folk who may decide to read it for pleasure. The family photographs, images of home and hearth, keyholes to adolescence and occasions, family / clan elders, photographic mention of hidden and even forbidden are some traits that will certainly leave deep imprints for on who shall experience

this book. The narration of rare Karachi wallas such as Bah'ai and Jewish communities will open fresh perspectives for serious researchers in their stride for discoveries and analytical findings.

This book has been produced with a careful approach of design down to the minutest of details. The acts of composition are applied in a manner where different textual, chromatic, graphical and photographic ingredients have been interlaced in appealing formats. That said, the composition retains the flavour of visual continuity without any rupture. Each and every page has been created with a prism of its own to catch the readers' interest in his stride of exploration. The collages and sequences of photographs and other visual details add graphical value and substance to the text in a flowing manner. However, in some instances, the pages have blank spaces which generate slight impression of compositional vacuum. Perhaps addition of dummy geometrical elements or abstract components may have maintained thematic continuity. Also some photographs could have been enlarged to fit the scale of the page ending. The wall papers that are inserted in the concluding part of the book are powerful depictions of the headings that they represent. One feels that on introductory brief towards the beginning may have added some clues for the lay readers! For the culinary delights of readership, the repository of rare recipes shall certainly prove as a real reward. Similarly the planners and social researchers would find the quasi-linear equation of in-city movement as useful evidences of transformations and upward social mobility. However the drawings about women's attire display an unclear and smudged message which adversely affect the otherwise articulate visual theme. In certain cases, one does not relate the color combinations with the dresses neither in the abstract nor in real symbols.

Finally, this labour of love by Rumana Husain is a gift – to no one else but all of us. A brows shall take us down the context and memory lanes of spaces and inhabitants of this wonderful city, many of which were very close to us. It shall nourish a nostalgia with a purpose – to know ourselves and our city better, with an informed stand point. For the fleeting passers by, it shall certainly act as a window into the microcosm of the sub-continent that Karachi happens to be in reality.

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Also published in monthly 'Archi Times', March, 2010.

INVITATION FOR CONTRIBUTIONS

Journal of Research in Architecture and Planning is an initiative taken by the Department of Architecture and Planning, NED University of Engineering and Technology, to provide a medium for communicating the research and the critique in the broader domain of architecture and planning in Pakistan and beyond. This annual publication shall focus on a specific theme in each of its issues.

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Format of contribution

- The length of the article should not exceed 5000 words.
- Text should be typed and printed on A-4 sized sheets. It should be in the format of Microsoft Word document. The paper can either be sent on a floppy disk or CD or it can be e-mailed to the address given below.
- Photographs should be original and preferably black and white. Do not embed graphics, tables, figures or photographs in the text but supply them in seperate file along with captions. Scanned images will only be accepted in *jpg* or *tiff* formats with 300 resolution.
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Contributions for our latest 'Book Review' section are welcome in the form of a brief summary and a sample of the publication related to the field of architecture, planning and development.

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