HOUSING FOR THE POOR:
A COMPARATIVE STUDY OF HASSAN FATHY'S HOUSING EXPERIMENT AT NEW GOURNA, EGYPT, AND CHRISTOPHER ALEXANDER'S HOUSING EXPERIMENT AT MEXICALI, MEXICO

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B.Arch., University of Pune, India, 1994

A THESIS

submitted in partial fulfillment of the
requirements for the degree

MASTER OF ARCHITECTURE

Department of Architecture
College of Architecture and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1998

Approved by:
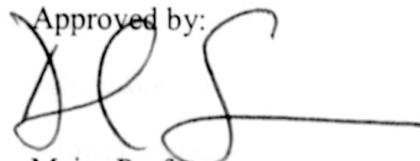
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ABSTRACT

This thesis compares and contrasts Hassan Fathy's housing experiment at New Gourna (Fathy, 1973) and Christopher Alexander's housing experiment at Mexicali (Alexander *et al*, 1985), two approaches to self-help housing in which actual human needs and values are given precedence over profit and speed of construction. At New Gourna, Fathy develops an empathetic-insider approach based on a close working relationship between architect, users and craftsmen, while at Mexicali, Alexander develops a pattern language approach based on an active dialogue between architect-builder and users. This thesis compares and contrasts these two experiments in self-help housing and evaluates both approaches as they might be a successful alternative for creating socially and economically effective housing for poor populations.

The thesis uses philosopher J. G. Bennett's (1993) tetrad model as a framework for comparative study. The tetrad is a conceptual model for understanding any activity as a whole and consists of four sources which together provide a comprehensive picture of the activity. In this thesis, self-help housing is the activity under examination, and the four sources are identified as ground, instrument, direction and goal. These four sources provide the basis for a detailed comparative analysis of the two approaches to self-help housing. Using these four sources, the thesis aims to answer the major question of how self-help housing can be used in the creation of successful homes and communities.

The thesis presents conclusions drawn from the comparative study and discusses the relative strengths and weaknesses of the New Gourna and Mexicali projects. The thesis concludes by suggesting ways by which further experimentation might make the activity of self-help housing more practical and successful in contemporary times, especially for low-income and poor populations.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

CHAPTER 1

INTRODUCTION: HOUSING FOR THE POOR

Some of the worst problems, it terms of human suffering, occur in the poorest cities of the developing world. Especially where population growth is rapid, local governments are unable to provide for even the most basic needs of their citizens. Throughout the developing world, the urban poor live in life threatening conditions.

~ Walters. G, World Health Organization (World Resources 1996-97, p. 1)

Shelter is one of the most important aspects in the life of a human being. Traditionally, the making of houses was an act of necessity and also a kind of ritual through which the inhabitants became "one" with their homes. According to Seamon (1979, pp. 70-71), the dwelling place is generally the spatial center of at-homeness, which is a prime root of personal and societal strength and growth, besides playing a major role in fostering community. In traditional societies, the production of houses was filled with human emotions and feelings by way of which the end product was a "dwelling" and not just an envelope to live in.

The key to dwelling, the German philosopher Martin Heidegger argues, is sparing and preserving--the kindly concern for land, things, creatures and people as they are and as they can become. As human beings we cannot fail to dwell, for dwelling, ultimately, is the essential existential core of human being-in-the-world from which there is no escape. At the same time, dwelling is just as much a means as an end, and there will always be a certain tension, a kind of imperfection, between what we wish to do and make (Heidegger, 1971).

The home often serves as a psychological and cosmological center, a religious or sacred place, or a reflection of family culture, besides reflecting a host of other cultural values (Altman and Chemers, 1980). Home is a staging of personal memory and functions as a two-way mediator: personal space expresses the personality to the outside world, but equally importantly, the outside world strengthens the dweller's self-image and concretizes his world order (Pallasmaa, 1995). Literally, the home roots the person spatially, providing a physical center for departure and return. Although inescapably a part of a larger geographical whole, the home is a special place because around it the person organizes his comings and goings (Seamon, 1979, p. 79).

With the rapid growth in industrialization and its accompanying developments, there has been a tremendous change in the way in which the art of home-making has been approached over the years. Amos Rapoport (1969) identifies three most basic levels of home design and construction, viz., primitive, pre-industrial vernacular and modern vernacular. According to Rapoport, the first stage is characterized by little specialization, and expertise about home construction was shared by everyone. In the second phase, houses were built by tradesmen, while the third stage involved many specialized building types, which called for teams of specialists (ibid.).

As the process of home-making moved further away from the users' hands to those of the specialists, there has also been a relative increase in the indifference with which the entire act of building construction as a whole, has been perceived. Moreover, technological advancements have generated related benefits like artificial heating and ventilation, just

to name a few. With the incorporation of central heating and air-conditioning systems, thermopane windows, insulation and storm doors, we tend to pay little or no attention to the local climatic conditions within which the building is to be built. Thus, less importance is being paid to the orientation of buildings to the sun and wind, towards natural means of securing insulation, and thereby the sense of creating a climate-sensitive architecture is lost.

With all these simultaneous increases in the specialization of building services, the art of home-making has become far removed from the users. Moreover, the use of more and more artificial building materials in construction makes the process inaccessible to the layman. This is especially so in the case of mass-housing projects. Standard building components are assembled on site and the building envelope is completed in a very short time. More often than not, it is the lower economical segment of the society which is forced to occupy such insensitive and unsympathetic environments.

According to Rapoport (1969), the users of buildings tend to emphasize associational qualities much more than designers, who typically emphasize perceptual qualities. Since designers tend to be very different from most users, they need to be very careful, particularly about housing--the primary setting for users and closely related to preferences and choice based on *their* ideals (Low and Chambers, 1989). Pallasmaa (1995, p.145) adds that today's avant-garde architecture has all but abandoned the problems of mass housing and that this loss of horizon and sense of purpose, shortening of perspective, had turned architecture away from images of reality and life into an

autistic and self-referential engagement with its own structures. Caught in this maze of unsympathetic construction, the worst affected in this process are poor populations

THE PROBLEM : A HOME FOR THE POOR

At least 600 million urban dwellers in Africa, Asia and Latin America live in 'life- and health-threatening' homes and neighborhoods because of the very poor housing and living conditions and the lack of adequate provision for safe, sufficient water supplies and provision for sanitation, drainage and the removal of garbage, and health care.

~ Cairncross, Hardoy and Satterthwaite (1996, p. 114)

The reason for the very poor housing and living conditions in which a sizeable proportion of poor people live in the world today is not because they lack a capacity to pay for housing with basic amenities, but that such housing is unnecessarily expensive or not available (Satterthwaite, 1996, p. 115). Thus, we find that there is much more to the problem of housing the poor than meets the eye. While trying to identify the problem at hand, it is also important to bear in mind the role of culture behind the process of home-making. Over the years, this process had a strong dependence on social, cultural and traditional values, all of which traditionally amounted to the automatic creation of a sense of place and belonging within the homes. A close analysis of the dwelling patterns, especially of poor people across different cultural contexts, reveals a close adherence to traditional building techniques and forms besides the use of natural building materials. Not only were such dwellings affordable, but they were sensitive environments both in a climatological as well as in a psychological sense.

With the advent of the modern era, much of this reliance on culture and tradition has been neglected and even overlooked. The urge to emulate the Western techniques, which are technologically-advanced and energy-consumptive, has been so strong that the importance of tradition and values took a back step.

Various attempts have been made to solve the problem of housing for the poor. A major aspect of this help was urban renewal--through better housing laid down on an abstract pattern from the outside. Its relatively simplistic notion was that slums are bad housing. Its solution was to tear down the bad housing and build better housing. This process was a bonanza for contractors but, for the poor, often became a new uprooting of communities whose roots were battered and under-nourished (Polk, 1973, p. xi). Poor people were forced to occupy high-rise housing developments, and found themselves lacking a sense of territorial identification. The buildings rapidly dilapidate, statistics of crime were often high, and a sense of lethargy and sullen anger, which is the hallmark of "underdevelopment", were evident (Polk, 1973, p. xi). In New York City, for example, ninety-five percent of the New York City Housing Authority's projects taller than six stories in height and larger than 1000 units in size had higher crime rates per 1000 population than those which were both smaller and lower (Newman, 1973, p. 27).

The dream of the modern movement in architecture and planning was that technology and industrialized housing would be able to provide high quality housing for everyone, mass-produced in high-rise blocks set in a garden landscape. Housing was regarded rationally in terms of universal requirements, applicable internationally and cross-

culturally and the house was conceived as a "machine-for-living-in," a piece of technology. The result, we have since learned, was very often homelessness (Altman and Werner, 1985). The evolution of the high-rise (the elevator-serviced, double-loaded corridor apartment buildings, in particular) could only have been conceived by architects in search of the most economical solution, which involved housing the most with the least (Newman, 1973, p. 25).

Since World War II, there can be identified scores of examples throughout the world where the provision of all the physical accouterments of housing failed the needs of their occupants. The fact is, in the view of William Polk, that we have painfully learned in the process of spending a trillion dollars in the period since World War II that development occurs in the minds and hearts of men, or it does not occur at all (Polk, 1973, p. xii). Until we begin to understand the day-to-day environment in terms of dwelling, Heidegger argues, we will continue to create locations that are lifeless and empty spaces rather than lived-in places fostering a sense of vitality and community (Seamon, 1979, p. 93). Hence, it is time that we turn away from a materialistic approach towards housing to a more humanly and sympathetic approach towards creating dwellings. If only we realize the fact that there is much more to home-making than just profit-making, we would be in a better position to design sympathetic environments for people.

A HUMAN SOLUTION

This thesis assumes that the standard of living among the world's desperately poor can be raised through <u>cooperative building</u>—the process by which designers and users collaborate in the act of construction to meet housing needs. There is much more in this approach than the purely technical matters that concern the architect. There are social and cultural questions of great complexity and delicacy, there is the economic question, there is the question of the project's relation with the government, and so on. None of these questions can be left out of consideration, for each has a bearing on the others, and the total picture would be distorted by any omission (Fathy, 1973).

In redressing this situation, a successful approach would be something of a "middle-ground merger" of traditional practice with the modern progressive impetus (Rowe, 1989, p. 319). The role of tradition establishes both continuity and a source of future guidance. Hence, instead of just neglecting tradition and values as something inappropriate for the present, it would be more worthwhile if we were to critically analyze traditional solutions to buildings and try to incorporate them into the contemporary building process. According to Rowe (1989, p. 319), a more fruitful version of the "middle-ground merger" would attempt to redress the root cause of the settlement problems through the use of participatory processes. Here, efforts would be made to involve inhabitants in matters of habitation, provision of shelter and design of communities. Such a participatory process forms the basis of the cooperative production of homes or self-help housing.

According to Seamon (1979, p. 94), learning to dwell in our modern world happens in two ways: discovering the importance of dwelling in our own and others' lives and designing physical environments that sustain and enhance dwelling. In the participatory process of the production of homes, there lies tremendous scope for the enhancement of the dwelling. Residents are involved in the creation of their own lived-in space, their own center, to which they are bound to have a great sense of attachment. This brings in more meaning to the entire process of home-making. In the view of Doxiades, if houses can be built by people, they should be built by the people. He adds that architecture should not be the private act of a coterie of architects but, rather, the act of the people-- their own expression of their own way of life (Steele, 1997, pp. 109-111).

AIM AND APPROACH OF THESIS

This thesis involves a description and critique of two such attempts to approach the creation of dwellings in a sensitive manner—a design for the village of New Gourna, Egypt, by Egyptian architect Hassan Fathy (1945-48); and a housing project at Mexicali, Mexico, by American architect Christopher Alexander and collaborators (1975-77). Both projects have one key factor in common: they both employ systems of production which are sensitive to human needs and ways of life. Both projects are distinctively different from the contemporary system of mass production of housing. Instead, Fathy and Alexander both sought the cooperation and active participation of the end-users in the construction process.

Hassan Fathy attempted to build the Upper-Nile village of New Gourna from mud bricks, employing such traditional Egyptian architectural designs as enclosed courtyards, domes and vaulted roofing. Fathy hoped to work closely with the people to tailor his designs to their needs; he taught the villagers how to work with mud bricks and supervised the erection of buildings. He encouraged a revival of ancient crafts like claustra, to adorn the buildings. Fathy had to rehouse the Gournii in some 1000 houses at a total cost of 50,000 Egyptian pounds (50 Egyptian pounds per house, equivalent to 15 US dollars per house in 1948). Besides housing, Fathy also hoped to design and build public amenities for the entire village.

Some thirty years later, in 1975, Christopher Alexander was asked by the government of the Mexican state of Baja California to conduct a self-help housing experiment in the northwestern Mexico city of Mexicali. He and his team were contracted to build thirty houses for an equal number of families, the first phase of which also included the construction of a builder's yard and a first cluster of five houses. Alexander and his team, working in close association with the five families, approached the construction process through what Alexander calls a step-by-step process. In other words, the families were involved with the production of their homes from the laying out of the land to the final finishing of the interiors.

The main aim of this thesis is to review and critique these two housing experiments. I examine the strengths and weaknesses of these two approaches to self-help housing and critically review the feasibility of such an approach for the present and future. I

emphasize in my evaluation that Fathy and Alexander's approaches bring to light an alternative method of construction of houses grounded in user participation and respect for human feelings and experience.

The thesis involves two phases of study. Firstly, the New Gourna and the Mexicali projects are reviewed to gain a thorough understanding of the nature of these projects and to clarify the intended goals of the two architects. This review and critique of the New Gourna and Mexicali projects, in addition to an overview of Fathy's search for cultural continuity and Alexander's search for wholeness, form the subject of chapter 2.

Secondly, a framework is identified to compare and contrast the New Gourna and Mexicali projects. This framework is based on the British philosopher J.G.Bennett's concept of the tetrad (Bennett, 1993), illustrated in the diamond-shaped symbol shown in figure 1.1. Most simply, the tetrad is a conceptual model that is said by Bennett to help one better understand any activity--i.e., any process geared towards the completion of some goal or ends, e.g., the making of a house or neighborhood. In his presentation of the tetrad, Bennett argues that any activity involves four aspects or sources, as he calls them. These sources are: (1) the ground—the material base from which the activity enfolds; (2) the instrument—the knowledge required for actualizing the goal of an activity; (3) the direction—the human forces and organization that guide the instrument; and (4) the goal—the underlying vision or aim of an activity.

goal (the envisioned result of the activity)

instrument (the knowledge for actualizing the goal)

direction (the human forces and organization that guide the instrument and keep it on track toward the goal

ground (the material base from which the activity enfolds)
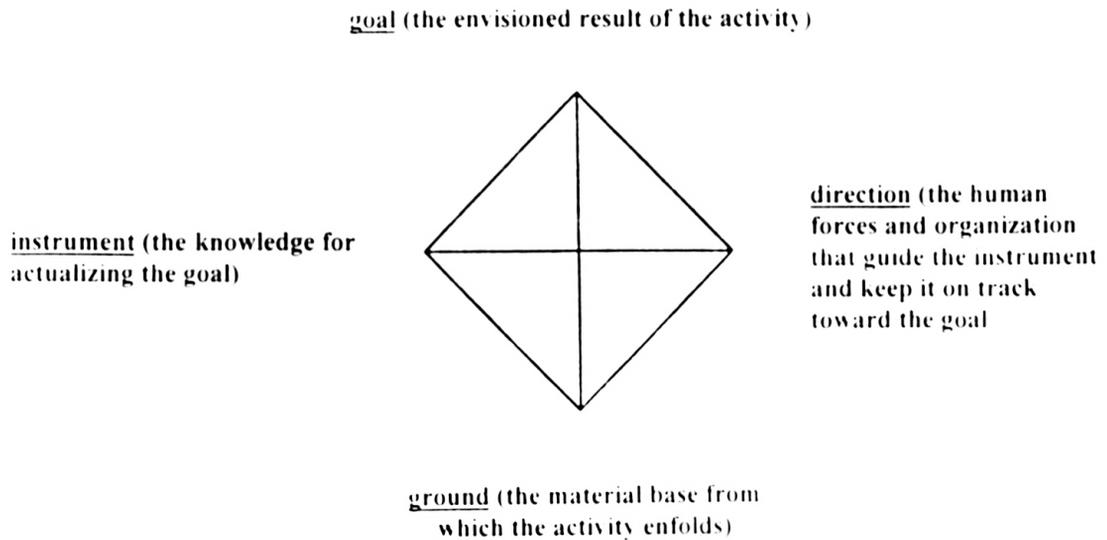
Figure 1.1: Bennett's tetrad model and its four sources (as drawn by author from Bennett, 1993, p.66)

The tetrad model and its broad application to Fathy and Alexander's project is considered in detail in chapter 3, then chapters 4-7 examine in detail both projects in terms of the four sources of the two housing projects. In chapter 4, therefore, the New Gourna and the Mexicali projects are compared with respect to the first source of the tetrad--the ground, which in the case of the two housing projects, is their geographical sites—characteristics of their actual locations (e.g., topography) as well as situational features (e.g., the fact that New Gourna is located on the main tourist road leading from the Nile River to the

Valley of the Kings). Chapter 5 discusses the second source of the tetrad--the instrument, which in the New Gourna and Mexicali contexts involves the design principles and concepts used by Fathy and Alexander in bringing the two communities into being. In turn, chapter 6 discusses the third source of the tetrad--the direction, which refers to the human process by which the designers and the participants implemented the project, drawing on the design principles (instrument) as a programming foundation. Finally, Chapter 7 discusses the fourth source of the tetrad--the goal, which relates to the designers' original visions behind the projects viewed in light of the goals achieved at the end.

The last chapter of the thesis presents conclusions drawn from the comparative study presented in chapters 4-7. This chapter compares and contrasts the relative strengths and weaknesses of Fathy and Alexander's projects. This chapter also discusses the potential of self-help housing systems today and offers suggestions as to how the merits of Fathy and Alexander's approach can be effectively used in contemporary community design, especially for disadvantaged populations.

Having discussed the background of the thesis and its organization, we now turn to chapter 2, which presents an introduction to Fathy's New Gourna and Alexander's Mexicali projects. This chapter also discusses the concepts grounding Fathy's search for cultural continuity and Alexander's search for wholeness.

CHAPTER 2

THE DESIGN APPROACHES OF FATHY AND ALEXANDER:

NEW GOURNA, EGYPT AND MEXICALI, MEXICO

This chapter presents an overview of the design approaches of Fathy and Alexander at New Gourna and Mexicali, respectively. Besides these issues, this chapter also brings to light the concepts leading to Fathy's search for cultural continuity and Alexander's search for wholeness in the environment. The discussion begins with an overview of the New Gourna project leading to Fathy's search for continuity, followed by an overview of the Mexicali project grounded in Alexander' search for wholeness. This background presentation is important for the critique of the New Gourna and Mexicali projects presented in chapters 4-7.

FATHY'S NEW GOURNA PROJECT

> *The best way to create beauty is not necessarily to make an odd or original design. How true this is even in the work of God, who does not have to change the design concept in order to produce individuality in men, but can span the whole scale of beauty between Cleopatra and Caliban simply by adjusting the position or the size of the elements in a face.*
>
> ~ Hassan Fathy (1973, p. 23)

The architectural works of Hassan Fathy centered around one major goal—a search for continuity in the culture and tradition of Egypt. Accordingly, Fathy's works indicate a strong adherence to traditional building forms and construction techniques. His architecture not only catered to the functional needs of his clients but also provided the

impetus for his search in terms of a regional identity in building. Though this search was reflected in his works, the greatest opportunity that Fathy was offered to experiment with these beliefs was at New Gourna. By catering to the needs of the Gournii, a group of Upper-Egypt peasants living in a village in the midst of the Valley of the Kings, Fathy wished to prove to the world that his beliefs and techniques were indeed feasible as a way to produce inexpensive housing for the world's poor.

In 1945, the Department of Antiquities of the Government of Egypt approached Fathy to design and build a village to rehouse the Gournii. The Gournii, traditionally, were tomb-robbers in the Valley of the Kings, and this profession was facilitated by the location of their traditional village close to the antiquities' zone (figure 2.1). When the Department of Antiquities decided to clear the antiquities' zone of the Gournis' village, they had to be rehoused elsewhere, and this was when the authorities decided to approach Fathy with this project. Fathy was allotted fifty acres of land within which he had to design and build a village to house the 7000 Gournii of the old village. In the words of Fathy, this was a daunting task—"all these people, related in a complex web of blood and marriage ties, with their habits and prejudices, their friendships and their feuds--a delicately balanced social organism intimately integrated with the topography, with the very bricks and timber of the village–this whole society had, as it were, to be dismantled and put together again in another setting" (Fathy, 1973, p. 17). Faced with such a serious task, Fathy went about seeking an authentic solution true to the very culture and tradition of Egyptian peasant society.

Figure 2.1: Squatter settlements of Old Gourna (Fathy, 1973, figure 28)

CULTURE, TRADITION AND SOCIETY

Fathy, a strong proponent of cultural and traditional values and a vernacular style in architecture, sought to set an example for Egypt and the Arab world so as to establish the validity and importance of a vernacular expression in architecture. Egypt itself had a particularly unhappy history of foreign occupation, colonial exploitation and systematic cultural destruction that was dramatically accelerated by the importation of foreign technology by both the Khedive Mohammed Ali and Ismail Pasha in the beginning of the 19th century in their expressed desire to make Egypt a "part of Europe"(Steele, 1989).

The main aim behind Fathy's work was to reverse this trend and to develop a traditional alternative, strongly rooted in natural building materials, natural methods of climate control and the incorporation of traditional human values and customs. Rather than

believing that people could be behaviorally conditioned by architectural space (as many Modernists did), Fathy felt that human beings, nature and architecture could coexist in harmonious balance (Steele, 1997, p. 11). With a time limit of three years and an allotted budget of 50,000 Egyptian pounds, Fathy began his process of building, seeking solutions to problems within the traditional society of the Gournii rather than outside it.

Realizing the importance of tradition in the design of settlements, Fathy went about the process of studying the lifeways and customs of the Gournii. According to Fathy (1973, p. 28), when the architect is presented with a clear tradition to work in, as in a village built by peasants, then he does not have the right to break this tradition with his own personal whims. What may be acceptable in a cosmopolitan city like Paris, London or Cairo in terms of design innovation would destroy a village. Fathy firmly believed that tradition represented the accumulated wealth of an ongoing culture and that individual creativity need not be sacrificed by following tradition because architecture is rooted in a continuity of experience over a long period of time (Steele, 1997, p. 20).

Fathy decided to use mud brick to build the entire village of New Gourna. Not only was this choice based on the good insulative capacity of the material, but its use was also an economic necessity. To design and build this village, at an average cost of 50 Egyptian pounds per house, Fathy had no choice but to resort to mud brick in his buildings and was in fact happy about this choice. In Fathy's words, he was fortunate in being compelled to use mud brick for large-scale rural housing; poverty forced him to use mud brick and to adopt the vault and the dome for roofing, while the natural weakness of mud

limits the size of the vault and the dome (Fathy, 1973, p. 37). As Fathy himself explains, mud is an ideal material in that it is:

> modeled by the craftsman, by the artisans, and man [is] putting something of himself into the material and radiating something into it, giving it something that [is] re-radiated back to man, along with the essence of the material, and doing him good. The principle of accretion allows for the constant interaction of man and material and environment. (Steele, 1997, p. 55).

Fathy undertook extensive trips up the Nile to Aswan, Egypt, to learn about the art of brick vaulting without the use of expensive formwork for the vault; this re-discovery was an important step in his search for the missing link in the chain of continuity in Upper-Nile architecture. The three early examples of mud-brick construction that Fathy visited and learned from were the vaulted areas behind the Temple of Ramses II, which were more than 2000 years old and still standing (figure 2.2); the Fatimid Tombs; the Deir al-Samaan monastery; and the Christian cemetery of Bagawat.
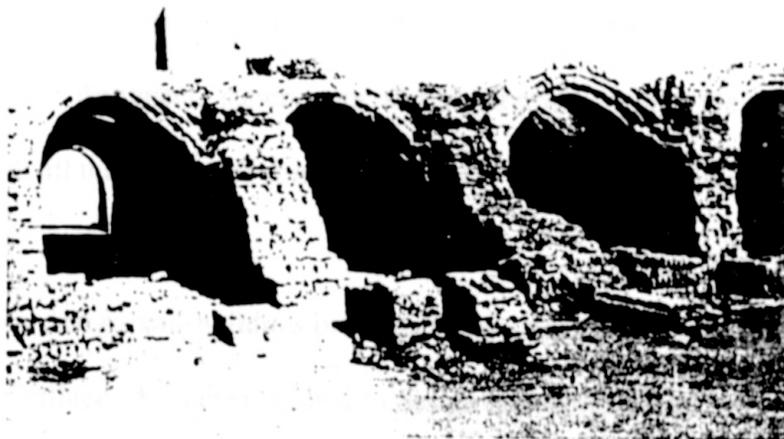
Figure 2.2: Vaults at the Temple of Ramses (Fathy, 1973, figure 5)

Fathy hired skilled masons from Aswan to come to work at New Gourna so that not only could they build the vaults and domes but, more importantly, teach the knowledge of their construction technique to the Gournii, thus keeping alive an invaluable construction method. One of the greatest advantages, according to Fathy, in the use of traditional building methods and bringing the craftsman back into the team, is that the architect is relieved of the work that he has unnecessarily taken over from the craftsman. In doing so, Fathy was trying to establish what he called *the trinity* of the owner, the architect and the craftsman, each working in his own domain, towards the creation of the final product—a home.

In today's Western system of production, the design of a village like New Gourna would have consumed most of the time, being created on the drawing board. Once the designing was complete, it would be passed on to the contractors at the site, who would then take control of the project, along with other specialists. Fathy's process, in contrast, was to involve the owners (the Gournii), himself and the Aswani masons, as a team, in the entire rebuilding of the village. According to Fathy (1973, p. 39), at Gourna, the team consisting of associates Hadji Boghdadi Ahmed Aly, Ahmed Abdul Rasoul and Fathy himself were the designers, supervisors and contractors, while the masons were as conversant with all the process of construction as the architect himself.

Throughout the design and building process, Fathy tried to involve the Gournii in the design of their village. He never wished to design stereotyped housing blocks and force the Gournii to reside in them. Rather, he wished to tailor the houses to the individual

needs of the families. In spite of his best intentions, Fathy found that it difficult to interest the peasants in their new houses. In the first place, the Gournii did not wish to relocate from their existing settlement because they would have to forsake their lucrative profession of tomb-robbing. They were reluctant to do anything that might later be construed as an acceptance of the plan for relocating them. Their indifference to the project also arose from the fact that they were unable to put into words their needs and desires (Fathy, 1973, p. 39).

A detailed discussion of the New Gourna project and the reasons for its failure will be dealt with in chapters 4-7, wherein New Gourna as well as Alexander's work are compared based on the conceptual framework of reference—the tetrad model. Before this discussion begins, however it is important to introduce Alexander's Mexicali project, which, like New Gourna, also sought to involve people in the building of their houses and common land.

ALEXANDER'S MEXICALI PROJECT

The real meaning of beauty, the idea of houses as places which express one's life, directly and simply, the connection between the vitality of the people and the shape of their houses, the connection between the force of social movements and the beauty and vigor of the places where people live –this is all forgotten, vaguely remembered as the elements of some imaginary golden age.

~ Christopher Alexander (1985, p. 14)

Having reviewed the New Gourna project, we must next overview Alexander's Mexicali project. Just as the New Gourna project was an experiment in Fathy's search for cultural continuity, so the Mexicali project was an experiment in Alexander's search for wholeness. Though the immediate objectives of the two projects were to meet the housing needs of the poor, they were also intended to achieve these higher goals. In July 1975, the state of Baja California, Mexico and Mexicali's Universidad Autonoma de Baja California invited Alexander and his group at the Center for Environmental Structure in Berkeley, California, to undertake a building project in Mexicali. The Center for Environmental Structure agreed to build thirty houses which the families would design themselves at a cost of $3500 per house (in 1975), each house with an approximate area of 650 square feet. The design-build team was comprised of Christopher Alexander and his Berkeley colleagues Howard Davis, Julio Martinez and Donald Corner as well as eight student apprentices from the University of California at Berkeley. From the beginning, the State Government of Baja California made it possible for the Center to take all responsibility for design and construction, with a minimum of interference from outside agencies (Alexander, 1985, p. 81).

ALEXANDER'S SEARCH FOR WHOLENESS

All of Alexander's efforts center on the *process* of an activity more than the end product, and this process is aimed at achieving wholeness in the environment. According to Alexander, a building is basically a living organism in which certain things are happening (as opposed to being a shell made of glass, bricks and mortar). These things that are happening are patterns of behavior as well as patterns of space. He adds that the idea that a building is as much, if not more, the life that goes on inside as it is the "shell" which encloses that life is congruent with the observation that the environment is made of patterns, not "things" (Grabow, 1983, p. 55). In other words, Alexander does not treat the built environment purely in terms of its appearance but also stresses the importance of the life that goes on within it.

Alexander, in his search for the holistic properties of structure, investigated the following themes, over a period of ten years (Grabow, 1983, pp. 56-57):

(1) "Goodness" of fit between form and context;

(2) Correspondence between the structure of a problem and the design program;

(3) Free functioning of a system;

(4) Overlapping structure of interactions;

(5) Real meaning of a language;

(6) Congruence between holistic perception and its behavior.

All these investigations came down to the search for the property of wholeness, richness or vitality that is present in beautiful buildings. In a sense, this search parallels the search which Fathy undertook in the 1940's and 1950's, wherein he looked at the traditional and

vernacular patterns so as to evaluate their underlying form and order, and even emulated those principles in his works. Although Alexander and Fathy may have used different words to describe their search, there seems to be considerable common ground between the two men's thinking—a point about which more will be said in the conclusion of this thesis.

AN ORGANIC STRUCTURE

In all his efforts, Alexander states that there seems to be some quality inherent in a structure which is responsible for the creation of an organic order. He refers to this ordering principle as "the quality without a name." In order to achieve this quality, both at the building as well as at the community level, he stresses the importance of a shared vision. For Alexander, an explicit pattern language could play the same role that shared traditions played in the past—in other words, providing a morphological approach to make sure that individual building projects worked together to create a whole (Grabow, 1983, pp. 100-101).

In trying to analyze the hidden quality behind organic structures, Alexander arrives at the fact that the geometric properties of the structure contribute to its wholeness. This inference could have arisen from his strong grounding in the science of mathematics and geometry wherein Alexander received his early training. As a route to study these properties, Alexander also uses the geometric properties inherent in early Turkish rugs (Alexander, 1993) (figure 2.3). He arrives at the conclusion that the whole rug achieves its overall oneness due to the fact that there are many subsystems in play to create this

wholeness. He had discovered slowly, through experience, that these carpets had a deeper structure, were more beautiful, and had far more of a complex and important structure from which there was much to learn (Alexander, 1993, p. 17).
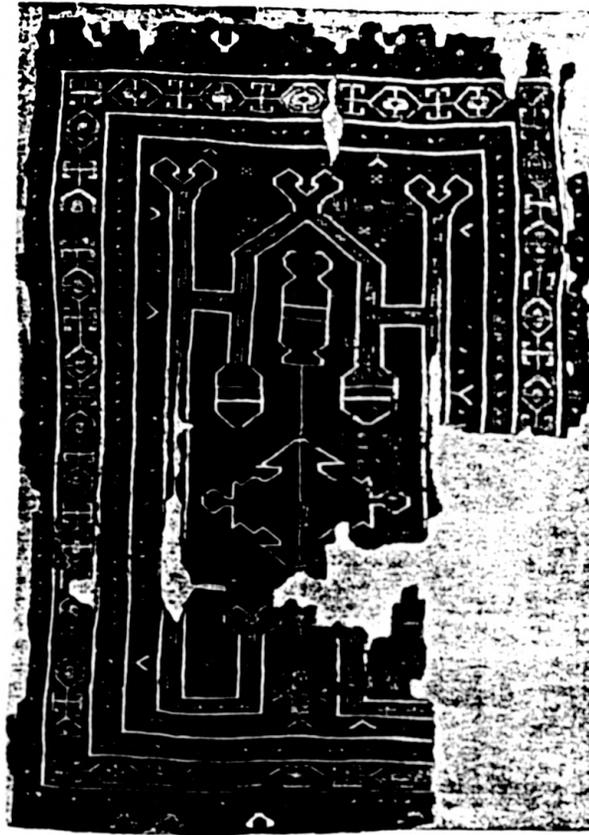
Figure 2.3: 16th Century Turkish Carpet (Alexander, 1993, p. 127)

It becomes evident that Alexander's search for wholeness in the built environment may partly have been a result of the understanding of the formation of the centers of wholeness in carpets. Alexander believes that places which have this wholeness, this "quality without a name," invite this quality to come to life in us. And when we have this quality in us, we tend to make it come to life in towns and buildings which we help build.

He adds that this impulse is a self-supporting, self-maintaining, generating quality–the quality of life. And we must seek it, for our own sakes, in our surroundings, simply in order that we ourselves become alive (Alexander, 1979, p. 53).

A NEW SYSTEM FOR BUILDING HOUSES

In seeking to achieve such a self-maintaining, organic quality in the built environment, Alexander proposes a system of production which hinges on user participation. On the importance of user participation, Alexander states that, firstly, it is good and brings people together and involves them in their world; in other words, it creates a feeling between people and the world around them because it is the world which they have helped to make. Secondly, the daily users of buildings know more about their needs than anyone else, so the process of participation tends to create places which are better adapted to human functions than those created by a centrally administered planning process (Grabow, 1983, p. 102).

Alexander also points out that the concept of user participation works against the principles of the mortgage system of today, which views the house as a commodity rather than an organic entity (Grabow, 1983, p. 145). In criticizing the existing mortgage system, he argues that, rather than financing and building the house incrementally over a longer period of time and in proportion to existing assets, the mortgage process encourages an interaction between financing and building which results in the highest possible initial investment and consequently, the greatest accumulation of interest. And in that interaction, the house is conceived as a "commodity," with the result being insensitive, inhospitable residential environments.

When the house is viewed as a commodity, it is subject to the cognitive manipulations of profit-motivated marketing techniques like high volume sales achieved through built-in obsolescence, artificial scarcity mechanisms, changing fashions, image-induced upward mobility and a disposable, throw-away aesthetic (Grabow, 1983, p. 145). This view aptly sums up the ills of the present system in which money flows into the housing industry. In order to counter these ills, Alexander and his team experiment at Mexicali, a system where the house was not viewed as a commodity, but as an organic entity which grew from the hands of its own users (figure 2.4). The families building their own houses made every decision at every stage, since they were best informed about their spatial needs.

Figure 2.4: The families together at work in Mexicali (Alexander *et al*, 1985, pp. 336-337)

Talking about the construction processes at Mexicali, Grabow (1983, p. 162) points out that, for Alexander, these processes needed to be much more gradual and more responsive to the individual spaces of the building and yet still have a structural unity and integrity. For Alexander, the need today takes the form of a search for a construction process which lends itself to user-design leading to uniqueness and variety (non-prefabricated and non-modularized) based on long-term, incremental and piecemeal growth. Such a process permits the engineering to be optimized and is therefore efficient and relatively inexpensive, and maintains continuity between design and construction (Grabow, 1983, p. 162). It is such an incremental construction process that Alexander carried out at Mexicali.

Although most of what Alexander says makes great intuitive sense, upon introspection, it is certainly a fact that it is the way that he puts across his opinions that antagonizes many people. Alexander's messianic tone and utterly uncompromising stance have rankled many in his profession. Alexander does not say that his methods are one way to create good buildings; rather, he insists, without equivocation, that "there is no other way in which a building or town which lives can possibly be made" (Krakauer, 1985). Alexander, aware of this fact, accepts that his tone, both in his writings and in his dealings with people, is one of his serious shortcomings as a person. Grabow feels that this tone could be a result of his frustration and his sense of agony that comes from this awareness–that although the focus of concern appears so highly specialized, it is actually part of a major transformation of thought that embraces more than just architecture (Grabow, 1983, p.182).

A HUMAN PROCESS OF DESIGN

Recognizing the importance of feeling in the building process and realizing its absence in most current systems of production, Alexander and his group tried to construct a housing process at Mexicali in which human feeling and dignity came first. Alexander argues that today most housing needs are met by a system of mechanized, mass production in which the end-users are totally detached from the design process. This alienation results in the users being forced into what might be termed as hostile and insensitive living environments. According to Alexander (1985, p. 22), there is no doubt that the alienation and despair which many people feel is created, at least in large part, by the depressing burden of this mass housing in which people are forced to spend their lives.

In Alexander's opinion, the system of housing production that exists today does not recognize that every family and every person is part of society (1985, p. 24). It is indeed a fact that today's system of production is aimed at the maximization of profit rather than the creation of a sense of place or home. Today's system lacks the means to unite people in a common bond, thereby resulting in the creation of alienation in the society. The houses built today express isolation, lack of relationship and fail altogether to help create human bonds in which people feel themselves part of the fabric which connects them to their fellow human beings (Alexander, 1985, p. 24). What Alexander proposes to counter this approach is a holistic approach based on what he calls *a pattern language*, and this approach was put into practice at Mexicali. Dovey (1990) argues that the pattern language approach that Alexander proposes can be interpreted as an extension of modernism. Although deeply opposed to the mass construction techniques and rigid

forms of modernism, it shares the commitment to social reform through architecture and to a kind of universal rationality.

Alexander argues that today's system of production is so complicated in nature that it involves many specialized personnel at various levels. There are too many decisions to be made at too many different levels. The end result is that an envelope is created, for sure, but it lacks the human touch. As a result of the involvement of too many specialists in segregated areas, the final product is not very harmonious. Precise coordination among all these experts would be an idealistic expectation. All these added together lead to the alienation of the house. In Alexander's view, it is inevitable that as the work of a building passes into the hands of specialists, the patterns they use become more and more banal, more willful and less anchored in reality (Alexander, 1979, p. 236). The alienated character of the buildings produced, is in the end, a direct consequence of the deep structure of the production system, and this character cannot be substantially improved until the systems themselves are altered at the roots (Alexander, 1985, p. 29).

In this system of decision making at various levels by various experts, the end-users are never in sight. They are just handed over the final product, created by distinct entities. This system presents a pattern of control which does not foster a close relationship between the builder and the built space. Keeping in view all these attributes of the current system of production, Alexander and his group focus on finding a new system of production which would be capable of giving detailed, careful attention to all the particulars needed to make each house "just right" at its own level, at its own scale and

which is at the same time, efficient enough, replicable enough and simple enough so that it could be carried out on an enormous scale and at a very low cost (Alexander, 1985, p. 40). Such a harmonious system of production was experimented with at Mexicali.

Having reviewed the New Gourna and Mexicali projects, and having briefly described Fathy and Alexander's design philosophies, the ground is now set to begin the process of comparing and contrasting the two projects. Before we begin with the actual comparative analysis, however, it is important to study the conceptual framework to be applied for this comparative analysis—the tetrad model. This framework in examined in detail in the following chapter.

CHAPTER 3

BENNETT'S TETRAD MODEL AND ITS APPLICATION TO

NEW GOURNA AND MEXICALI

Having examined the New Gourna and Mexicali projects in chapter 2, we have set the ground for a comparative study of the two projects drawing on the tetrad model. This chapter presents the tetrad model in greater detail and justifies its application as a framework for comparing and contrasting New Gourna and Mexicali.

To understand the tetrad model, we begin with an outline of systematics, which is an interpretive method developed by British philosopher J. G. Bennett for examining the underlying structures and patterns of any entity—i.e., any thing, process, event, activity or situation. According to Bennett, the main aim of systematics is to provide a means for understanding any whole and its parts. Bennett says that, in this sense, systematics is a conceptual tool that helps one find meaningful patterns in the midst of life's complexity. The assumption of systematics is that, beneath the world's diversity and continual change, there is an underlying coherence that provides a vehicle for understanding, both practical and theoretical (Bennett, 1993, p. 2).

According to the principles of systematics, all structures in the world—things, beings, events or processes--can be understood by simple patterns, or systems as Bennett calls them (1993, p. 8). Each of these systems can be expressed in terms of one characteristic quality like universality, polarity, relationship, activity, and so forth. According to

Bennett, each of these qualities arises from the experienced significance of number—in other words, the symbolic meaning of one-ness, two-ness, three-ness and so forth. In turn, Bennett (ibid.) uses the word system to designate the underlying pattern that a specific number represents. Bennett gives a name to each of these systems by using the Greek word for the particular number followed by the suffix "–ad." Thus, the monad represents one-ness; the dyad, two-ness; the triad, three-ness; the tetrad, four-ness, and so forth.

For example, the first-order system in systematics is the monad, which is said by Bennett to relate to one-ness, to which he attributes the characteristic quality of wholeness. Bennett (ibid. p. 18) points out that the monad identifies the content of a structure and helps us recognize the substantial things of life—entities, experiences, events and processes that make our human world essentially what it is. In other words, the monad helps us understand how, underlying the diversity and complexity of a thing, is a quality of coherence that identifies the thing as a unified whole. For example, in the context of self-help housing, the monad would help understand how the various aspects of the particular self-help project—the design concepts, user participation, cost control, construction method, and so forth--all contribute towards the achievement of a unified whole—a residential neighborhood.

In turn, the second-order system is the dyad, which helps us understand a structure by seeing the underlying differences within it. Bennett (1993, p. 9) argues that in order to understand the whole, it is important to look at the structure in complimentary ways. The

dyad serves this purpose by allowing us to see the differences or polarities inherent in a structure. For example, in the case of self-help housing, the dyad would be instrumental in bringing out the polarities inherent in the system—the public and private realms of the houses built; the tension between achieving cost efficiency, on one hand, and a sense of aesthetics, on the other; the connections between the designer and users; and so forth. In turn, the triad, the next higher-order system, relates to action, relationship and the life of a situation (Bennett, 1993, p. 36). This system allows us to understand an activity by examining the nature of the relationship involved in the structure. For example, the triad would help understand the relationship between the architect, the builder and the users in the act of construction. The triad would give a clearer picture of how these three participants in the design process come together to make a particular kind of house and neighborhood.

Thus, Bennett argues that the qualitative significance of numbers plays a vital role in the understanding of wholes. Through underlying patterns arising from the qualitative significance of numbers, systematics works to stay in contact with the whole rather than to break it into parts that are studied piecemeal (ibid. p. 4). Bennett discusses this quality of systematics to hold sight of the whole as an example of synthetic understanding whereby parts are held in sight in relation to the whole. In this regard, Bennett distinguishes between two contrasting approaches to knowledge—analysis and synthesis. Analysis, the method most commonly used in modern western science, involves breaking up a whole into its parts and trying to analyze each part by applying some method of examination. Analysis, according to Bennett (ibid. p. 3), has been immensely successful

in broadening our practical knowledge but less successful in regrouping all the parts to gain the original whole.

On the other hand, another way of understanding the complexity of the world is through synthesis, which, contrary to analysis, tries to understand the complexity of the entire situation in a holistic manner. The key question in terms of synthesis is whether, in the midst of the world's complexity, we can find some order other than the patterns of analysis, which are often imposed and reductive (Bennett, 1993, pp. 3-4). This notion of finding order amidst the complexity of the world is what we intend to achieve by the comparative approach used in this thesis.[1]

From the review in chapter 2 of the New Gourna and the Mexicali projects, it becomes evident that both Fathy and Alexander were, in their own ways, working towards the creation of a whole—i.e., designing and building with the ultimate aim of creating well-integrated houses and neighborhoods. Hence, in order to evaluate both these projects by comparison and contrast, systematics should prove to be a valuable tool, helping to understand the complexity of the two design efforts in a holistic way. This effort will begin in chapter 4. First, however, it is important to examine the tetrad and its parts in detail.

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[1] The value of systematics as a useful analytical tool has been established in a master's thesis by Beena Mukkamala (1997), who used the tetrad model to evaluate two urban design approaches--Alexander *et al*'s New Theory of Urban Design (Alexander *et al*, 1987) and Bentley *et al*'s Responsive Environments (Bentley *et al*, 1985).

THE TETRAD AND ITS FOUR SOURCES

Of the various systems that are used in systematics to identify and understand wholes, the fourth order system, or the tetrad, is centrally important to this thesis, since the tetrad relates to activity and answers the question, "What is happening here and why?" In this thesis, we are asking, "What is happening in the process of self-help housing as established in Fathy's and Alexander's projects? Why and how are Fathy and Alexander's two systems of design and building appropriate for the creation of a residential environments for the poor?"

To understand how the tetrad can help answer these questions, we must describe its parts in greater detail. As indicated in figure 3.1, the tetrad can be represented symbolically by a diamond, which has four terms called sources, which Bennett identifies as ground, goal, instrument and direction. According to Bennett, these four sources are not separate entities in reality, but rather, are interconnected and influence each other. However, to examine the underlying structure of any activity, it is useful to identify these four terms separately and realize they contribute different inputs to the successful completion of any activity.

We next must define each of these four sources. According to Bennett, the ground represents the *material source* of the activity and deals with quantities, actualities, facts and the tangible base of the activity. The material source is often physical and involves an extended spatial nature. Second, the goal represents what Bennett calls the *spiritual source* because this dimension of activity is concerned with the value in the activity and points towards the potential, ideal, and vision of the activity. The spiritual source draws

the process to completion and indicates the direction where significance and quality are found.

goal

instrument   direction

ground
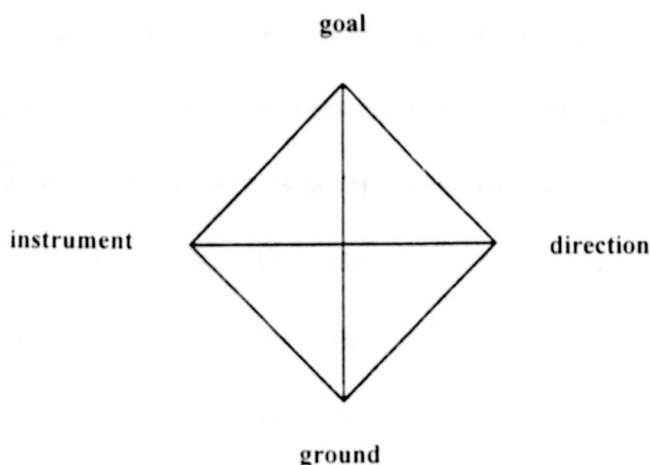
Figure 3.1: The Tetrad and its four Sources (as drawn by author from Bennett, 1993, p. 66)

In turn, the instrument deals with the practical aspects of any activity. This source refers to aspects of the activity like rules or procedural steps that work to hold an activity together and to give it form practically. On the other hand, the direction is concerned with the motivational aspects of any activity in terms of the human beings behind it. This source refers to a driving quality concerned more with the human force getting the activity done and often relates to the creative awareness directing the activity.

Finally, we need to discuss the horizontal and vertical lines connecting the four sources. The horizontal line of the tetrad, connecting the instrument and the direction represents the *means* for an activity, while the vertical line, connecting the ground and the goal,

represents the *ends* of an activity (figure 3.2). The horizontal line reflects aspects of the activity that can be controlled, at least to some degree—for example, aspects of step-by-step construction or cost control. On the horizontal line appears the value of repetition and experience--that by participation in an activity one may become more skilled and knowledgeable (Bennett, 1993, p. 70). On the other hand, any point on the vertical line represents an intermediate position between material and spirit, fact and value. In other words, the motivation for any activity is never necessarily pure and can involve all shades of driving forces (ibid.). In effect, the value of the entire tetrad system lies in it being viewed in totality, for all these parts strive to give a better understanding of the interconnectedness of the activity in question.
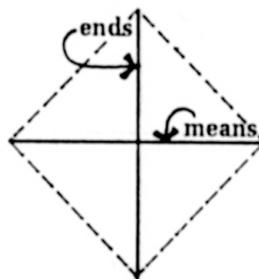
Figure 3.2: The Tetrad as Means and Ends (As drawn by author from Bennett, 1993, p. 66)

EXAMPLES OF THE TETRAD

In order to have a better understanding of the tetrad, Bennett provides several examples of activities as they can be analyzed by the tetrad model. One example he gives is the activity of gardening (figure 3.3), which he says involves the four sources of <u>land to be</u>

worked (ground), ideal garden (goal), cultural context (direction) and gardening skills (instrument). The garden arises from a plot of land, the size, topography and soil quality of which decide in many ways the garden's physical qualities. The garden designer's vision of his ideal garden is the image that the he strives to achieve in accordance with the potential of the given site. In dialogue with the image of the ideal garden is the cultural context which provides direction to the gardener; the then-prevalent garden conception (e.g., picturesque, classical and so forth) will shape the specific layout, composition and ambience for which the designer strives. Just as important as instrument, is the skill of the garden designer. In this sense, the final product is bound to differ, depending on whether the gardener is a gifted professional or rank amateur.

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                        ideal
                         /|\
                        / | \
                       /  |  \
                      /   |   \
                     /    |    \
   skills  <--------+-----+-----+--------> cultural context
                     \    |    /
                      \   |   /
                       \  |  /
                        \ | /
                         \|/
                        land
```
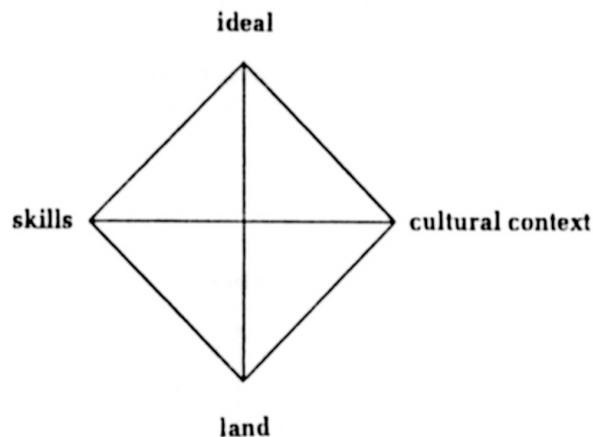
Figure 3.3: Gardening as a Tetrad (Bennett, 1993, p. 72)

Another example furnished by Bennett to illustrate the use of the tetrad in understanding activity is that of modern western science. According to Bennett, the tetrad of scientific activity (figure 3.4) is comprised of the four sources of contact (ground), vision (goal),

technique (instrument) and knowledge (direction). Bennett argues that the great advances in modern science have involved a direct insight into phenomena. For any scientific activity to take place, direct contact with the phenomena is crucial and this forms the basis upon which the activity develops. In addition to this direct contact, it is also important that there be a vision behind the activity. According to Bennett, if there is no unifying vision behind the activity, the scientific work will tend to remain small and may never come to life. Actualization of this vision is brought about by technique, which refers to the necessary skills that the scientist must possess to conduct research experiments practically. Besides these practical skills, it is also important that the scientist possess the required knowledge, which involves intellectual comprehensiveness and the ability to relate one's own ideas and research to the larger discipline of which the scientist is a part. Thus we see how these four sources work in collaboration towards the actualization of the goal—scientific discoveries and advancement.
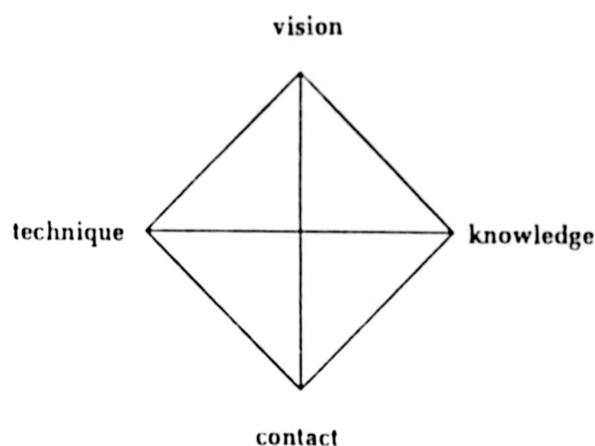
Figure 3.4: The Tetrad of Scientific Activity (Bennett, 1993, p. 69)

THE FOUR SOURCES AS APPLIED TO NEW GOURNA AND MEXICALI

Having looked at the examples of gardening and scientific activity through the medium of the tetrad, we have indicated the significance of the tetrad for analyzing any activity. As applied to this thesis and as illustrated in figure 3.5, the tetrad can also be used to represent the activity of <u>self-help housing</u>, of which New Gourna and Mexicali are both examples. It is important to understand that figure 3.5 presents that activity of self-help housing in general terms. As the figure illustrates, the <u>human and environmental base</u> forms the ground for the activity. Here, people involved in the project, the location of the project, its situational context, the physical geography of the land and so forth, work together towards the actualization of the goal, which, in this case, would be the <u>creation of integrated residential environments and neighborhoods</u>. The actualization of this goal would be brought about by the <u>knowledge</u> of cooperative construction techniques and some method of effective cost control. These practical mechanisms for building would be given direction by the actual process of <u>user-participation</u>—some workable system whereby the designer, the builder and the user can successfully collaborate towards the creation of a housing and neighborhood whole.
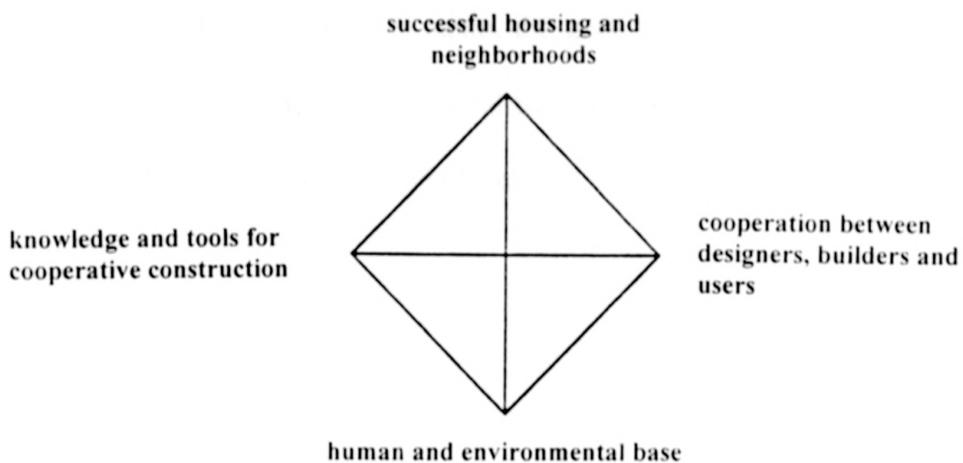
Figure 3.5: Tetrad of Self-help Housing in general terms (as drawn by author from Bennett, 1993, p. 66)

It is important to emphasize that the tetrad in figure 3.5 presents self-help housing in general terms. We next must consider the tetrads of the New Gourna and Mexicali projects specifically, since the differences in Fathy and Alexander's approaches will provide points of comparison and contrast for the extended discussion of the four sources in chapters 4-7. Before we begin this detailed analysis of the four sources, however, it is useful to lay out the tetrads for Fathy and Alexander's efforts, highlight the four sources of each project, and indicate the kind of questions related to each source. The two tetrads for Fathy and Alexander's projects are presented in figures 3.6 and 3.7, respectively. Immediately notice that, for three of the sources—instrument, direction and goal—the specific contents are different.

Thus, the instrument for New Gourna is Fathy's empathetic approach to construction based on an enlightened tradition, while for Mexicali, what Alexander identifies a pattern language approach form the instrument. In turn, the motivational force behind New Gourna is the active cooperation between the architect, craftsmen and the users, while at Mexicali, the impetus to construction is provided by the active dialogue between the architect-builder and the users. Yet again, the goal, for New Gourna is the search for cultural continuity in the Arab architectural tradition, while in the case of Mexicali, the goal is the search for environmental wholeness.

cultural continuity

enlightened tradition

trinity

Gournii and New Gourna site
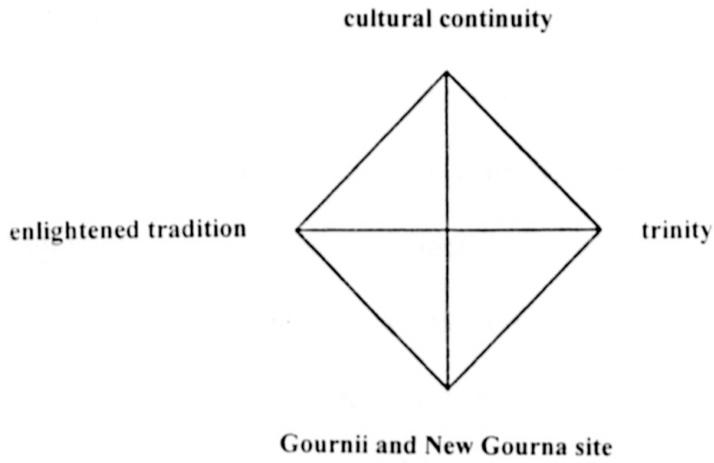
Figure 3.6: Tetrad for New Gourna (as drawn by author from Bennett, 1993, p. 66)

wholeness

pattern language

dialogue

Mexican families and Mexicali site
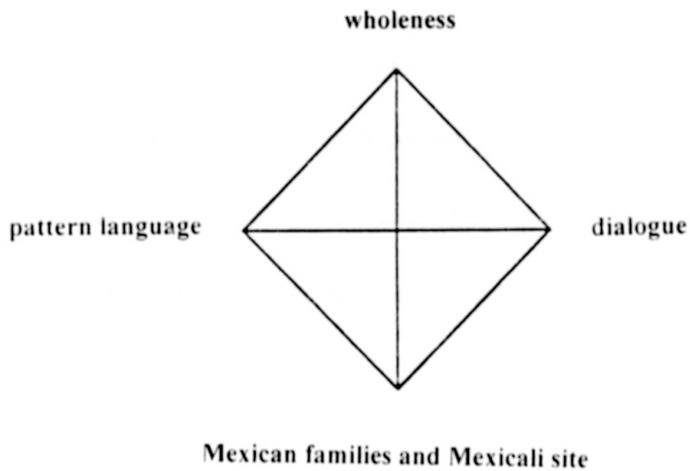
Figure 3.7: Tetrad for Mexicali (as drawn by author from Bennett, 1993, p. 66)

QUESTIONS TO BE ASKED IN REGARD TO THE FOUR SOURCES

The last issue we need to address in this chapter is the kinds of questions that can be asked in terms of the four sources of the two projects. These questions will give the reader a preliminary sense of the kinds of issues that chapters 4-7 will examine in greater detail. As we have seen, the ground of the tetrad represents the raw material or the human and environmental base for a given activity. For New Gourna the ground is represented by the Gournii and the New Gourna site, while for Mexicali, the ground is represented by the five Mexican families and the Mexicali site. The ground is not only instrumental for comparing and contrasting the end-users of Fathy and Alexander's designs, but also requires examination of the precise physical context in which the two projects arise. This detailed study of the Gournii, the five Mexican families and the site and situation of the two projects is presented in chapter 4 and considers questions like the following:

- Who are the end-users of the designs and what are their specific needs and hopes?

- What is the physical and geographical context within which each site is located?

- How is the site related to its surroundings?

- What kind of relationship is achieved between the site and its buildings?

- What are the advantages and disadvantages that the site offers in terms of its location and whether or not these advantages and disadvantages are utilized in the final designs?

Next, we will consider the second source of the tetrad--the instrument, which, in the case of the two projects, refers to the knowledge required for actualizing the goal of the

activity. In the New Gourna project, the instrument can be represented by the knowledge that Fathy derives from traditional Egyptian culture. Consideration of the instrument gives a detailed picture of the extent to which Fathy relies on traditional solutions to building techniques, materials of construction and society-building. In addition, Fathy's view of technology as an instrument to improve and refine cultural values can also be analyzed. These two factors—tradition and innovation--can be considered as an integrated focus that I call here "enlightened tradition." In the Mexicali project, in contrast, the instrument can be represented by Alexander's seven rules of construction. In Alexander's view, these seven rules concern the overall organization of the production process--the relation between the people and the design of houses. These contrasts and commonalties will become more clear in chapter 5, which discusses the instrument of the two projects in detail. This chapter will consider questions like the following:

- What is the knowledge base that formed the foundation for the design solutions?

- What is the pattern language approach to construction and how is it implemented?

- What are the methods of step by step construction and how are they carried out on site?

- How is the cost controlled in the construction process?

Next, in chapter 6, we will consider the third source of the tetrad--the <u>direction,</u> which is the force that guides the instrument and the source that motivates and sustains the process. In the case of New Gourna, Fathy envisions that the force behind the project will be provided by what he calls *the trinity*–in other words, a working relationship among the architect, the owner and the craftsmen. On the other hand, Alexander's

construction process hinges on the cooperative efforts between the architect-builder and the end-users. In a sense here, the roles of the architect and the craftsman are merged into one--that of the architect-builder. On the whole, both Fathy and Alexander's approaches demonstrate cooperative efforts on the part of the architect as well as the end-users, although we shall see that the extent to which this cooperation actually took place varied between the two projects. Therefore, the discussion of the direction will aim to answer questions like the following:

- What is the guiding force behind the project?

- How is the project implemented?

- Who is involved in the actual implementation of the project?

- Who is in charge of the entire operation?

- Who lays out and constructs the buildings?

Lastly, in chapter 7, we will consider the last source of the tetrad—the goal, which is the end product or the final result of an activity. In the case of New Gourna, Fathy's goal is the search for continuity, while at Mexicali, Alexander's search is for environmental wholeness. Consideration of the goal provides a base for discussing whether Fathy and Alexander's projects actually achieved the goals that they originally set--in Fathy's case, continuity; in Alexander's case, wholeness. Examination of the goal in chapter 7 will deal with questions like the following:

- Was there a vision behind the project?

- What did the designer originally set out to achieve?

- To what extent were these original intentions put into practice?

- Were the users satisfied with the constructed buildings?

Thus, the comparison of New Gourna and Mexicali in light of the four sources of the tetrad, as presented in chapters 4-7 will bring out the two projects' similarities and differences as well as their strengths and weaknesses. Having overviewed the tetrad model and justifying its use as a framework for evaluation, we are now ready to begin the actual process of comparison and contrast. In the next chapter, we begin with the examination of the first source of the tetrad--the <u>ground</u>, as related to the sites of the two projects.

CHAPTER 4

THE GROUND OF NEW GOURNA AND MEXICALI

Having reviewed the New Gourna and Mexicali projects and having described the tetrad as a framework for comparison, we begin the comparative study of these two projects. As discussed in chapter 3, the first source of the tetrad is the <u>ground</u>, which in this chapter is discussed in terms of New Gourna and Mexicali's human and environmental aspects. Firstly, the <u>human</u> base of both projects—the Gournii of New Gourna and the five families of Mexicali—are reviewed. Secondly, the <u>environmental</u> aspect of the ground, the geographical site and situational qualities of New Gourna and Mexicali are reviewed and compared. This discussion is presented with the discussion of the New Gourna project first, followed by the Mexicali project.

HUMAN ASPECTS OF THE GROUND: THE GOURNII AND THE MEXICAN FAMILIES

From the overview in chapter 2, we know that the New Gourna project was to cater to the housing and rehabilitative needs of 7000 Gournii, while the Mexicali project was to meet the housing needs of thirty Mexican families. At the outset, we recognize a striking difference of the human scale involved in these two projects. As we have seen in chapter 2, the Gournii, occupants of the village of Old Gourna, consisted of five tribes interrelated in a complex web of blood and social ties. These five tribes were the Hassassna, the Atteyat, the Horobat, the Ghabat and the Baerat. The Hassassna were a very old clan, who derived their name from Al Hussein, the grandson of Mohammed, from whom they had descended. Because of this ancestry, their clan was respected as

being pious and learned. The Atteyat had always been associated with the Hassassna and lived with them in the same hamlet of Old Gourna. The name "Atteyat" was derived from the word for "gift." Next, the Horobat, whose name means "the warriors," were a more worldly group that included the most prominent tomb robbers. The third tribe--the Ghabat--derived their name from the word "forest." Lastly, certain families of the Baerat clan had occupied Gorent Mora, a smaller settlement outside of Old Gourna.

Each of these five tribes was further divided into groups of families called *badana*. The *badana* is a tightly related group of people, consisting of about ten to twenty families, with a recognized patriarch and a close sense of social allegiance. In Old Gourna, these families had lived in adjoining houses and, though there were differences in wealth and status between the individual families, they followed a communal way of life as is evident in the fact that the *badana* formed the center of activity of all communal functions; thus, many activities including baking bread were undertaken in a collective manner. In addition, the Gournii had a strict reverence for patriarchal hierarchy and followed elders' ideals and wisdom. Social qualities like these clearly indicate the closely-knit nature of the Gournii and the extent to which kinship and custom formed a major part of their society.

While Fathy at New Gourna had to deal with several thousand people, all related through tribal connections, Alexander at Mexicali was concerned with only five families in the first stage of his project. These families were identified by ISSSTECALI, a Mexicali credit union. This credit union had sent out advertisements to all its members, inviting

them to come forward to design and build their own houses at a cost of 40,000 pesos (approximately 3500 US dollars). Thus, we find that the five families that came together for constructing their houses had not known each other before, and only by virtue of being members of the same credit union were they selected to be part of the self-help experiment at Mexicali. Unlike the Gournii, these five families were totally unrelated to each other and, later, when we discuss the instrument in chapter 5, we will see that this lack of connectedness was to become a major barrier to the project's success.

We next need to describe the five families, which were the Duran, the Tapia, the Cosio, the Rodriguez and the Reyes families. Alexander gives a fairly detailed description of the five families and their social and economic characteristics. First, the Duran family consisted of Lilia, a nurse, her husband Jesus, a barber and their two-year old daughter. The average income of this household was around 4500 pesos per month (approximately 530 US dollars). Secondly, the Tapia family was composed of Jose Tapia, his wife and three little children, besides Jose's brother Pancho. Tapia worked as a clerk in the office of Tourism and his average income was around 3700 pesos a month (approximately 435 US dollars).

Third, there was the Cosio family, consisting of Cosio, a divorced woman with ten children of ages ranging from seventeen to two years. Emma worked as a secretary in the office of a high political official and her average income was around 5000 pesos a month (approximately 590 US dollars). Fourth, the Rodriguez family was comprised of Julio Rodriguez, his wife and four children of ages ten, eight, six and four years. Rodriguez

worked as a meter reader for an electric company and his wife kept house and took care of the four children. He had an average monthly income of around 3800 pesos (approximately 450 US dollars). Finally, the Reyes family consisted of Makaria Reyes, her husband and two children of ages two and one. Makaria was a nurse and her husband was a policeman and their household had an average monthly income of around 8000 pesos (approximately 940 US dollars). Makaria had an affable personality and liked to entertain a lot of friends at her house.

Thus, a review of the human aspects of the ground of New Gourna and Mexicali brings to light many differences between the two projects. On one hand, at New Gourna, an entire village of 7000 Gournii were to be the end users of the housing and village design, while at Mexicali, only thirty families were to be built houses and a neighborhood. The Gournii, as we have seen, were a closely-knit community of five tribes, and social as well as spatial integrity was inherent in their existing structure. On the other hand, the first five families at Mexicali were not even aware of each other before the project commenced. They were brought together on site by the promise of a new home but, otherwise, they had little in common. Thus, Fathy was to design and build for a community within which the identity of each tribe was well established, whereas Alexander had to deal with the potential problem of getting five unrelated families to live near each other in a cluster.

Another significant difference in terms of the human aspect of the ground is the fact that Fathy was working to relocate the entire population of Gournii, who never wished to

leave Old Gourna because they would have to forfeit their lucrative profession of tomb robbing. Alexander, on the other hand, was working with five families who had volunteered to build their own houses, under the guidance of the Alexander and his team. Again, later in the discussion of the instrument in chapter 5, we shall see that the Gournis' not wanting to leave Old Gourna minimized their interest and involvement in Fathy's project. In contrast, the five Mexican families all wanted a house of their own and were much more willing to be actively involved in the design and construction process. We shall see that this difference in personal initiative and involvement is crucial to the whole process of self-help housing.

ENVIRONMENTAL ASPECTS OF THE GROUND: SITE AND SITUATION OF NEW GOURNA AND MEXICALI

In discussing the environmental aspects of the ground for New Gourna and Mexicali, it is useful to overview the concepts of site and situation as developed by academic geographers. The specific characteristics and features of any location itself is referred to by geographers as the site. Site characteristics involve such localized qualities as size, dimensions, topography, vegetation, soil, climate and so forth (Kendall, Glendinning and Mac Fadden, 1967, pp. 393-394). On the other hand, geographers also speak of situation, which refers to those aspects of a place arising out of its relative location--in other words, its spatial relation to other places. Thus, we find that the concepts of site and situation are interrelated, dealing with the specific qualities of the actual place and the related qualities of the surrounding area, respectively.

Having discussed the concepts of site and situation as understood from a geographical point of view, we now move on to a discussion of the actual site and situation of New Gourna and Mexicali. In the following discussion, firstly, the site qualities of New Gourna and Mexicali will be discussed, compared and contrasted. This will be followed by the discussion of the situational qualities of New Gourna and Mexicali, bringing out the similarities and differences between the two. Both site and situation characteristics, we shall find, are crucial for understanding the environmental ground of New Gourna and Mexicali.

SITE QUALITIES OF NEW GOURNA AND MEXICALI

The site for the village of New Gourna was chosen by a government-appointed committee consisting of representatives of the Egyptian government's Department of Antiquities, the mayor of Gourna, the Sheikhs of the five hamlets of Gourna, and Hassan Fathy. This committee had to find a site well away from all ancient remains, which meant that the new village could not be located upon the hills above the river valley, for these hills were full of tombs for a distance of some three and a half miles along the edge of the agricultural land, from the Valley of the Queens to the Valley of the Monkeys (Fathy, 1973, p. 17). This committee finally decided upon a parcel of agricultural land close to the main road and the railway line. This site was low and in a *hosha*--a permanently dry field kept free from floodwater by a system of dikes (ibid.). The fifty-acre site was bought in fall, 1947, by compulsory purchase from its owner, at a cost of L.E. 300 per acre (approximately 90 US dollars per acre).

In contrast, the specific site in Mexicali for Alexander's self-help project was highly urban in character and was located near the outskirts of Mexicali, some five miles from the central city. For Alexander's project, the government of Baja California provided land for thirty families to design and build their own homes. Eventually, Alexander would divide these two lots into three blocks, one of which would be occupied by a "builder's yard". The location of Alexander's site was in Colonia Arizabo, a neighborhood in a larger district called Colonias Populares, an area of Mexicali subdivided into small lots of approximately 2500 square feet and provided with basic services of unpaved roads, water and electricity. Colonias Populares is a generic term that refers to a locality rich in spontaneous development activity.[1] In these districts, no standards are imposed on what the individual settlers could build.

According to Fromm and Bosselmann (1984, pp. 76-90), when Alexander began the project in 1976, there were a few small squatter homes near his building site, built in a temporary manner to provide quick shelter. The area around the site was beginning to be filled with construction activity, mostly of a temporary nature. Today, the area is heavily urbanized and Alexander's five houses are surrounded by many other low-income and squatter neighborhoods (Davis, 1998).

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[1] Information obtained in a telephone interview with Howard Davis, Professor of Architecture, University of Oregon, Eugene, on March 21, 1998. Davis was one of the authors of The Production of Houses and part of the design-build team at Mexicali. This interview is hereafter cited as Davis, 1998.

We next need to consider specific characteristics of the environmental ground of the two sites. These site characteristics are summarized in table 4.1, and pertain to site size, dimensions, topography, climate and soil conditions.

Table 4.1: Characteristics of the sites of New Gourna and Mexicali

CHARACTERISTICS	NEW GOURNA	MEXICALI
Area of site	50 acres	1.7 acres (envisioned) 0.43 acres (acreage for the block of five completed houses); 0.27acres (acreage of builder's yard)
Dimensions of site	700 meters by 300 meters approximately	two lots of 50 meters by 35 meters and 50 meters by 110 meters, approximately; lot size of finished houses, 50 meters by 35 meters, approximately.
Topography	flat terrain	flat terrain
Soil conditions	dry and compact earth	dry and fine; clay subsoil
Climate	hot and dry Maximum summer temperature:120°F Annual rainfall: 0.2 inches	hot and dry Maximum summer temperature:115°F Annual rainfall: 3 inches

First, we need to consider the size and dimensions of the two sites. As table 4.1 and the maps of figures 4.1 and 4.2 indicate, there is a tremendous difference in the scale of the to sites. The New Gourna site was around thirty times larger than that of Mexicali. The New Gourna site involved fifty acres of land while the original Mexicali lots involved just around 1.7 acres. As we already know, only five houses were completed and the acreage of their block is only 0.43 acres. This immense difference in terms of the area of

53

the to sites gives an idea of the differences in scale between the two projects; since the New Gourna site had to incorporate several public amenities and services as well as housing, the much larger size was necessary to accommodate all these functions. On the other hand, at Mexicali, the area of the site was just sufficient to accommodate the houses and a builder's yard.

This issue of relative size leads to another major difference in the two sites--their relative dimensions. Again, as figures 4.1 and 4.2 indicate, the New Gourna site measured 700 meters by 300 meters approximately. The site was almost rectilinear with the southeast corner curved along the curvilinear form of the railway track. This rectilinear shape of the site meant that Fathy could not spread the buildings out on the site, especially in relation to the smaller dimension of the site. In addition, the elongated nature of the site would require that the village street pattern would emphasize a northeast-southwest direction.

On the other hand, the Mexicali site was split into two lots, one on either side of a ten-meter approach road from the central city. The lot to the west of the road was the smaller of the two, and measured 50 meters by 35 meters approximately, while the lot to the east of the road measured around 50 meters by 110 meters. The smaller lot would eventually accommodate the first cluster of five houses, while the other lot would accommodate the other four housing clusters plus a builder's yard. As we already know, however, these other four housing clusters were never constructed, while the construction of the builders yard took place before that of the first cluster.
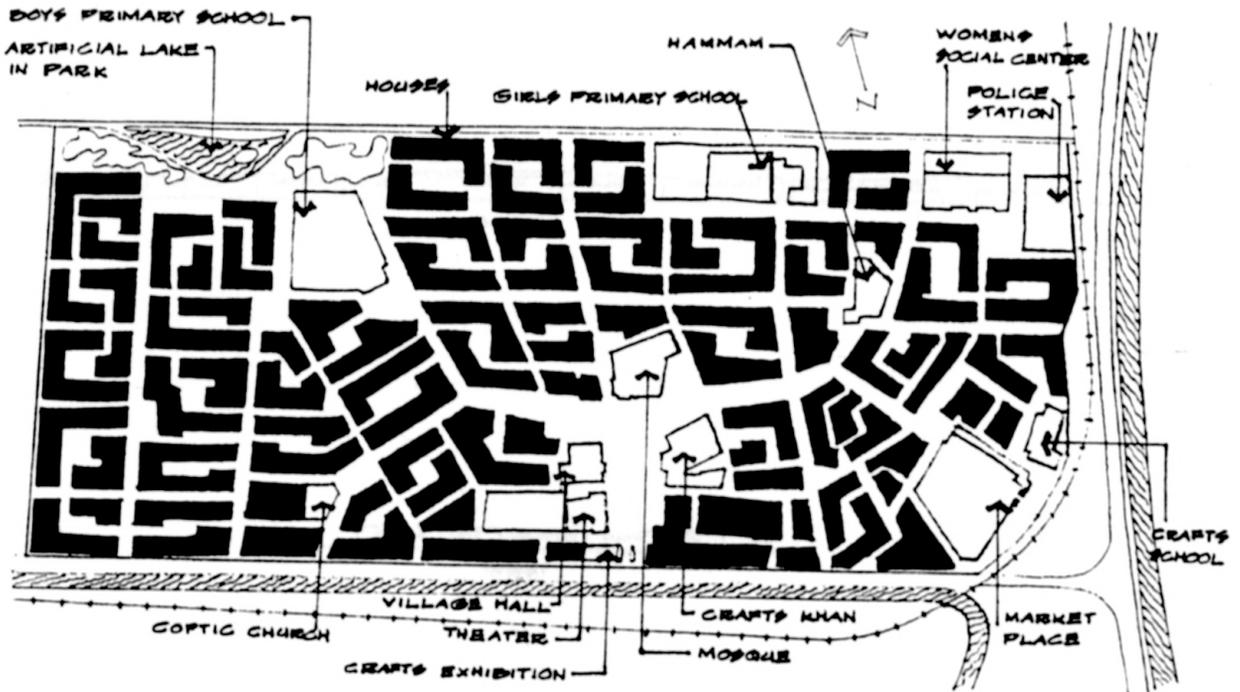
Figure 4.1: Site of New Gourna (as drawn by author from Fathy, 1973, figure 66)
(same scale as figure 4.2)
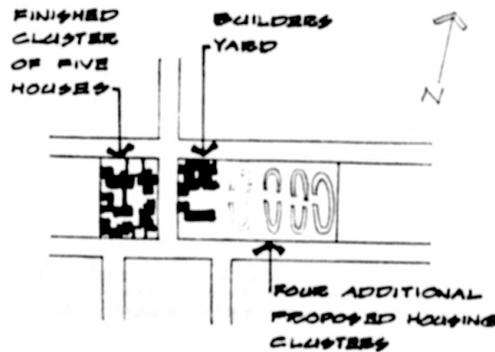
Figure 4.2: Site of Mexicali (as drawn by author from Alexander *et al*, 1985, p. 122)
(same scale as figure 4.1)

SOUTH

WEST
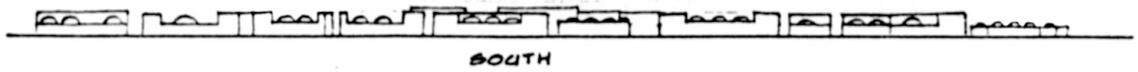
Figure 4.3: Profile of New Gourna (as drawn by author from Fathy, 1973, p. 67)
        (roughly to scale)

EAST

BUILDER'S YARD
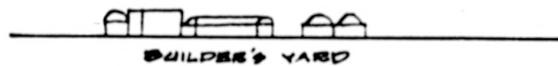
Figure 4.4: Profile of Mexicali (as drawn by author from Alexander *et al*, 1985, p. 10)
        (roughly to scale)

Also relevant to the environmental ground is the topography of the two sites. As figures 4.3 and 4.4 indicate, the nature of both the New Gourna and Mexicali sites are uniform and flat so that the natural topography played little role in the eventual design for the two sites. As a result, in New Gourna (see figure 4.3), Fathy would use the juxtaposition of various forms and volumes to create an interesting skyline. Similarly, as figure 4.4 indicates, by the use of a system of individual vaults and intersecting vaults, Alexander sought to create an interesting profile over a flat site.

Another feature of the site that affected Fathy and Alexander's design solutions was soil conditions. Though the climatic conditions for the two sites were similar, the soil conditions varied. The New Gourna site was predominantly of dry, compact earth, not quite typical of the village and farmland of most of Upper Egypt. In the part of Egypt where Gourna is located, the hod system of irrigation is used, by which the river water is let over the fields at flood time. This annual wetting of the soil causes it to expand, so that when it dries, enormous cracks appear all over the earth's surface as in dried mud. This parched state of the earth is referred to as *sharaki* (Fathy, 1973, p. 179). On the other hand, at Mexicali, the nature of the soil was fine and dry, over a subsoil of clay. The locally available fine adobe soil was used by Alexander as an ingredient in manufacturing the soil-cement blocks used for construction at Mexicali.

One of the most important features of the site relates to climatic conditions, which were similar for both locations. Both the New Gourna and Mexicali sites were located in regions which experience a more or less, similar climate--hot and dry, with the maximum

summer temperatures reaching 115 degrees Fahrenheit in Mexicali and around 120 degrees Fahrenheit in New Gourna. The average rainfall at New Gourna is just around 0.2 inches while that at Mexicali is around 3 inches. Given these arid climatic conditions, it becomes clear that an appropriate design solution in these two sites should indicate a responsiveness to this hot and dry climate. We shall see how the two men dealt with the climatic factors in chapter 5, wherein we will discuss the instrument of New Gourna and Mexicali.

SITUATIONAL QUALITIES OF NEW GOURNA AND MEXICALI

We next must consider the situational qualities of New Gourna and Mexicali. This topic will make explicit how the New Gourna and Mexicali sites related to their larger surroundings. As illustrated in figure 4.5, New Gourna is located on the west bank of the Nile River, across from the historically significant city of Luxor on the east bank. The New Gourna site is some three miles (five kilometers) away from the Valley of the Kings and some two miles away from Old Gourna. En route from New Gourna to the Valley of the Kings are prominent structures of architectural and archeological significance—the Ramesseum, the tombs of the Queens, the tombs of the Nobles, the temple of Hatshepsut and the Colossi of Memnon, with two massive badly weathered statues of Amenophis III.

Many of the Pharaohs of ancient Egypt's New Kingdom are entombed in the Valley of the Kings, surrounded by treasure and replicas of what they would supposedly need in their afterlife. Tomb robbers from Old Gourna, which adjoined this valley of tombs, had been ravaging many of the ancient burial chambers. In order to protect these tombs from

CAIRO

N

RIVER
NILE

LUXOR

VALLEY OF
KINGS

GOURNA VILLAGE

NEW
GOURNA

NILE

LUXOR

ASWAN

100 500

0 800   1000   1500 M

Scale

0   50   100   200   300 km
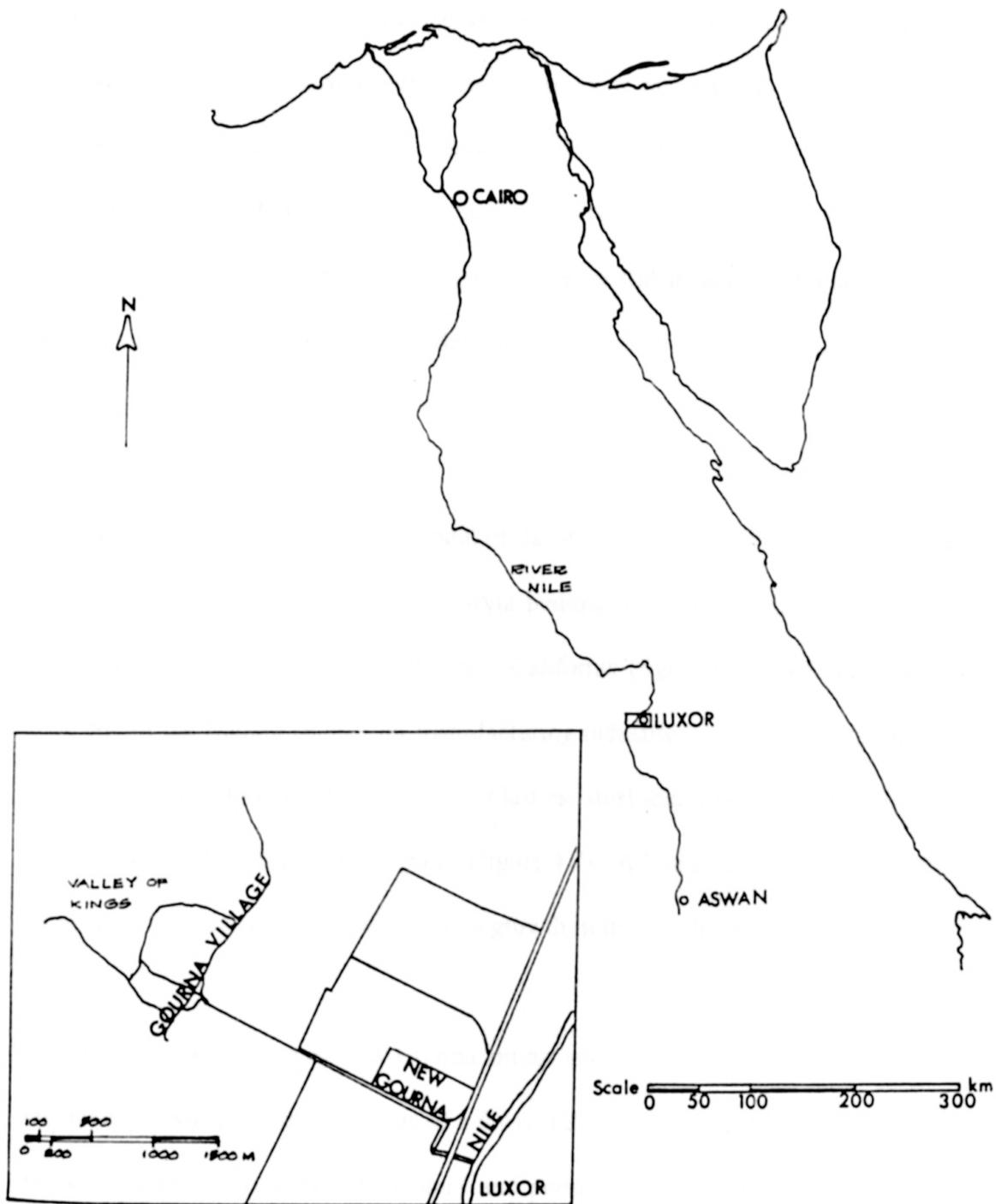
Figure 4.5: Location of New Gourna with respect to Luxor, Egypt (Hassan and Plimpton, 1989, p. 73)

being plundered further, the Department of Antiquities of the Government of Egypt decided to relocate the entire settlement of the Gournii to the site of New Gourna. Thus, we find that the site of New Gourna was within close range of an ancient architectural heritage, and Fathy felt that he had an enormous task at hand, living up to such a heritage. In Fathy's own words (1973, p. 18), "it needed a very self confident architect to start building there, within sight of the Temple of Deir el Bahari and the Ramesseum, under the minatory eyes of the Colossi of Memnon gazing coldly over the countryside toward our site."

Mexicali, on the other hand, is the capital of the state of Baja California and is located in the northeast section of the Baja California peninsula, bordering the city of Calexico, California and part of the Imperial County, California (figure 4.6). Mexicali has grown to be one of the leading centers for manufacturing industries, including automotive, auto parts, electronics, food processing, glass, plastics, steel and textiles. Mexicali is also a leading center for industrial theme parks (figure 4.7). All these activities in the industrial realm have also brought along with them a growth in the construction business[2].

In contrast to the location of New Gourna amidst ancient architectural ruins, Alexander's Mexicali site was located at the edge of a fairly well developed neighborhood, dominated by construction activity, both temporary and permanent. This rapidly developing area was a predominantly residential neighborhood with scattered commercial activity restricted to small shops attached to individual houses. These shops catered to the

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[2] Information from the Government of Mexicali homepage @ http://www.mxl.cetys.mx/~mexicali

immediate and small-scale, daily housing needs of the neighborhood. For other needs, one had to travel around five miles by road to the central city.
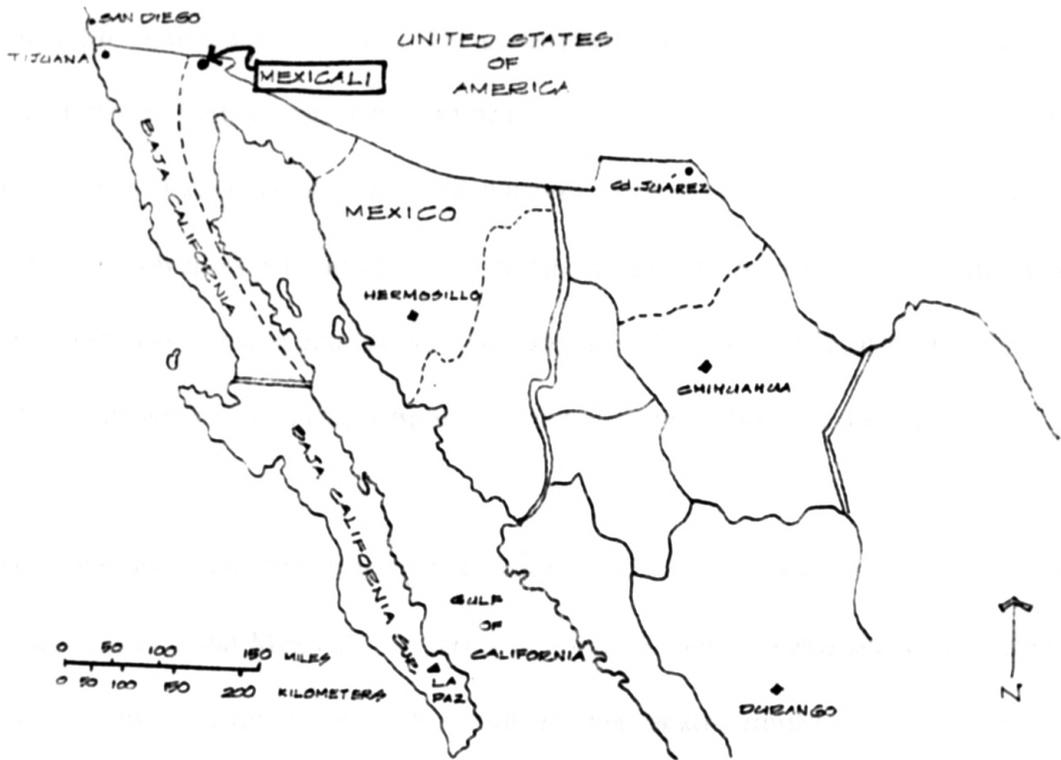
Figure 4.6: Map of Baja California, Mexico (as drawn by author from Atlas of Mexico, 1975, p. 33)
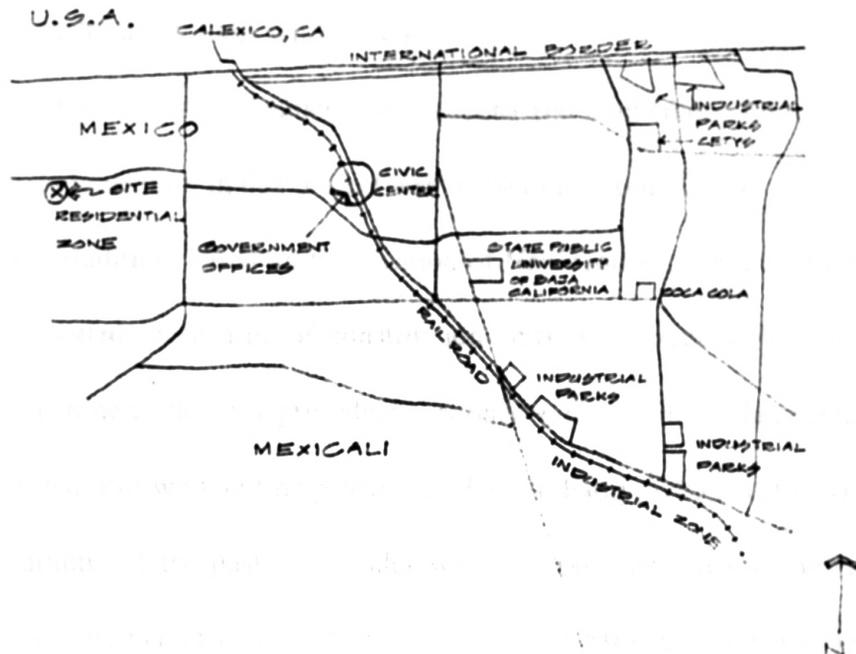
Figure 4.7: Map of Mexicali (as drawn by author from map @ http://www.mxl.cetys.mx/~mexicali)

According to Fromm and Bosselmann (1984), the government had started several pilot projects to demonstrate how to build earthquake-proof structures and how to insulate against Mexicali's desert climate. The government viewed Alexander's project similarly--that it would demonstrate easy construction techniques for their city. In short, the Mexiali site was located in an area wherein several construction experiments—both temporary as well as permanent—were being carried out. As a result, the entire focus of the project was housing and, as we shall later see, there was little concern for the other sorts of surrounding uses like workplaces, shopping, recreation and so forth.

The above discussion brings to light a major difference between the situational contexts of New Gourna and Mexicali. In terms of location, New Gourna site was located near historic ruins of Egypt, while the Mexicali site was located amidst squatter settlements of Mexicali. In terms of responsiveness to the situation, Fathy believed that he had to live up to the architectural heritage that the situation presented and that was no ordinary task. Designing and building a village within close proximity of such a rich heritage called for serious consideration of ancient values and traditions and a reverence for the past. Thus, Fathy's major responsibility in this project was to establish continuity in terms of cultural and architectural tradition, based on the location of New Gourna. On the other hand, the Mexicali site, located in an area of construction activity, presented Alexander with a situation for which he could set a precedent, not only with his pattern language approach to construction but also with self-help housing. Unlike Fathy, who had to live up to the ideals and traditions of the past, Alexander was in a position wherein he could set a precedent for an alternative construction process. The Mexicali site was to serve as

perfect experimental grounds, not only for his approach to construction, but also to his paradigmatic shift in views on building construction as a whole.

Just as Alexander decided to maximize on the location of the Mexicali site in a rapidly urbanizing zone, Fathy also decided to make the best use of the fact that New Gourna site was located on the road that led to the Valley of the Kings. According to Steele (1997, p. 79), each day thousands of tourists take the ferry across the Nile from Luxor to the west bank of the river to see the tombs in the Valley of the Kings, Queens and Nobles, and travel there by taxi, mini-bus, tour bus, bicycle, donkey or on foot along this single-narrow two-lane road adjoining the New Gourna site.

Fathy saw this road (see figure 4.5) and the potential customers on it as the "main life-line of the new village and an endless source of legal business transactions in the future" (Steele, 1997, p. 79). Like any good shopkeeper, Fathy decided to locate his wares right near the main lines of traffic in an open-air structure that would show them off to best effect and tempt the people to stop (Steele, 1997, p. 79).

Fathy's attempt to maximize the village location was an effort to put the Gournii on a firm economic footing. Fathy realized that the only way of rehabilitating the Gournii and revitalizing their economic standards was to train them in various crafts like weaving, basketry, silversmithy and building construction. Hence, with this strong reliance on manufacture and sales, Fathy intended to raise the economy of New Gourna and make it stronger than those of the adjacent villages, the economies of which were almost entirely

dependent on agriculture. In fact, such an attempt by Fathy was intended to serve as an example in economic development that other villages in Upper Egypt might eventually be able to follow. As seen above, Fathy dovetailed this aspect of economic development with the possibility of New Gourna's crafts exhibits as a tourist attraction. Travelling to the Valley of Kings, these tourists would have provided a substantial clientele to the crafts and wares displayed in the crafts exhibition. This possibility clearly brings out the extent to which Fathy went to bring together locational aspects of the site and the development of the local economy.

LOOKING AHEAD

Having examined the human and the environmental aspects of the ground of New Gourna and Mexicali, and having reviewed similarities and differences, we now move on to study the conceptual and practical means that were instrumental in bringing these two projects into reality. This topic will involve, besides the philosophies of the respective designers, the foundational base for self-help housing. In other words, the design concepts and the knowledge that Fathy and Alexander drew upon in the making of New Gourna and Mexicali need to be discussed. This topic takes us into the subject of discussion of the next chapter--the instrument.

CHAPTER 5

THE INSTRUMENT OF NEW GOURNA AND MEXICALI

As explained in chapter 3, the instrument is the practical means for actualizing an activity's goal, which for both Fathy and Alexander was the creation of a sense of place and community. The instrument is the conceptual means by which Fathy and Alexander, starting with the site in hand, set out to program and design their respective communities. As explained in chapter 3, the instrument for the New Gourna project is Fathy's reliance on an *enlightened traditional* approach towards society-building. For the Mexicali project, Alexander's use of *pattern language* to design the houses and the neighborhood is the instrument for his community-making. In this chapter, these two instruments are analyzed and compared in order to evaluate the extent to which they were successful in the realization of Fathy and Alexander's original goals.

From the review of the New Gourna and Mexicali projects in chapter 2, it becomes clear that both Fathy and Alexander's intentions were directed towards the creation of a successful community. In order to achieve such a goal, the routes adopted by Fathy and Alexander were considerably different. On the one hand, Fathy tried to adopt the role of an empathetic insider, trying to put himself in the place of the Gournii and evolve a suitable solution. On the other hand, Alexander's process of experimentation was based largely on the pattern language approach to building.

Hence, in order to have a complete understanding of the instruments of New Gourna and Mexicali, we need to discuss in detail Fathy's approach of empathetic insideness and

Alexander's pattern language approach. In other words, we need to look at the means of planning and programming that formed the basis of these two projects. In order to facilitate such a discussion, the following themes have been identified:

(1) Approach for understanding the end-users;

(2) Layout of the whole;

(3) Layout of the individual houses.

The New Gourna and Mexicali projects will be compared in light of these three themes. The discussion will be presented with the coverage of the New Gourna project first, followed by the Mexicali project.

APPROACH FOR UNDERSTANDING THE END-USERS

Both Fathy and Alexander's approach to the programming and design of their respective projects relied on an understanding of their end-users. In order to evaluate the extent to which the two architects were successful in their approaches, it is useful to view the men's understanding of their users in light of the concept of empathetic insideness as put forth by geographer Edward Relph. According to Relph (1976, p. 54), empathetic insideness demands a willingness to be open to the significances of a place, to feel it, to know it and respect its way of life and symbols. This effort involves not only looking at a place, but also seeing into and appreciating the essential elements of its identity. Just as Relph's idea is related to the empathetic understanding of places, likewise, a similar view can be adopted in the empathetic understanding of the people in that place. Relph adds that this empathetic insideness is possible for anyone not constricted by rigid patterns of thought and who possesses some awareness of the environment.

Using Relph's idea of empathetic insideness, it becomes clear that both Fathy and Alexander intended to put into practice such a way of understanding the end-users of their designs but, as we shall see below, the extent to which they were successful in this effort varied, with Fathy's approach probably ending up more successful than Alexander's.

Fathy's Empathetic Insider Approach to Understanding

In laying out the village and buildings of New Gourna, Fathy sought to become an empathetic insider because he believed deeply in making every effort to incorporate the actual needs of the Gournii into the design and construction of the village. Fathy, like most other architects of his time, had the easier option of designing and constructing prototypical units and laying them out on a rigid grid and thereafter forcing the Gournii to occupy them. Instead, Fathy chose the more difficult and time-consuming option of tailoring the village to the existing, everyday needs and lifeways of the Gournii. Fathy aptly sums up his approach as follows (Fathy, 1973, p. 51):

> I had a living society in all its complexity and I could either force it into a few standard-size dwellings, leaving it to experience all the cramps and blisters of a recruit getting used to his boots, or I could measure it and produce a village that would accommodate it in all its irregularities and quirks, which would be rather like taking a snail out of one shell and inserting it in another.

Hence, opting for this difficult option, Fathy tried to put himself into the world of the Gournii so that he could study, evaluate and reinterpret their needs. Fathy had access to an earlier survey of Old Gourna that listed the houses and described their areas, the

number of rooms in each house and their building materials (Fathy, 1973, p. 52). Fathy realized that, since this survey had been prepared ten to fifteen years prior to the project, it would be out of date. Moreover, Fathy was certain that it would mostly be filled with the usual "yes" or "no" answers rather than the personalized responses for which Fathy was looking.

Thus, in order to acquire such personalized information, especially related to the hierarchy of the tribes at Old Gourna, Fathy realized that it was important to talk to the elders of the village and also to observe the villagers at least for a month. In this regard, Fathy felt that it was very important to observe how the Gournii went about their work and how they used their houses and public spaces. In short, Fathy wished to subject Old Gourna to a thorough socio-ethnographic survey and economic investigation to acquire sensitive and reliable, firsthand information upon which he could accurately ground his entire programming for New Gourna. However, since the government authorities in charge of the project never provided any professional assistance, Fathy had to generate his own knowledge and intuition based on his own sympathetic understanding of peasant life (ibid., p. 54).

Alexander's Pattern Language Approach to Understanding

We now move on to a discussion of how Alexander went about the process of understanding his end-users—the five Mexican families. At the outset, it is important to realize that, at Mexicali, the pattern language provided the unifying force, not only in regard to layout and construction procedures but also in terms of bringing the five

families and Alexander into a cooperative process. For Alexander, pattern language forms the conceptual and design basis around which the actual construction activity takes place. According to Alexander, a pattern language for Mexicali would have the potential to unify the generic needs of each of the five families and produce a house which was unique and personal and one which satisfied basic domestic needs (Alexander *et al*, 1985, p. 176).

In order to understand the pattern language approach of Alexander, it is important to have a clear idea of what the pattern language is about. Briefly, the pattern language is a comprehensive vocabulary of design elements that are said by Alexander to contribute to a sense of place and community. Alexander says that the vitality of the pattern language approach arises from the fact that the patterns are not treated as isolated entities but in relation to other patterns, both smaller and larger than the pattern in question. This brings out the organic nature of the pattern language approach to construction.

In Alexander's master volume, <u>A Pattern Language</u> (Alexander *et al*, 1977), he identifies 253 of these patterns, which are divided into three broad groups, depending on the scale of the environment that they deal with. Hence, the first group involves patterns for regions, towns and communities, while the second group deals with patterns for buildings and groups of buildings. Finally, the third group deals with patterns related to construction details. The nature of this threefold grouping immediately indicates that these patterns start with the largest scale of the environment, beginning with regions and move down to the smallest scale involving details of construction. Moreover, each of

these patterns are interrelated and it is this aspect of continuity, according to Alexander, that brings out the organic nature in the construction that follows this approach.

To put such a pattern language approach into practice at Mexicali, Alexander laid out a set of forty-one patterns, as shown in table 5.1. Twenty-seven of these patterns were used in the layout of the common land, while twenty-one were used in the layout of the individual houses. However, there were seven patterns (indicated by *C*) that were used in the layout of both the common land and the individual houses. It is important to note here that all forty-one patterns were taken from pattern language and hence Alexander and his design colleagues generated this pattern language themselves; the families were not involved.

As we can see, such an approach to construction based on the pattern language is not common and therefore, it was necessary that the five families at Mexicali be first introduced to the pattern language approach. Alexander and his team of apprentices helped the five families understand this language by holding a series of discussions on it. Copies of the pattern language were distributed to the families and they were guided through it by the design team, who attempted to get the families to see that this method of designing and layout was very much different from any usual designing process, where the end-users are largely passive. The families were made to understand that they themselves would play an active part in designing their houses and the common land and that they would be provided the directions from the pattern language. According to Alexander (1985, p. 133), the families became enthusiastic about the project as they

began to see the richness inherent in the patterns, though we shall see in chapter 7 that the large-scale patterns, especially, did not work well and were changed after the families had lived in their houses for several years.

Table 5.1: The Pattern Language for Mexicali (Alexander *et al*, 1985, pp. 134, 175-176)

1.	House cluster
2.	Common land
3.	Main entrance
4.	Path network
5.	Small parking lots
6.	Degree of publicness
7.	Building fronts
8.	Arcades
9.	Gallery surround
10.	Private terrace on common land
11.	Northeast open space (c)*
12.	Wings of light
13.	Positive open space (c)
14.	Connected buildings
15.	Long thin house (c)
16.	Main entrance (c)
17.	Half-hidden garden (c)
18.	Entrance transition
19.	Patios which live
20.	Common areas at the heart (c)
21.	Intimacy gradient (c)
22.	Car connection
23.	Public outdoor room
24.	Child's play
25.	Family of entrances
26.	Seats on stairs
27.	Front-door bench
28.	Front porch
29.	Farmhouse kitchen
30.	Couple's realm
31.	Children's realm
32.	Back porch
33.	Sequence of sitting spaces
34.	Bed alcoves
35.	Bathing room
36.	The shape of indoor space
37.	Light on two sides of every room
38.	Closets between rooms
39.	Structure follows social spaces
40.	Columns at the corners
41.	Natural doors and windows

*(c) indicates patterns used for both neighborhood and house designs.

In carrying out this process practically, at every stage in the layout, there were a series of discussions between Alexander and the five families. Alexander realized that it was the families' houses that he was helping them build and that the families had the most knowledge of their immediate spatial needs. He realized that active dialogues between them was very essential to put into practice their requirements. All these discussions took place on the site and once a consensus was arrived upon, the decisions were immediately implemented on the site—a topic we will cover in greater detail in the next chapter on direction.

In spite of Alexander's efforts to understand his users and their needs better, we find that the extent to which he could assume the role of an empathetic insider was considerably less as compared to that of Fathy. Though he wished to involve the families in the process, Alexander was more or less in control of the entire process and his decisions were final, including the choice of the patterns for the project. So, although it appears that Alexander tried his utmost to understand his end-users during the layout of the project, the activities seem to be guided more by Alexander's concepts and visions rather than by a concrete understanding of his end-users' needs. On the other hand, Fathy's approach to the Gournii indicates a greater understanding of their actual needs.

LAYOUT OF THE WHOLE

Having discussed the empathetic insider approach of Fathy and the pattern-language approach of Alexander, we now move on to see how such an understanding was instrumental in the layout of the neighborhood wholes for New Gourna and Mexicali. This discussion will give us a clear picture of how Fathy and Alexander were able to incorporate the needs of their end-users in terms of the overall community design.

Layout of New Gourna

Fathy began the layout of New Gourna with a clear understanding of the spatial layout of Old Gourna. Figure 5.1 indicates the street plan designed by Fathy at New Gourna; this arrangement automatically suggests that it was different from the easy, but monotonous option of a typical Western gridiron layout. Fathy was of the opinion that a gridiron layout may work in big cities, where transportation was by motor vehicles, but he was certain that such a layout would be very harmful in a village like New Gourna, where the peasants may never even possess a bicycle (Fathy, 1973, p. 72). In Fathy's layout, the major streets were ten meters wide (approximately thirty feet), since these streets were intended to be the main thoroughfares connecting all the main spaces of the village and its public buildings.

On the other hand, the streets that provided access to the semi-private squares of the blocks of houses were made deliberately narrow—only six meters (approximately eighteen feet)—so as to provide shade and a feeling of intimacy in the residential areas. These minor streets also included many corners and bends so as to discourage strangers

from using them as thoroughfares and thus keep the residential areas more or less private (Fathy, 1973, p. 71).

Fathy's plan included a major thoroughfare in the shape of a crescent, as shown in figure 5.1. Leading on to this main street was a street that led the villagers into the village through the market place located at the southeast corner of the village. The crescent shaped main street widened substantially towards the center of the village, forming the main square. This square was also approached by a street from the south that adjoined the crafts exhibition located on the main road to the Valley of the Kings. The other streets originated from the main crescent-shaped street and connected the rest of the village to the main square, which was intended to be the nucleus of the whole village, particularly because of the mosque to which most villagers came to pray at least once a day.
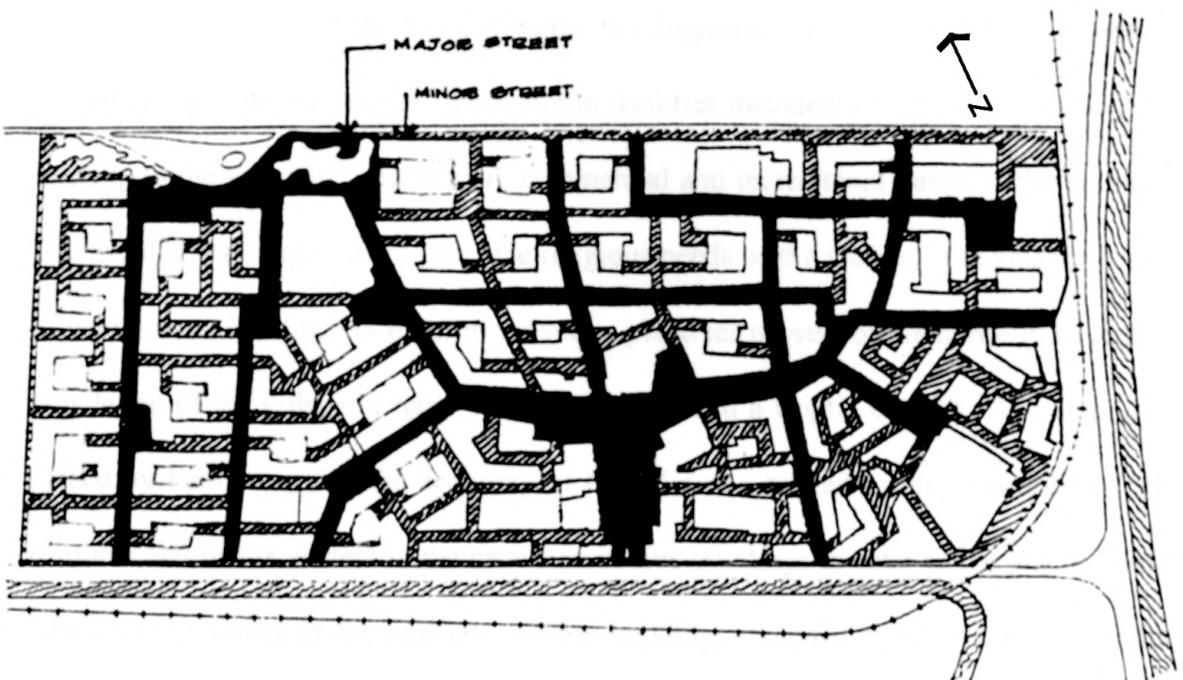
Figure 5.1: Layout of street pattern at New Gourna (as drawn by author from Fathy, 1973, figure 66)

Table 5.2: Public buildings and amenities at New Gourna

RELIGIOUS	-mosque -Coptic church
EDUCATIONAL	-boys' primary school -girls' primary school -crafts school -crafts khan -women's social center
COMMERCIAL	-market place -permanent crafts exhibition
RECREATIONAL	-theater -public bath, or *hammam* -artificial lake -park
ADMINISTRATIVE	-village hall -police station

Table 5.2 gives a list of the thirteen public buildings and amenities that Fathy provided for the village. As we can see, these public facilities included a wide range of activities catering to the religious, educational, commercial and recreational needs of the Gournii. The mosque was important to meet the religious needs of the Gournii, the great majority of whom were Muslim. In order to provide a place for prayer for the minority Christian population of the village (around 100), Fathy provided a Coptic Church. The emphasis placed by Fathy to uplift the economy of New Gourna hinged on the education of the peasants and this is evident in the provision of five buildings to cater to the practical and educational training of the peasants. These buildings included a crafts school, a crafts khan, a women's social center and separate primary schools for boys and girls.

The market place and the crafts exhibition catered to the sales and the distribution of commercial products to be produced by New Gourna as well as by neighboring villages. To cater to the recreational needs of the Gournii, Fathy provided a theater, which contained facilities for staging plays, dances and traditional quaterstaff contests (stick fights). Fathy also proposed a public bath, or *hammam*, which was intended to be a gathering place for the entire community. In addition to this bath, Fathy included an artificial lake and an adjacent park to add to the recreational features at New Gourna. Finally, Fathy also provided a village hall and a police station to meet the administrative needs of the village.

As the map of figure 5.2 illustrates, most of these buildings and amenities centered around the main square. Here, one finds the mosque, the crafts khan, the village hall, the theater and the permanent exhibition hall. To the west of the theater was located the Coptic Church, separated from the activity of the main square. In addition, the boys' primary school was located towards the northeast end of the crescent-shaped street, adjoining the artificial lake and park. The girls' primary school was located in the northeast part of the village. To the south of this school, Fathy located the public bath or *hammam*, adjoining the crescent-shaped main street. Located at the northeast corner of the layout were the police station and the women' social center and dispensary.
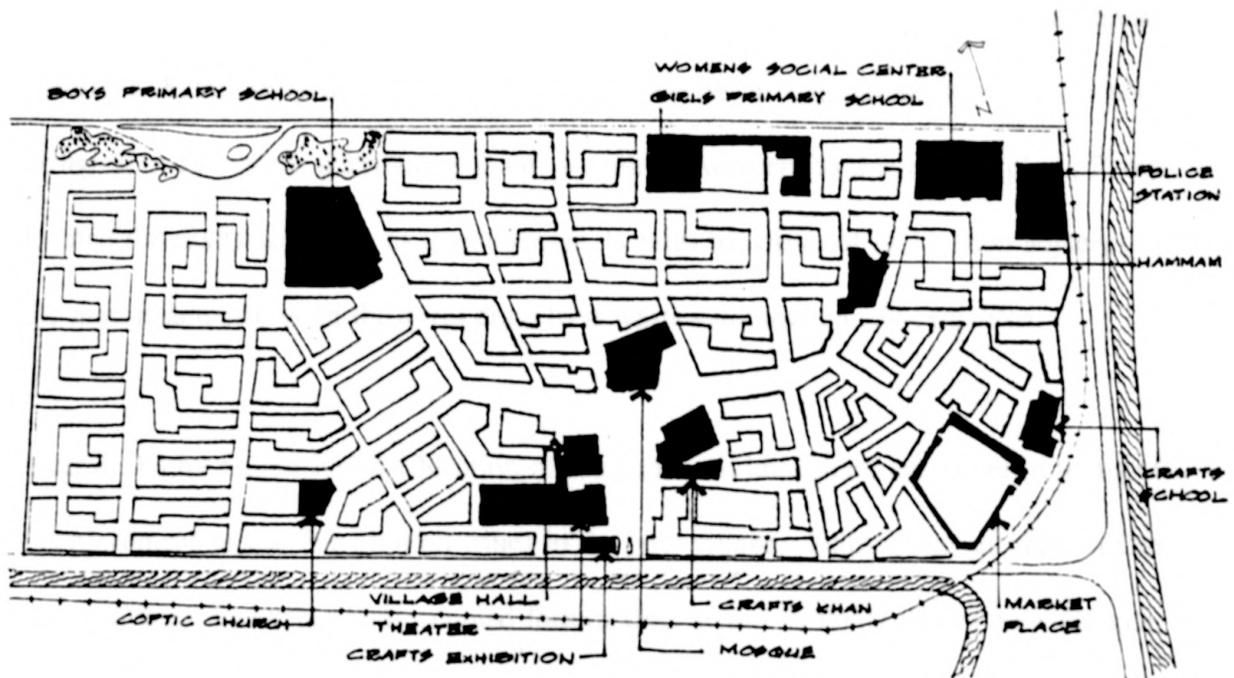
Figure 5.2: Layout of the public buildings at New Gourna (as drawn by author from Fathy, 1973, figure 66)
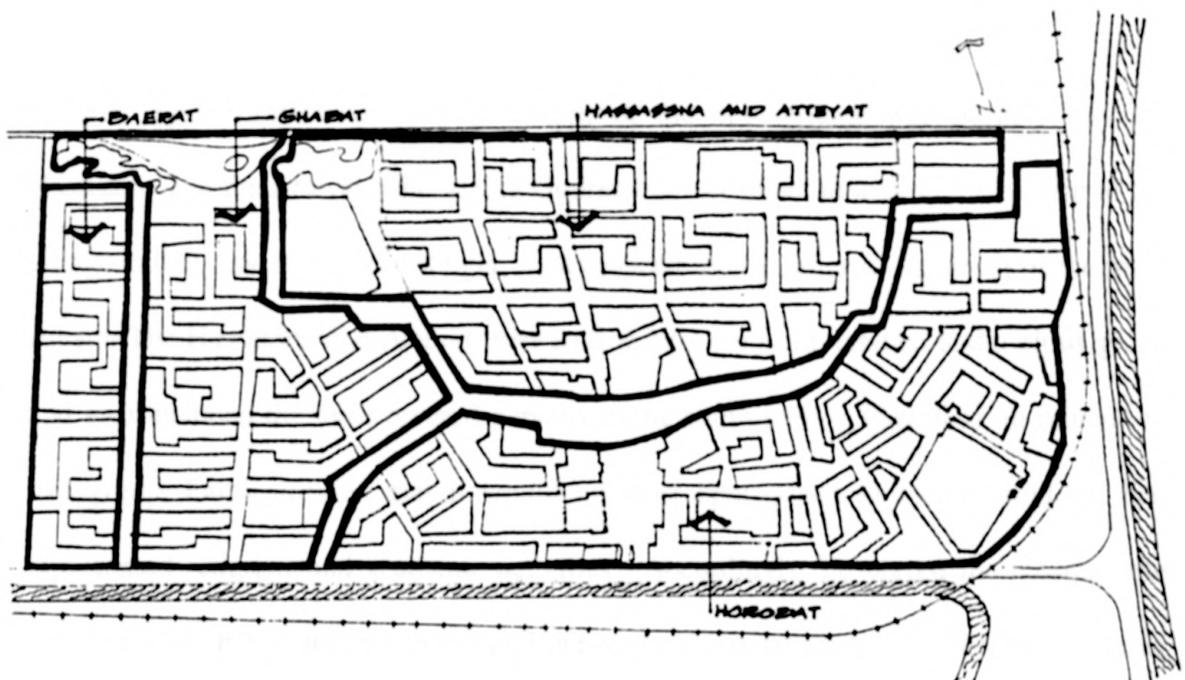
Figure 5.3: Layout of the four quarters of New Gourna (as drawn by author from Fathy, 1973, figure 66)

Fathy decided to locate the market place at the southeast corner of the site (see figure 5.2) to make maximum utilization of the railway line that had a stop at this curvilinear junction. Fathy aptly decided that this site would be an appropriate location for both bringing in as well as distributing goods by train. Adjacent to this market place, Fathy located the crafts school so as to encourage its sales by virtue of its location adjacent to the market and also to let the dyers drain their wastewater into an adjacent ditch.

Overall, Fathy established the location of the public buildings and amenities in terms of his placement of the five Gournii tribes in the new village. Fathy observed that, in Old Gourna, these five tribes had occupied four distinct areas. In the layout of New Gourna, therefore, Fathy realized that it was crucial for him to maintain this social and spatial distinction and, accordingly, laid out the five tribes into four well-marked quarters as shown in the map of figure 5.3.

As this figure illustrates, the first quarter of the new village was occupied by the Hassassna and the Atteyat, who at Old Gourna had occupied an area in the middle of the village called Assassif. Accordingly, Fathy placed their quarter to the north of the main square. The Hassassna and Atteyat were said to be a very old, learned and a pious group and also included the most revered persons in the community. Therefore, in relation to this group, Fathy decided that it would be most appropriate to locate buildings that represented religious and academic activities. Accordingly, he placed the mosque, the boys and the girls' primary schools and the women's social center in this tribe's quarter, as seen figure 5.3. Next, the second quarter of the new village was occupied by the

Horobat to the south of the crescent-shaped main street, embracing an S-shaped curve, as also shown in figure 5.3. Since this group incorporated most of the tomb robbers, Fathy decided to locate them in relation to more "active" functions like the market place, the crafts school, the village hall, the theater, the crafts khan, the crafts exhibition and the police station.

The third quarter of New Gourna was occupied by the Ghabat, who derived their name from the word "forest." Accordingly, Fathy placed their quarters adjoining the artificial lake and park to the northwest of the village, as shown in figure 5.3. Finally, Fathy placed the last quarter of the new village--the Baerat--at the extreme western end of New Gourna, separated by a broad street from the rest of the village. Since this tribe had always kept themselves apart from the Gournii and had lived in a small area adjoining Old Gourna, Fathy decided to maintain this separation in his new layout. Thus, we find that, with respect to the spatial layout of the five tribes, Fathy was entirely guided by their existing spatial order in Old Gourna and he tried to create a similar layout at New Gourna, so as to maintain a block continuity in their spatial patterns.

An important feature of New Gourna's spatial layout was the arrangement of buildings around courtyards. Not only did Fathy decide to build each house around a courtyard, but he also decided to locate groups of houses around larger, semi-public courtyards or "pasha's courtyards," as he called them (Fathy, 1973, p. 58). The significance of these courtyards becomes evident from the extent of their use in the layout, as shown in figure 5.4. Each of these spaces, with surrounding houses, was intended to serve one extended

family group, or *badana*. As we already know, the *badana* consisted of a group of ten to twenty families, each with its own patriarch. From studies he conducted in Old Gourna, Fathy learned that these *badanas* had their own cafe, a barbershop and a grocery store. When one family baked bread in a *badana*, the neighboring families could use their oven to heat their old bread and the families took turns to render this service (Fathy, 1973, p. 58). Fathy also took note of the fact that the *badana* served as a social space for the reception of guests during feasts and celebrations. Having made note of all these functions, Fathy made sure that, in the final layout of New Gourna, each *badana* was housed together and given facilities to pursue all the communal activities to which it was accustomed.
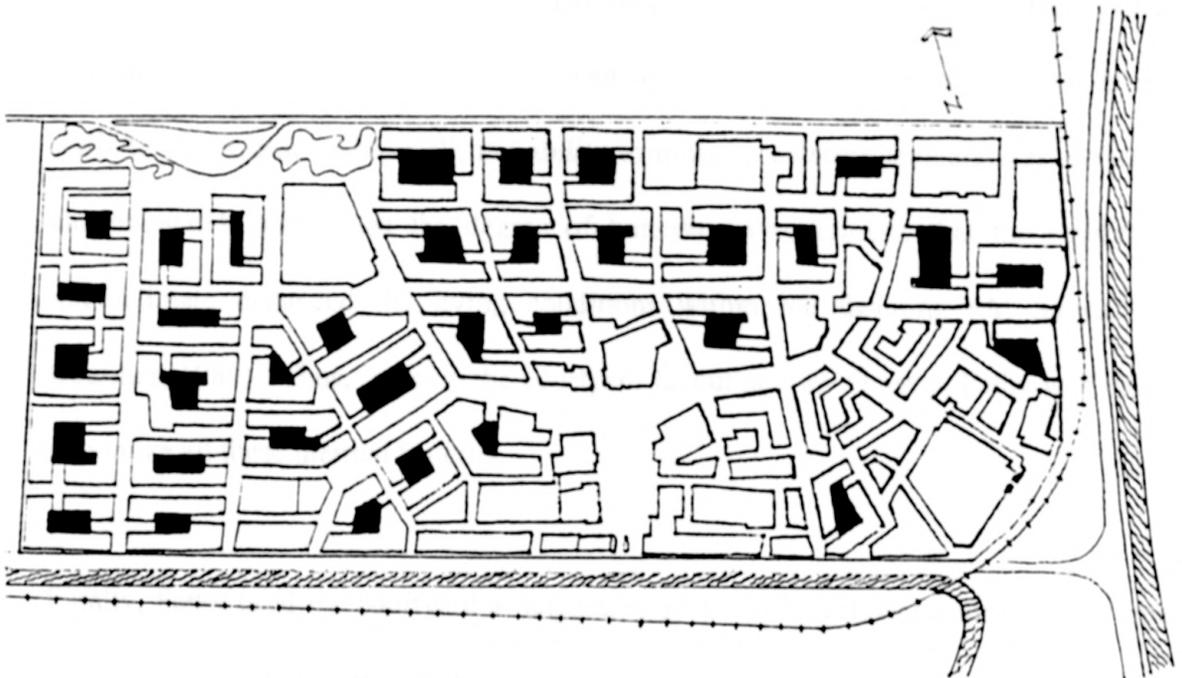
Figure 5.4: Layout of courtyards at New Gourna (as drawn by author from Fathy, 1973, figure 66)

By emphasizing these courtyards in his village design, Fathy hoped that they would cement together the family group by a constant, gentle emphasis on oneness (Fathy, 1973). In other words, Fathy hoped that this inward orientation of the houses looking out on the courtyards would be instrumental in maintaining the communal atmosphere prevalent in the *badana*. Moreover, Fathy also intended that these semi-public spaces would provide other uses like temporary storage space for fuel and hay or play areas for children under the nearby eyes of their parents.

Besides utilizing the courtyard for its social and functional benefits, Fathy also intended to maximize the thermal benefits of the courtyard, which were significant, especially in wake of the hot, dry climate of New Gourna. The most salient thermal benefit included passive cooling using water elements like a small fountain or a laundry pit for evaporative cooling during the day. The minimization of heat gain resulted from the compactness of the houses, which allowed for the minimum exposure of the exterior walls to direct heat. Above all, the ability to mitigate extreme temperatures, deflect or channel winds and adjust the degree of humidity were reasons that the courtyard's microclimate enhanced the living conditions within the dwelling (Al Sayyad and Bourdier, 1989). Thus, in using the courtyard layout at New Gourna, Fathy was able to maximize all these thermal benefits.

Finally, Fathy used the courtyard arrangement as a way to achieve a hierarchy of open spaces in the overall layout. For Fathy, it was extremely important that a person step out of his house into a house courtyard and then into a larger, but still enclosed square, and

then finally into the public street. According to Fathy, this gradual contraction is more peaceful and more soothing than an abrupt plunge from the privacy of one's small house into the bustle of the larger public realm of the village (Fathy, 1973, p. 58).

Layout of Mexicali

We next turn to Alexander's layout of the Mexicali neighborhood. Figure 5.5 shows an axonometric view of the completed cluster of five houses laid out roughly in an ellipse and forming an inward-facing group of houses. Located in the center of this house cluster was a space of common land, which as we see in the figure, was literally formed by the boundaries of the five houses themselves and not by separate walls. At the center of the space were a fountain and an arcade that were helped to enhance the communal nature of the entire common land and to lend it a positive character.

The main entrance to this cluster of five houses was located on the east side of the site between the houses marked 4 and 5 on figure 5.5. This main entrance consisted of an arcade which was to provide a transition between the semi-public common land and the public domain of the road. There were also two secondary entrances to the site: first, a north entrance between houses 3 and 4; and, second, a south entrance between houses 1 and 5. The spaces formed immediately outside the two secondary entrances were intended to be the parking lots for the cluster.

Based on the requirements of the five families and the constraints of the site, Alexander arrived at a set of twenty-seven patterns (see table 5.3) that were to be used in the layout

and construction of the site as a whole. A look at these twenty-seven patterns immediately shows a sense of hierarchy: the first patterns like HOUSE CLUSTER and COMMON LAND are of the largest scale and relate to the overall layout of the cluster and the common land, while the middle patterns like LONG THIN HOUSE and PATIOS WHICH LIVE are related to the design of individual buildings on the site. Lastly, the patterns at the very end like SEATS ON STAIRS and FRONT-DOOR BENCH relate to the details of construction at the level of the individual houses. Thus, we find that the pattern language for the Mexicali neighborhood illustrates the same qualities of hierarchy, order and continuity as the arrangement of the original *Pattern Language*.
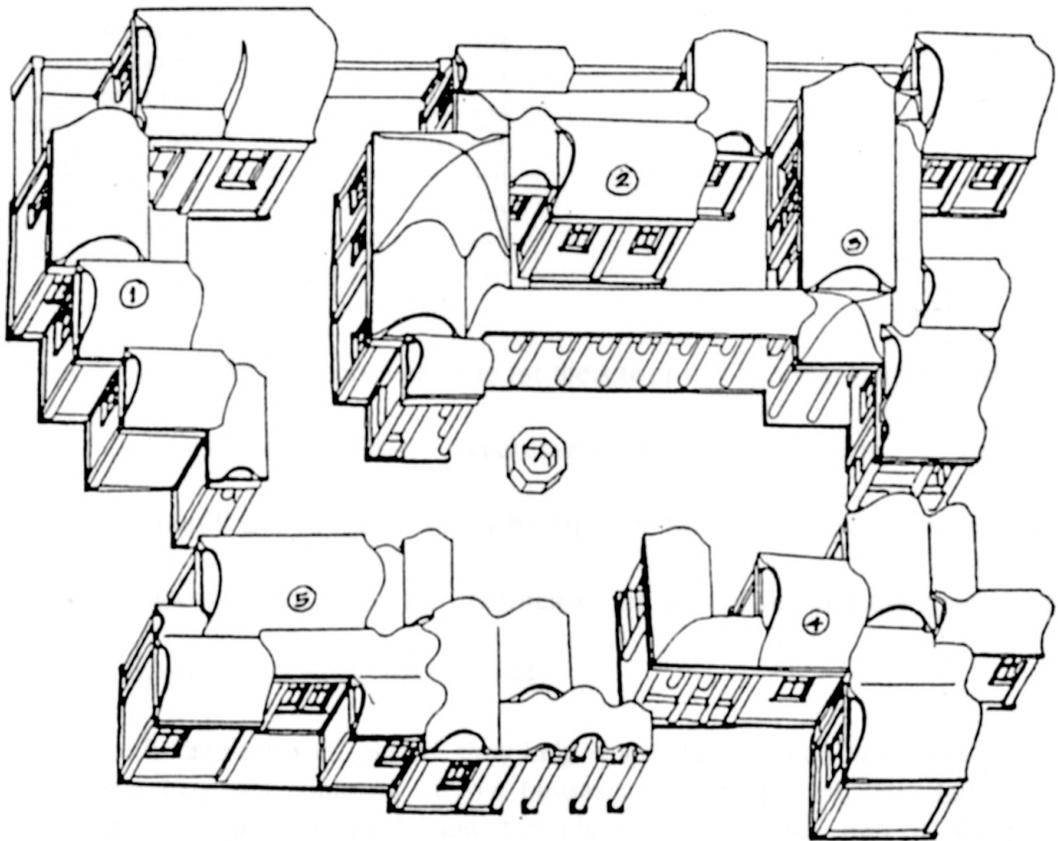
Figure 5.5: Axonometric view of the cluster at Mexicali (Alexander *et al*, 1985, p. 10)

Table 5.3: Patterns used for the layout of common land at Mexicali (Alexander *et al*, 1985, p. 134)

1.	House cluster
2.	Common land
3.	Main entrance
4.	Path network
5.	Small parking lots
6.	Degree of publicness
7.	Building fronts
8.	Arcades
9.	Gallery surround
10.	Private terrace on common land
11.	Northeast open space
12.	Wings of light
13.	Positive open space
14.	Connected buildings
15.	Long thin house
16.	Main entrance
17.	Half-hidden garden
18.	Entrance transition
19.	Patios which live
20.	Common areas at the heart
21.	Intimacy gradient
22.	Car connection
23.	Public outdoor room
24.	Child's play
25.	Family of entrances
26.	Seats on stairs
27.	Front-door bench

The crux of Alexander's pattern language for the site as a whole was the very first pattern in table 5.3--HOUSE CLUSTER. According to Alexander, locating the five houses around a commonly shared space would be vital for the creation of human community within the cluster. He describes the significance of the cluster and the spaces created within it as follows (Alexander, 1985, p. 144):

> If the houses are well placed, they help shape the common land, and the cluster becomes coherent. If the houses are badly placed, they fail to shape the common land, and the cluster degenerates into a loose aggregation of individual houses, with no communal spirit.

For Alexander, the need for a coherently shaped common space meant that the placement of the houses around the common land had to take into consideration two important

aspects--the shape of the any common land and the shape of the private gardens. The ultimate aim of the entire effort was to create a cluster layout within which both the shape of the private gardens of the five houses and the overall shape of the common land were of a positive character. The final layout of the cluster, as shown in figures 5.6 and 5.7, indicates the division of this space into private and shared domains.

Figure 5.6 illustrates the nature of the public space that was formed as a result of the layout of the cluster. The rectilinear shape of this space was partly due to the dimensional restrictions of the site. This space, as we see in the figure, was not a perfect rectangle but has its own niches of various sizes. This offset profile was the result of the shape of the individual houses, which consisted of many offsets. However, it is important to note that this common space has been formed by the location of the houses themselves and not by dead walls erected solely for the purpose of an enclosure. In other words, there was a spatial fluidity between the common space and the houses adjoining it. In addition, the fountain located in the common land was intended to be a center of activity, since Alexander believed that water is a major source of attraction for people. Finally, the arcade connecting houses 2 and 3 faced the center of the common land and thereby formed a permeable division that both delimited and joined houses with the common space, which was intended to serve as a communal gathering place, especially for summer barbecues.
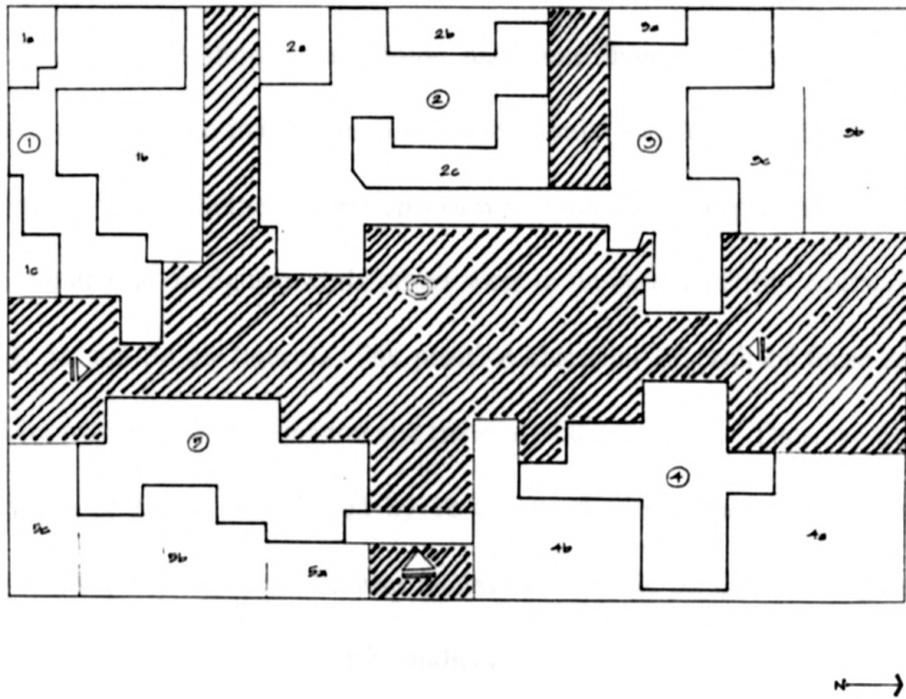
Figure 5.6: Layout of common space in cluster at Mexicali (as drawn by author from Alexander *et al*, 1985, pp. 167, 169, 170, 171, 173)
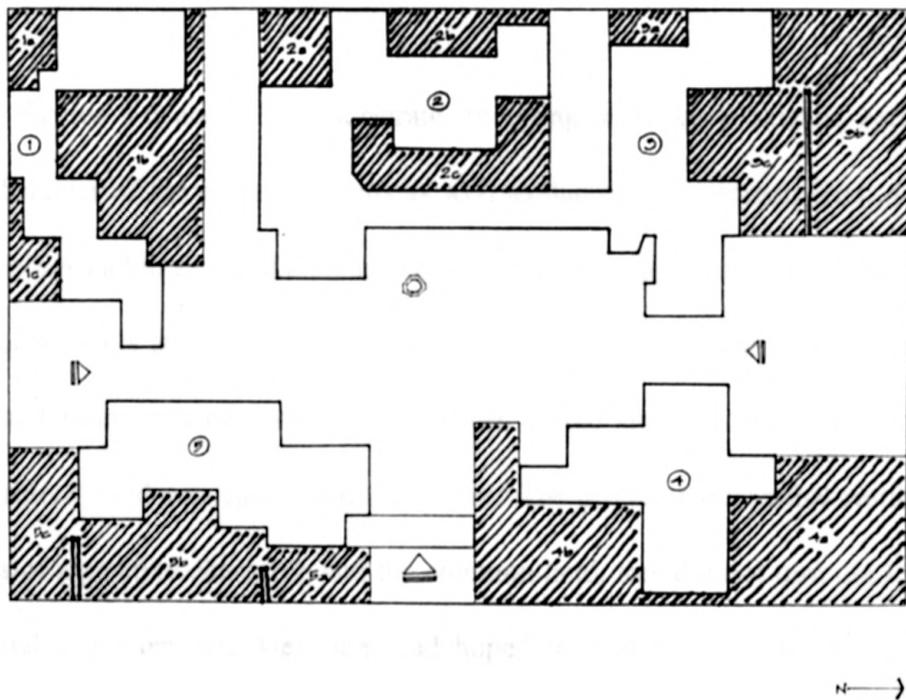
Figure 5.7: Layout of private spaces in cluster at Mexicali (as drawn by author from Alexander *et al*, 1985, pp. 167, 169, 170, 171, 173)

The map of figure 5.7 shows the private spaces that resulted from the layout of the cluster. As the figure shows, each house had more than one private space that was formed as a result of the manner in which each house was located with respect to the central common space. Some of these spaces were intended to be private gardens (spaces 1b, 2c, 3c, 4b and 5b on figure) while others were to function as utility courts (spaces 1a, 2a, 3b, 4a, 5a and 5c on figure). The positive character of each of these spaces was generated by way of both the location and the size of these spaces. Thus, we find that the private garden of house 1--indicated by 1b on the figure—generated a more positive character than the front garden of house 2—indicated by 2c on the same figure. On the other hand, the utility court of house 2—indicated by 2a on the figure—displayed a more functional shape, size and location than the utility court of house 1—as indicated by 1a on figure 5.7. Thus, we find that the nature of the private spaces generated as a result of the location of the houses varied according to their relative locations on the site.

Hence, as figures 5.6 and 5.7 demonstrate, in trying to strike a balance between the positive character of the private gardens as well as that of the common land, Alexander and the families had to arrive at a compromise. Alexander had to strive to create positive private spaces, while at the same time such an effort had to shape the common land well. This reconciliation of public and private spaces of the site was an interrelated and a continual activity and was easier said than done. The private gardens that resulted were not always of a positive character, and the common land, too, did not turn out to have as much spatial character that Alexander had hoped to achieve. In the end, Alexander

(1985, p. 147) acknowledges this fact and mentions that the positive character of the open spaces in this cluster had been compromised.

Comparison and Contrasts in the Layouts of New Gourna and Mexicali

Having reviewed the overall layouts of New Gourna and Mexicali, we encounter various similarities and differences between the two. In terms of scale, we find that New Gourna, on the one hand, had to deal with the layout of residential, religious and other public amenities, while Mexicali had to deal only with the layout of houses (and also a builder's yard, which will be discussed in the next chapter). Here, this enormous difference in the scale of these two projects becomes explicit.

We also find a significant difference in how Fathy and Alexander approached the layout of the whole site. Fathy's approach was that of an empathetic insider; he wished to emulate the social and cultural background of the Gournii with the ultimate aim of making them feel at home in New Gourna. In other words, Fathy relied on the values and lifeways of the Gournii community as a way to bypass any personal biases that might prejudice his New Gourna design and convert it into a design that would not work well for the Gournii.

At Mexicali, on the other hand, the pattern-language approach to the overall layout was unique and non-traditional in the sense that it was innovative and integrated both traditional and non-traditional ideas. The pattern language provided the conceptual framework for the layout and this effort involved active involvement of the five families.

Though it appears that the families played a role in the layout of the whole at Mexicali, they were not without assistance from Alexander and his design team. Most of the procedures, especially with respect to the layout of the land, were directed by Alexander and the pattern language (more will be said about the construction process in chapter 6). On the other hand, although Fathy wished to involve the Gournii in the design of the layout, this hope did not materialize and hence their participation in terms of the layout can be termed as only indirect.

One important similarity in terms of the New Gourna and Mexicali layouts was the incorporation of courtyards. This accommodation indicates a common motive for both Fathy and Alexander--that of communal living. Not only was the courtyard intended to act as a climatic barrier for heat, but it was also intended to draw people together, especially at the level of the community. Thus, this aspect of an open space serving both a functional and social end was incorporated by both Fathy and Alexander in their layouts.

LAYOUT OF INDIVIDUAL HOUSES

Having reviewed the layout of the whole at New Gourna and Mexicali, we now move to a discussion of the layout of the individual houses. In this discussion, I will present a detailed analysis of the layout of one typical house at New Gourna, since there was minimal variation among the plans of houses that Fathy proposed for the village. On the other hand, for the Mexicali project, I will discuss each of the five houses in detail, since the layout of each was unique as outlined by the families themselves.

Layout of Houses at New Gourna

As we already know, there is a vast difference in scale in terms of the number of houses in the two projects. Fathy had to design some 900 houses at New Gourna while Alexander was originally responsible for only thirty houses at Mexicali. This difference automatically brings out an important issue—the time allotted to the design of each house. Although New Gourna involved some thirty times as many houses as at Mexicali. Fathy tried his best to tailor each house to meet the needs of the Gournii just as Alexander did at Mexicali. This similarity in approach will become explicit in the discussion that follows.

At New Gourna, Fathy designed the layout of the individual houses, emphasizing the social and spatial needs of the Gournii. In order to tailor the houses to these needs, Fathy, at the very beginning of the project, built some twenty experimental houses by the khan—the crafts center. Fathy did this so that he could "observe" the Gournii live in them and see how the houses "fitted" the Gournii's daily routines. Based on this observation, Fathy believed that he would be able to make the necessary changes to tailor these houses exactly to meet the Gournii's needs. Though this experiment was not successful because the Gournii refused to move into the new houses, Fathy's attempt again highlights the empathetic insider approach adopted that he adopted. This approach gains increased importance in wake of the fact that, even in spite of reluctance on the part of the Gournii, Fathy deemed it necessary to consult them before he laid out the houses in full.

According to Fathy, the peasant's life was very much dependent upon one or two cows and an acre or so of land (1973, p. 92). In Fathy's words, "there are hens running in and out among the dust and babies, there are even cows inside the house itself, so that it looks more like a barn with some people putting up with it than a real family home." Fathy recognized that, besides accommodating the family members, a peasant house also had to accommodate a large variety of bulky stores, including cattle, fodder and fuel. Hence, Fathy learned through observation that he had to cater generously to storage space and cattle sheds at New Gourna. Immediately, Fathy realized that allocating sufficient space to these services in over 900 houses would consume substantial space and, in order to accommodate all these uses within the dimensional restrictions of the site, Fathy decided that every New Gourna house would have to be two-storied. From his study of existing peasant houses, Fathy learned what to do and, more importantly, what not to do. For example, Fathy learned that it was important and functional to group the household services of cooking washing and latrines around a central courtyard. At the same time, he also learned not to store flammable crops and fodder on the rooftops of closely packed houses, since in Old Gourna there had often been fires caused by carelessness.

In order to have a better understanding of how Fathy tailored the individual houses to meet the actual needs of the Gournii, it is useful to look at the layout of a typical peasant house at New Gourna as shown in figure 5.8. The plan indicates a compact layout of functions around a central courtyard. Although most of the house dimensions were very much determined by the distances of brick-dome spans (ten to twelve feet), Fathy tried to utilize each and every corner of the house. Located besides the entrance, to its east, was

an outdoor, partly covered, sitting area called the *mastaba*. The entrance itself led one to a central, open courtyard, which, as noted above, was the central organizing feature of the house design. Beyond the courtyard, to its south, was a narrow passage that led to two ground-floor bedrooms. Fathy derived the layout of bedrooms from the layout of the central *qa'a* of old Arab houses—a square domed room with vaulted alcoves off its sides containing built-in seats (Fathy, 1973, p. 95).

GROUND FLOOR PLAN

FIRST FLOOR PLAN
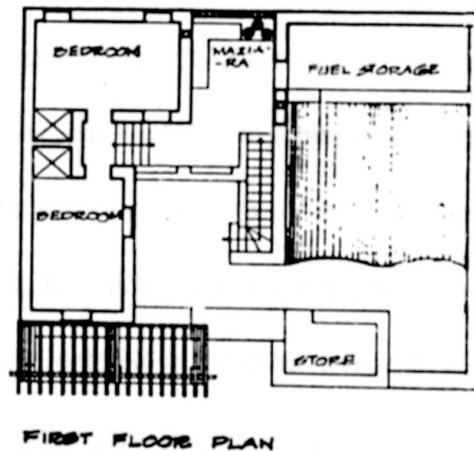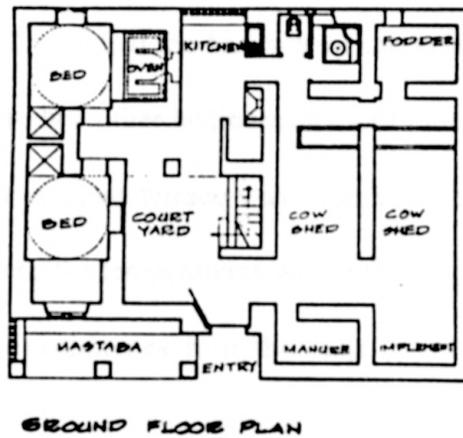
Figure 5.8: Plans of a peasant house at New Gourna (Fathy, 1973, figure 106)

A closer look at the bedroom immediately adjoining the courtyard shows how Fathy adapted the layout of the *qa'a* to suit the peasants' needs at New Gourna. The vaulted alcove, or *iwan*, contained a built-in bed with room for storage below. This space also had a scorpion trough to baffle these insects if they tried to climb up to the sleeping level. Located opposite this bed alcove was another small vault over a cupboard--a tidy replacement for the usual rope on which the peasant hung his clothes. By this arrangement, Fathy intended to keep the central area of the room free of furniture, thereby giving a sense of space and dignity to the room (Fathy, 1973, p. 96). The second bedroom opposite this bedroom had the backside of the kitchen-oven to warm the room during winters. There were two other bedrooms located on the upper floor of the typical New Gourna house. The outdoor terrace was used as an effective, cool sleeping area during summer nights, since the temperatures within the house were quite high at nights, due to the re-radiation of day-time heat from the walls.

Adjoining the ground-floor bedroom was a kitchen, which Fathy designed for the peasant way of preparing food. The peasant woman usually resorted to a squatting position while cooking, and Fathy designed the fireplace accordingly, at a height of some twelve inches above the ground. The fire was enclosed in a permanent grate, with a fire brick grid for the pans and a large hood and flue above to collect and dispose the fumes. To the south of the fireplace was a sink, to which water was supplied by a pipe from large water jars in the roof. The kitchen area catered to the other living areas, while the other half of the house was mainly filled with bathroom and animal facilities. The latrine and the laundry pit occupied an end of the house accessed both from the animal service area as well as

from the kitchen. Fathy had designed the laundry pit to accommodate both washing and bathing activities. Beyond the laundry was a room to store fodder for cattle. The remaining area of the house was occupied by the cow sheds and a manure pit. The plan clearly shows that the cowsheds occupy nearly as much area as the rest of the house, indicating their importance in a peasant's life.

Thus, with a basic understanding of the peasants' way of life, Fathy went about the design and layout of the individual houses. Though the overall layout of all the houses was more or less similar, they were not identical. The shape, form and location of functions varied from house to house, depending upon its relative location in the overall layout of the village. The significance of these houses arose from the fact that every space within the house was modified by Fathy, so as to either continue or better existing living patterns of the Gournii. By incorporating a modified layout for each specific family and house, Fathy expected to be able to cater to the actual needs of the Gournii rather than providing them with stereotypical and less functional room layouts.

Layout of Houses at Mexicali

Unlike at New Gourna, where the layout of the individual houses was guided more by Fathy's generalized understanding of the Gournii's needs, the layout of individual houses at Mexicali was governed by Alexander's pattern language and the actual needs of the five specific families. Just like Alexander and the families used the twenty-seven patterns for the neighborhood layout as a whole (as shown in figure 5.3 earlier), so they also used a set of twenty-one patterns for laying out the individual houses, as shown in

table 5.4. Again, as with the patterns used for the common land, these patterns were largely established by Alexander and his design team before the actual designing and construction began. Thus, the five families, guided by the pattern language and the design team, laid out their individual houses on the basis of patterns identified not by them but by Alexander's knowledge as an architect.

Table 5.4: Patterns used for the layout of individual houses at Mexicali (Alexander *et al*, 1985, pp. 175-176)

1.	Main entrance
2.	Northeast open space
3.	Positive open space
4.	Long thin house
5.	Half-hidden garden
6.	Common areas at the heart
7.	Intimacy gradient
8.	Front porch
9.	Farmhouse kitchen
10.	Couple's realm
11.	Children's realm
12.	Back porch
13.	Sequence of sitting spaces
14.	Bed alcoves
15.	Bathing room
16.	The shape of indoor space
17.	Light on two sides of every room
18.	Closets between rooms
19.	Structure follows social spaces
20.	Columns at the corners
21.	Natural doors and windows

These twenty-one patterns were thought by Alexander and his design team to be instrumental in tailoring the five houses to the exact needs of the families that were to occupy them. One concludes from the table that the patterns selected for the layout of the individual houses were not just restricted to the development of the houses but also involves spaces both within and outside. One also notes that just as tables 5.1 and 5.3

(discussed earlier) indicated a hierarchy, so the patterns in table 5.4 also display a similar hierarchy. Thus, the first patterns like MAIN ENTRANCE and NORTHEAST OPEN SPACE deal with the layout of the spaces around the houses, while the following patterns like COUPLE'S REALM and CHILDREN'S REALM help in the development of the individual rooms of the houses. Finally, the final patterns like COLUMNS AT THE CORNERS and NATURAL DOORS AND WINDOWS helped in the working out the details of the individual houses.

As we have already discussed in chapter 4, the constitution of each of the five families at Mexicali was different. While the Cosio family consisted of ten children, the Durans had a single child. Moreover, as we have also seen earlier, the economic structure of each of these five families also varied. Hence the spatial requirements of each of these families were quite different and they were given an opportunity to express their dwelling requirements at this stage. Given the restrictions of the area allowed for each house, the families were free to decide the number of rooms and their relative functions. Hence this laying out procedure involved an element of flexibility. On the other hand, it is important to remember that, though the families had a say in deciding the number and sizes of rooms, the dwellings' overall layout was guided mostly by Alexander's patterns, especially LONG THIN ROOMS and INTIMACY GRADIENT.

In order to have a better understanding of the layout of the individual houses and evaluate how each house was arranged to meet the specific needs of each family, it is useful to discuss the layout of each house. This discussion will make explicit the extent to which

the pattern language approach of designing houses was instrumental in tailoring houses to meet the exact spatial and locational needs of each family.

We begin with the floor plan of the Tapia house, shown in figure 5.9. This house occupied the southwest corner of the site, in a corner location removed from the common space, since the Tapias preferred to live in privacy. Their house was the most elongated in form of the five dwellings, with the entrance placed at one end and the main bedroom at the other, giving the house considerable privacy. The entry porch helped form the entrance to the cluster from the south. Located adjacent to the living room was the kitchen, the alcove next to which was a room for Tapia's brother. Beyond this alcove were located the bedrooms and the service areas. The elongated form of the house was useful in forming a well-shaped private garden that touches the rooms of the house.
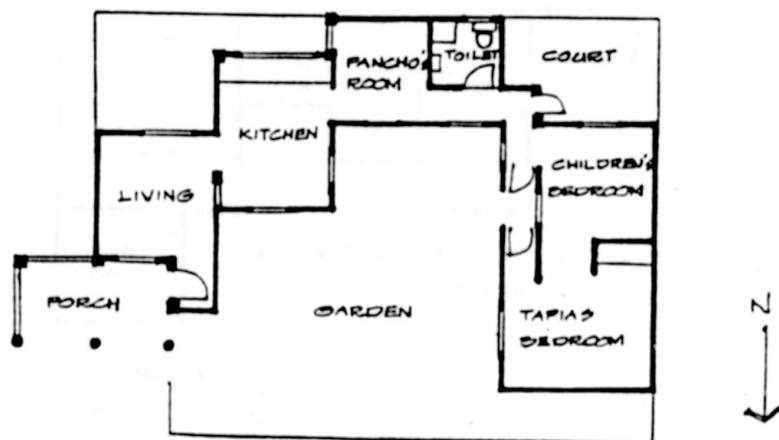
Figure 5.9: Layout of the Tapias house at Mexicali (as drawn by author from Alexander *et al*, 1985, p. 169)

Adjacent to the Tapia house, to the north was the Cosio house. The floor plan of figure 5.10 shows the layout of the Cosio house, which was the biggest house in the cluster. This house consisted of a big family room, roofed by the largest dome in the entire cluster. The entrance porch to this house faced the common land and was approached by the secondary entrances to the cluster from the north and south. The rest of the house was divided into a series of alcoves to accommodate Mrs. Cosio's ten children. Mrs. Cosio's bedroom was placed at the end of the house with a workshop space outside it, where she hoped in the future to make clothes and prepare vegetables for sale. Mrs. Cosio's private garden was located in the space between her house and the arcade that connected her house to the house of the Rodriguez family. Due to the fact that Mrs. Cosio's enthusiasm and involvement decreased as the project proceeded, her house was the least well finished of the five, according to Alexander.
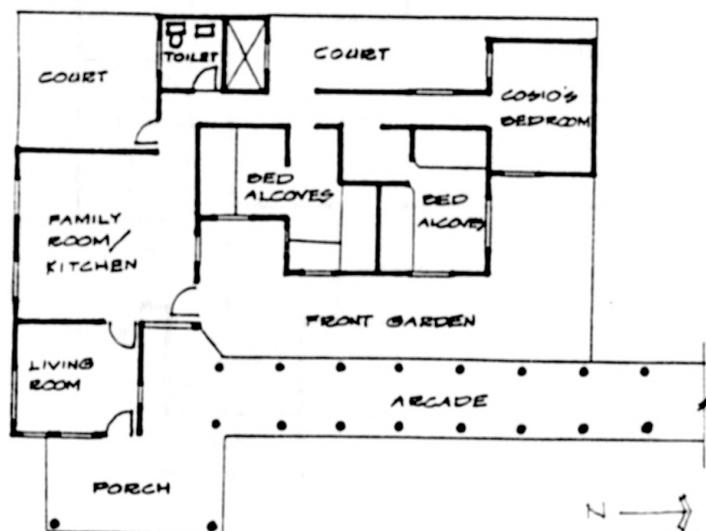
Figure 5.10: Layout of the Cosios house at Mexicali (as drawn by author from Alexander *et al*, 1985, p. 170)

Next, we move on to the layout of the Rodriguez house (figure 5.11), which occupied the northwest corner of the cluster, to the north of Cosios house. Rodriguez was a very enthusiastic and an outgoing person. The entrance porch was located to the east of the house and helped form the secondary entrance to the cluster from the north. This house was divided distinctly into public and private areas, with the living, dining and the porch areas forming the public part, while the kitchen and the two bedrooms formed the private part of the house. In this house, as we can see, importance was given to the public part of the house, in accordance with the outgoing personality of Rodriguez. The private garden for this house was located to the north of the house, adjoining the bedrooms.
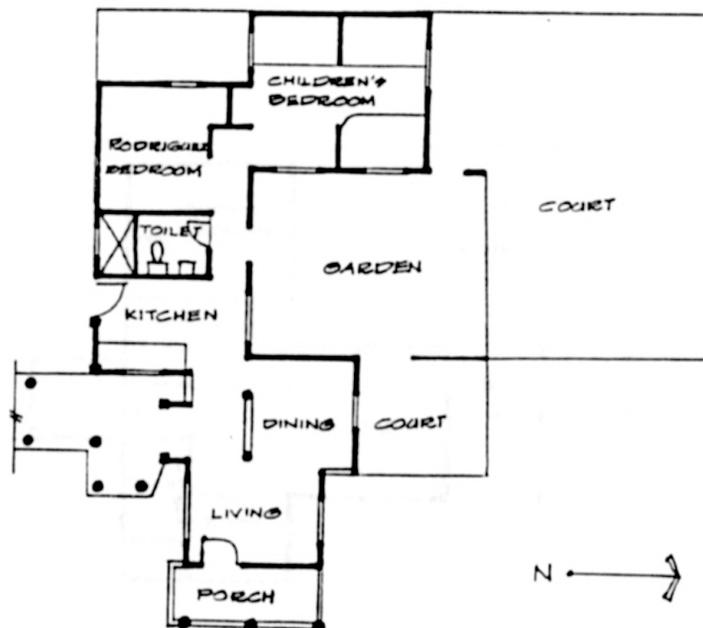
Figure 5.11: Layout of the Rodriguez house at Mexicali (as drawn by author from Alexander *et al*, 1985, p. 171)

To the east of the Rodriguez house was the Duran house, as shown in the floor plan of figure 5.12. This house occupied the northeast corner of the site and was the smallest of the five houses in the cluster. This house was shaped like a cross and consisted of a family room, next to the entrance facing the common land. Adjoining the living room was a kitchen and the service areas. Located opposite the kitchen, was an alcove for the Durans' only daughter, who was the center of their life. Next to this alcove was a bedroom. Duran, a barber, wished to build a barbershop in the future, and hence he and his wife were saving money by building a small house, at least for the time being. Their private garden was located on the northeast corner of their house, next to their bedroom.
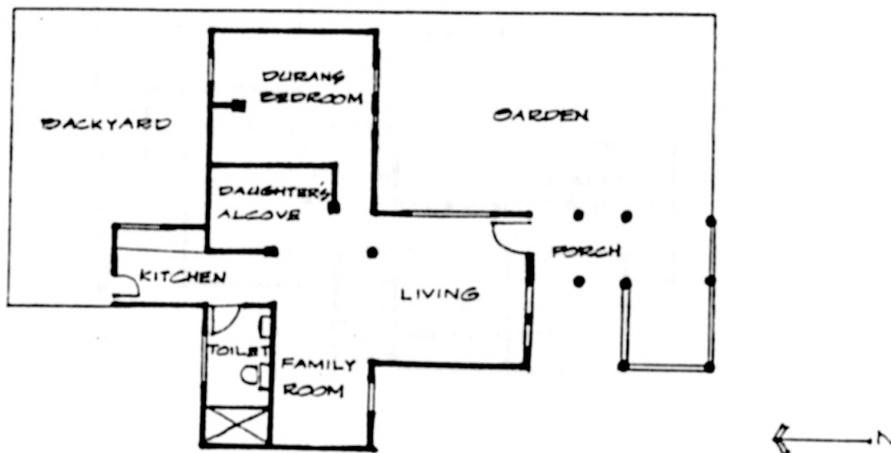
Figure 5.12: Layout of the Durans house at Mexicali (as drawn by author from Alexander et al, 1985, p. 167)

Adjoining the Durans' house to its south was the house of the Reyes family. Their entrance porch faced the Durans house and was accessed by the main entrance to the cluster from the east. The house was the center of the cluster, and this suited the friendly nature of Makaria. As figure 5.13 illustrates, the kitchen was located next to the entrance and this arrangement was very convenient to welcome people into her home and entertain them. Three bedrooms were located beyond the kitchen and the service areas. As we can also see from the floor plan, the three bedrooms were more prominent than the living and kitchen areas. The house's private garden was located adjacent to the couples' bedroom, facing east. According to Alexander, this house was the best finished of all the houses in the cluster.
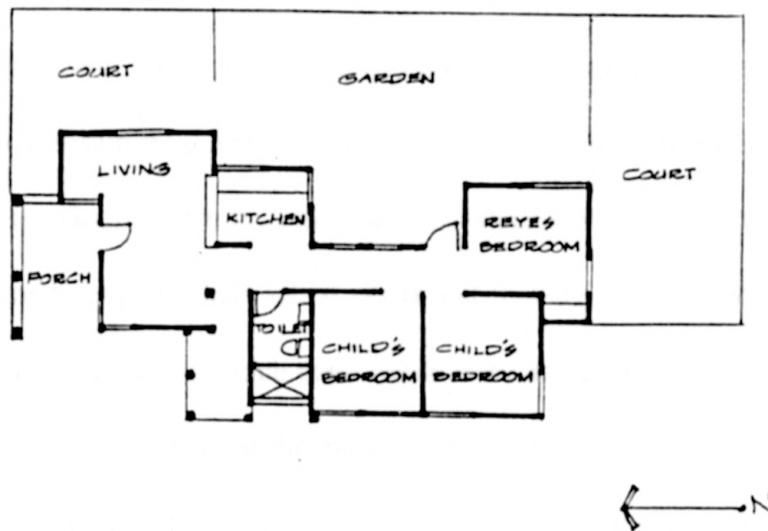

Figure 5.13: Layout of the Reyes house at Mexicali (as drawn by author from Alexander *et al*, 1985, p. 173)

A look at the layout of the five houses, as illustrated by figures 5.9 to 5.13, clearly indicates the manner in which each house was designed and built to meet the specific requirements of each family. Thus, the Cosios house consisted of a series of alcoves to accommodate the ten children, an accomplishment which might not have been possible in a usual rectilinear arrangement. We also see that, while importance was given to the public domain of the Rodriguez house (living and dining), importance was laid on the private domain for the Reyes house (bedrooms). These specific accommodations may not have been feasible had Alexander resorted to a prototypical house. Such a uniform method would have undermined the central aim of the pattern language approach—to create a humanly-scaled environment specific to the needs of each family.

Comparing and Contrasting the Individual Houses of New Gourna and Mexicali

From the above discussion, we find a common thread running between the two approaches: the wish to tailor housing to the actual needs of the end-users. In Fathy's case, he had to ascertain these very needs by exercising his judgement based on in-depth observation of the Gournii. On the other hand, in Alexander's method, the families were given the chance to express their actual needs and thereby be involved in the planning phase. However, the extent to which these needs were actualized varied—a fact that will be discussed in chapter 6. One of the most striking difference in Fathy and Alexander's approach to the layout of individual houses was that Fathy's approach was more conventional and based on detailed drawings that he prepared, while Alexander's method was more intuitive and called for much understanding of the pattern language and actual

visualization on site. More will be said about these differences of approaches in the next chapter on direction.

LOOKING AHEAD

Thus, the discussion of the instrument of New Gourna and Mexicali has been helpful in bringing to light the similarities and differences involved in the programming and designing phase of the two projects. The discussion also made explicit the extent to which the two approaches--Fathy's empathetic insider approach and Alexander's pattern language approach—were instrumental in tailoring New Gourna and Mexicali, to meet the everyday needs of the end-users. However, we realize that the end of the programming phase is certainly not the end of the project and hence we need to move on to the next stage of the two projects—their implementation. The significance of Fathy and Alexander's approaches can be judged only after we consider the execution of their respective programs and designs. The extent to which these approaches were practical and the feasibility of such approaches within the current framework of mass-production need to be discussed in order to gain an overall picture of the relative success of the two projects. This process of implementation is the topic of the next chapter—direction.

CHAPTER 6

THE DIRECTION OF NEW GOURNA AND MEXICALI

Having discussed the instruments of New Gourna and Mexicali in the previous chapter, it is clear that, while Fathy was guided by an empathetic insider approach to design at New Gourna, Alexander was governed by a pattern language approach to design at Mexicali. We next must ask how the programs and designs for the two projects were actualized on site--i.e., the methods of implementation. This focus is represented by the third source of the tetrad—the direction.

Direction, as we have seen in chapter 3, is the force that guides the instrument--the source that motivates the process and guides it to completion. While the instrument was defined as the knowledge and point of view required for actualizing the goal, direction is the means to operationalize and implement the specific process in the real world. This third source works to bridge the gap between theory and practice. In the present instance, direction relates to the participants in the design process and the way in which they work towards completion of the two housing experiments. In this sense, direction deals with the architect, the client, the end-users and the various contracting agencies responsible for construction and their interrelationships.

At New Gourna, the core of the implementation process was the cooperation between the architect, the Gournii and the craftsmen--the *trinity*, as Fathy calls it. Fathy believed that the responsibility of each of these personnel was equally important and that it was necessary for each to render his or her expertise in the activity of design and construction.

Not only was such a system intended to encourage the development of design and building craft, but it also involved a vision of bringing people together by the act of construction. In a similar way, at Mexicali, an active dialogue between the architect-builder and the Mexican families formed the basis of the implementation process.

In order to understand the process of implementation of New Gourna and Mexicali, it is important to identify themes that underlie the stages in which implementation took place. Here, I identify three such themes which will be used to clarify and evaluate the practical implementation of the New Gourna and Mexicali projects. These three themes are:

(1) framework for implementation;

(2) phases of implementation;

(3) controlling costs of implementation.

We now consider each of these three themes in turn, with the discussion of the New Gourna project first, followed by the Mexicali project.

FRAMEWORK FOR IMPLEMENTATION

At New Gourna, Fathy's framework for implementation centered around a close working relationship between the architect (Fathy), the end-users (the Gournii) and the craftsmen—the *trinity* (Fathy, 1973, p. 39). Fathy believed that in order to create successful housing environments, the contribution of each of these three participants was important and it was their active cooperation that would make a project successful. This aspect of cooperation also formed the basis of Alexander's framework for implementation at Mexicali. However, for Alexander, this framework centered around a

dialogue between the architect-builder (Alexander and his design team) and the end-users (the five Mexican families). The following discussion brings out the features of both Fathy's trinity and Alexander's dialogue, with the discussion of Fathy's trinity first followed by Alexander's dialogue.

Fathy's Trinity—Architect, Craftsmen and Users

Fathy (1973, p. 40) writes that "client, architect and craftsman, each in his province, must make decisions and if any one of them abdicates his responsibility, the design will suffer and the role of architecture in the cultural growth and development of the whole people will be diminished." With regard to the involvement of his users--the Gournii--we have already seen in chapter 5 that Fathy tried to empathetically understand the actual housing needs of the Gournii at the designing stage. Anticipating the difficulty to get the Gournii to take a constructive part in the planning of their houses, Fathy built some twenty houses in the early stages of the project, to show them the kind of architecture proposed by him as well as to "consult" them by seeing their needs in practice (Fathy, 1973, p. 40). This effort clearly indicates the importance that Fathy attached to the input of his end-users, for he believed that the contribution that his clients made to his design—however ignorant or suspicious they may be—was something that he could not do without (ibid.).

The second component of Fathy's trinity was the craftsmen, and to a certain extent, he was able to get them to play an active role in the construction process. Fathy, as we already know, made all possible efforts to revitalize the crafts industry, and he knew that one effective way of accomplishing this aim was to reestablish the craftsman's

significance in the construction industry. He believed that one of the greatest advantages of returning the craftsmen as an active participant in the building process was that the architect would be relieved of the work that he had unnecessarily taken over from the craftsmen (Fathy, 1973, p. 39). Fathy was of the opinion that masons and carpenters, being experts in their fields, were in a better position to work out specific construction details with a minimum of supervision. In order for a full-blown system of craftsmanship to exist, however, it was first important to reestablish a confidence in their craft, which many of these craftsmen had long since lost (Fathy, 1973, p. 43).

Fathy realized that one way to reestablish this confidence and to maintain its continuity was to establish permanent training centers for crafts wherein expert masons and other craftsmen would train local peasants to do their own construction and thus become craftsmen in turn. The crafts khan and the crafts school that Fathy planned at New Gourna were to function as a training center for the development of practical crafts like brick-making and masonry as well as more artistic traditions like pottery, basketry, silversmithy and textiles. By trying to establish a training system for craftsmen, wherein the peasants would be provided in-service training, Fathy was not only trying to bring back the craftsman as an important component of the building industry, but also, more importantly, he was making an effort to place New Gourna on a self-supportive and firm economic footing. The continuity of such a system is evident from the fact that forty-six masons who were trained at New Gourna (some of them Gournii) continued to render their expertise to the Gourna region, years after they had acquired their skills.

Fathy describes specific examples at New Gourna wherein he tried to reestablish the confidence of the craftsmen (Fathy, 1973, p. 35). For example, when the New Gourna project reached a stage when doors had to be fitted to the buildings, Fathy asked his carpenter, who was trained in Cairo, to make traditional *sabras* doors—wooden doors constructed by nailing together small boards in original pattern (ibid., p. 233). When he refused, Fathy approached a local village carpenter and encouraged him to make these doors, besides challenging him to make each one different, which he finally did. Fathy (1973, p. 35) mentions that "once he was forced back to the native tradition, he too grew enthusiastic about it and before long, was producing the most ingenious and beautiful patterns, the best of which is the great door of the mosque" (see figure 6.1). Similarly, Fathy adopted the same approach with the masons, encouraging them to improve and extend their traditional skills. For example, Fathy asked the masons to fill in the windows of the market building with different patterns of *claustra*—moldings and tracery in mud used to decorate doors and windows (ibid., p. 232). Accordingly, as seen in figure 6.2, the result was a more interesting facade than what would have resulted by the use of standardized screens.

Thus, we find that at New Gourna, Fathy made every possible attempt to involve the Gournii and the craftsmen in an active process of dialogue and creation with the architect. Though this effort was not successful in terms of Gournii participation, Fathy's approach can be said to have been partly workable because it did actively involve the craftsmen. In spite of this success, however, Fathy was still regularly responsible for most major implementation decisions and the craftsmen appear to have required his regular

supervision. Thus, the full involvement he had hoped to have as a dialogue among designer, builders and users was never satisfactorily actualized.

Figure 6.1: *Sabras* door of the mosque at New Gourna (Fathy, 1973, figure 30)
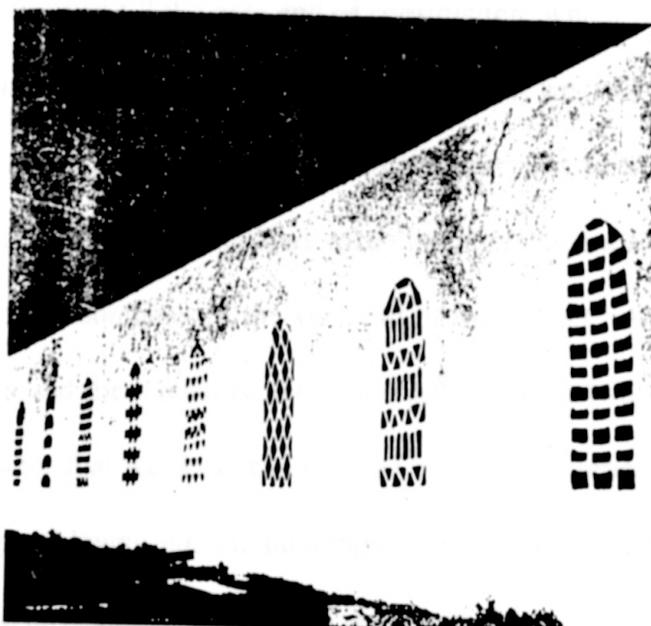
Figure 6.2: *Claustra* work at the market place in New Gourna (Fathy, 1973, figure 36)

Alexander's Dialogue—Architect-Builder and End-Users

At Mexicali, on the other hand, the framework for implementation centered around a dialogue between the architect-builder (Alexander and his design team) and his end-users (the five Mexican families). At the very beginning of the project, once the five families were selected to participate in this self-help housing experiment, they were introduced to Alexander and his design team. From then on, the families met with Alexander and his design team on site and held a series of discussions, both for the purpose of understanding as well as for arriving at decisions. We have already discussed in chapter 5 to how the five families were introduced to the pattern language, and thereafter, how they collectively applied the pattern language approach to the layout of the common land and the individual houses. Hence, it becomes clear that this active dialogue between Alexander the five families began much before the actual implementation phase.

This dialogue continued till the very end of construction, which was again undertaken in a collective manner, following a series of steps that we will discuss shortly. For Alexander, it was crucial that this dialogue not be terminated at the end of the design stage, after which, usually, the builders take charge of the construction. For him, this active dialogue must continue till the very end of the project. As he explains (1985, p. 72), "the warmth and the humanity, the subtle differences between family to family, the individual character that we seek, can only be created in a process where the architect, who is in charge of laying out the buildings, is also actively and humanly involved in making them and physically shaping them along with the users."

Framework for Implementation: Comparisons and Contrasts

Thus, we find that, while Fathy's framework for implementation revolved theoretically around the establishment of the significance of the *trinity*, Alexander's framework centered around a continuous dialogue between the designer and the end-users of design. We see here an important contrast in the two ways of implementation—differences in the domain of expertise. Fathy, on the one hand, called for a distribution of expertise based on the skills of the craftsmen. He believed that they had a right to exercise their decisions in their domain. Contrary to this, Alexander tried to enlarge the responsibilities of the architect-builder, creating a new type of professional who would be in charge of both designing and construction—the roles of an architect and a builder combined into one.

Another difference between the two projects relates to participation in the phases of construction. At New Gourna, the participation of the Gournii was only indirect in the design phase (i.e., Fathy studied Old Gourna and used his observation to plan New Gourna) and there was no participation on the part of the Gournii during the construction phase. It is true that Fathy's craftsmen were involved during the construction phase but, ultimately, Fathy was left to direct most of the actual construction himself. In this sense, Fathy's trinity never fully materialized in the New Gourna experiment. On the other hand, at Mexicali, though there was an active dialogue between Alexander and the five families throughout the designing and the construction phases, it appears that Alexander and his knowledge of the pattern language were more in control of the design. However, at the construction phase, the active participation of the families was significant, thereby bringing out the importance of collaboration in the construction effort. In this sense, at

111

least during the building phase, Alexander was able to facilitate interaction among himself, his construction team and the five families.

PHASES OF IMPLEMENTATION AT NEW GOURNA AND MEXICALI

Having discussed the implementation of both projects in broad terms, we next consider how this framework was actualized on site. The following discussion will make explicit the extent to which the two frameworks—Fathy's trinity and Alexander's dialogue with users--were practically transformed into actual built environments. At New Gourna, the implementation phase took place in three seasons that began in August 1945 and ended in 1948. Fathy was responsible for the entire implementation, coordinating between the supplies of materials from the government on the one hand, and the supply of skilled and unskilled laborers on the other. At Mexicali, the implementation phase began in December 1975 and the five houses were finished by December 1976. The construction time lines for New Gourna and Mexicali are presented in tables 6.1 and 6.2 respectively, which also indicate the buildings constructed in each phase of implementation. A look at the two tables immediately brings to light the difference in the time period involved in the two projects. While it took Fathy some three years to complete the construction of some 100 houses and seven public buildings (approximately 19000 square meters), it took Alexander a year and four months to construct a builder's yard and the five houses (approximately 500 square meters). This difference immediately suggests that the time required per square meter of construction was much more at Mexicali than at New Gourna, even though Mexicali involved the construction of a far fewer number of

buildings. The reasons for such a difference become clear as we move ahead with the review of the details of the phases of implementation at New Gourna and Mexicali.

Table 6.1: Time table of implementation at New Gourna

PHASE	PERIOD	WORK COMPLETED
First season	August 1945-May 1946	-experimental row of twenty houses -mosque foundations laid
Second season	October 1946-January 1947	-several public buildings including a crafts khan and a major part of the market place -mosque foundations relaid
Third season	September 1947-May 1948	-eighty houses -several public buildings including a boys' primary school, a crafts school, a village hall, and a theater

Table 6.2: Time table for Mexicali

PHASE	PERIOD	WORK COMPLETED
First phase	August 1975-December 1975	Creation of pattern language and layout of overall site
Second phase	December 1975-March 1976	builder's yard
Third phase	March 1976-December 1976	Five houses of first cluster

Implementation at New Gourna

As we have already seen in table 6.1, the actual construction at New Gourna progressed in three seasons. Unlike Mexicali, where the families were engaged in construction and thus had to learn a step-by-step building procedure, Fathy largely directed the construction at New Gourna and was in control of most construction decisions. Coordinating materials and labor, Fathy began construction in the first season of building that lasted from August 1945 to May 1946. Since the entire village was to be constructed from mud bricks, Fathy realized that it was important to have a steady constant supply of mud bricks, so as to maintain a progress in construction. Hence, at the beginning of the first season, he had engaged twenty-five, four-man teams of brick makers who manufactured some 75000 bricks each day to keep the construction going on at a steady pace. Fathy built some twenty experimental houses during this first season so as to inform the Gournii about the kind of architecture that he was proposing, even though they claimed no interest in New Gourna. Fathy used the first of these houses as a field office on site. Also during the first season, the foundations of the mosque were laid out.

In December 1945, during the first season, the government stopped the straw supply, and Fathy was forced to cut the number of brick-making teams from twenty-five to eight. Since straw was a main ingredient of the bricks, its supply was necessary to maintain steady manufacture. Moreover, the government gave Fathy only one lorry to transport quarried stone; his repeated requests for more lorries fell on deaf ears in the Department of Antiquities. As a result, Fathy was also forced to lay off several masons in the first season, retaining only the skilled ones from Aswan. Fathy still tried to keep the brick

making viable by purchasing straw in small quantities from nearby villages, using a small contingency fund provided by the government. Unfortunately, this account provided only twenty Egyptian pounds at a time (approximately six American dollars) and hence was regularly exhausted. Fathy's use of this fund was seen by hostile government bureaucrats as an attempt to misuse funds, leading to their attempts to stall the project. However, the under-Secretary in charge of construction refused to believe these accusations and the project continued to the end of the first season.

In the second season, which began in October 1946, Fathy built most of the market place, completed the khan and redug the foundations of the mosque, which had not been correctly oriented towards Mecca. In November, the government officials informed Fathy that of the 15,000 Egyptian pounds (approximately 4,500 American dollars) allotted for the second season, only some 7,000 Egyptian pounds (approximately 2,000 American dollars) remained in the account. This amount was sufficient for Fathy to carry on with the project till June 1947, with estimated monthly expenses around 1,000 Egyptian pounds (approximately 300 American dollars). However, when the government notified Fathy in December that only some 1,500 Egyptian pounds (approximately 450 American dollars) were left in the account, he could not proceed with the construction due to lack of funding. Finally in January 1947, when the government stopped further funding, Fathy had to stop work at New Gourna completely.

During the third season (1947-48), Fathy managed to complete several houses and also the boys' primary school, the village hall and the theater. In September 1947, however,

the dike that adjoined the village site was sabotaged and hence, the entire village of New Gourna was flooded. Fathy resorted to pumps to drain the water and to let the buildings dry. All these obstacles increased day by day and Fathy found it more and more difficult to keep the progress going. Fathy (1973, p. 137) explains that he was in an unhappy in-between situation, neither properly of the government, nor of the village, hence he suffered from both sides. He even made several attempts to transfer the project to some government department other than the Department of Antiquities which handled the New Gourna project. In spite of all these attempts, continued and severe opposition brought the project finally to a standstill. Thus, after nearly three years of construction, only about hundred houses besides the mosque, the boys' primary school, the crafts school, the khan, the market place, the village hall and the theater were completed—roughly a fifth of the area originally intended by Fathy.

Implementation at Mexicali

In contrast to New Gourna, the phases of implementation at Mexicali were substantially different, bringing to light the uniqueness of the pattern language approach to design and construction. The pattern language approach to construction was given shape by Alexander's concepts of the builder's yard and principles of step-by-step construction. Hence, the first step in the design and construction phase was the construction of the builder's yard, which was to function as a living, physical example of the kind of architecture which the families would also build. This phase was followed by the step-by-step construction phase in which each family constructed their own house by themselves, having mastered the step-by-step construction procedure outlined by

Alexander and his design team. Thus, we find that at Mexicali, in order to discuss the phases of implementation, it is important to examine the builder's yard first, followed by the step-by-step construction process that the five families mastered at each stage in construction. We begin by presenting Alexander's construction of the builder's yard.

The Builder's Yard

At Mexicali, the first step in construction was making the builder's yard—a physical and social center of activity upon which building experimentation and construction revolved. The building details worked out in the builder's yard and the patterns embodied in it were to be drawn upon by the families in their houses. In effect, the builder's yard was a concrete example around which the families might organize the dreams of a home. According to Alexander, the builder's yard was the physical and the spiritual starting point for the whole process, and it remained so throughout (Alexander, 1985, p. 112).

Alexander envisioned the builder's yard as assuming a continuing role in the development of the Mexicali neighborhood. This yard was designed not only to serve the construction needs of a single project. Rather, its presence was to provide a continuing relationship with a growing community. In addition, the builder's yard was expected to take on new roles once the construction activity was over—e.g., a place of expertise where families could get practical help; a community center for recreation activities; and a center for cooperative industry. In this sense, the continuing vitality of the builder's yard would stem from the fact that it continued to remain a neighborhood center, serving an important social role.

As shown in the plan of figure 6.3, the builder's yard was organized around two courtyards, the larger of which was surrounded by a tool shed, open loggia, taco stand and stairs that led to the second floor of a main gateway. A fountain occupied the center of this courtyard—a concept similar to the central fountain in the common land. Around the second, more private courtyard were an arcade surrounding a central garden, workshops and staff living quarters.
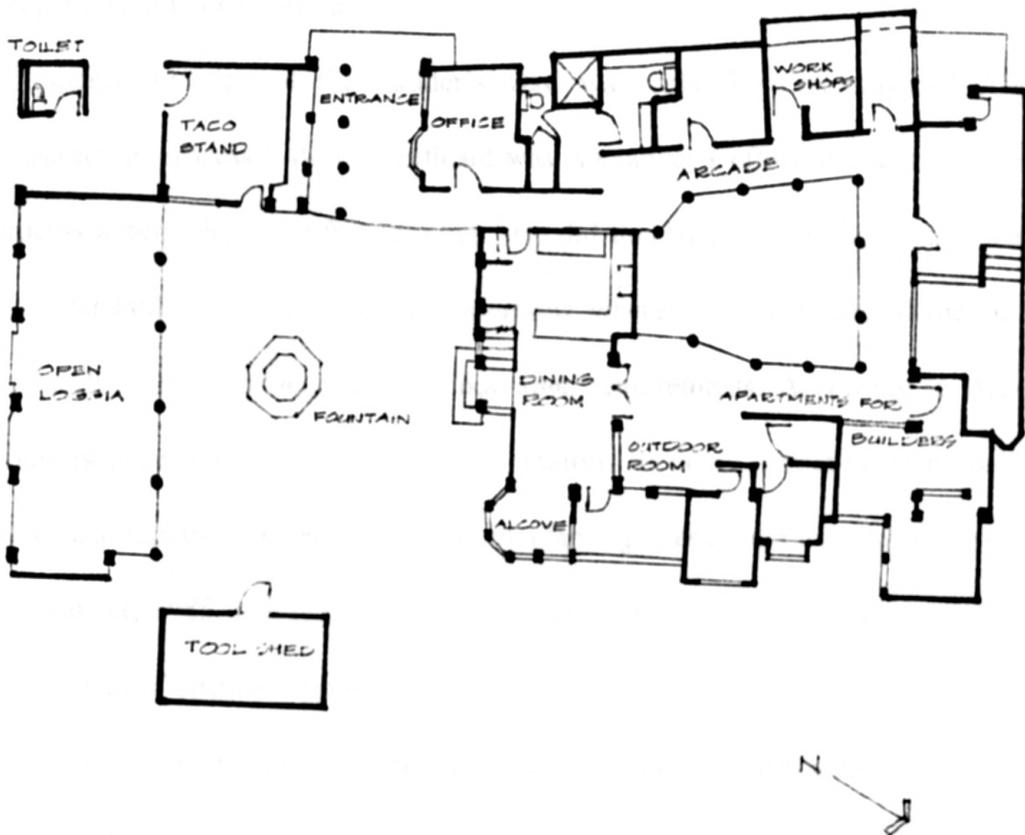
Figure 6.3: Layout of the Builders Yard at Mexicali (as drawn by author from Alexander *et al*, 1985, pp. 108-109)

For Alexander, the builder's yard was a crucial step in the construction process, since it provided a place where the families would gain a sense of the entire building process as well as a picture of what the actual houses would look like. This phase proved to be instrumental in introducing the families to Alexander's pattern language, which laid emphasis on human dignity and needs. With the design and construction of the builder's yard, Alexander and the design team created a situation that prepared the families for their personal participation in the actual building process.

Step-by-step Construction

Ultimately, creation of the builder's yard was only the first stage of Alexander's construction process. More significant was Alexander's effort to make the construction process accessible to the five families. He did this by creating a system in which what was standard were the building *operations* wherein the size and shape of building materials could vary according to individual requirements. According to Alexander, a house is an organic system, like a living creature. Its fabric cannot be properly adapted to needs and functions unless the process of adapting goes all the way down to small details (Alexander, 1985, p. 221). Alexander laid down four criteria which were to be met by any system of operation (ibid., p. 224):

(1) The operations do not impose dimensional constraints on the plan of the building; they create parts that are adapted in size to the place where they occur;

(2) The sequence of operations generates the building from a rough layout designed directly on the ground; the resulting construction does not merely fill in the physical reality of a previously detailed design.

(3) The building operations are consistent with the patterns used for the base plan;

(4) Each operation is complete in itself and is felt as a psychological fact of "accomplishment" when it is completed.

We recognize from these criteria that the entire construction phase revolved around a system of building operations, which formed the backbone of Alexander's step-by-step construction process. Hence, at the beginning of the project itself, Alexander and his design team submitted a set of twenty-three building operations (see table 6.3) to the Public Works Department for official approval.

Table 6.3: Building Operations for Mexicali (Alexander *et al*, 1985, p. 234)

1. Lay out stakes
2. Excavate and neutralize soil
3. Place corner stones
4. Place wall foundations
5. Prepare slab
6. Prepare under-slab plumbing
7. Pour slab
8. Erect columns
9. Erect walls between the columns
10. Install door frames
11. Build perimeter beams
12. Weave roof baskets
13. Erect gable ends
14. Install electrical circuits
15. Place roof first coat
16. Place roof top coat
17. Install window frames
18. Build and install windows
19. Build and install doors
20. Install plumbing
21. Install electrical
22. Paint walls, roofs and trim
23. Lay brick floors on walks and arcade floors

Alexander and his building team next instructed the five families in how each of these twenty-three steps were carried out in terms of actual construction. Thereafter, following these steps with the assistance of the design team, the five families constructed their houses. These steps are presented in table 6.3. As the first step of the table indicates, the families began by laying out of stakes to demarcate the boundary of their houses within the common land and then constructed foundations, columns, walls and roofs, and so forth. Thereafter, the process led to details of construction like painting and flooring of arcades. This step-by-step construction phase brought all the families into unison, making explicit the human rhythm of the entire process, which Alexander argues is integral to this method of construction. The families were shaping at all times the built environment in which they were going to live. The families were responsible for making their final decisions and, at every stage, it was *their* home that they were creating. Certain operations like the roof pours involved all the families assembling at one roof. These communal efforts brought people together and were intended to strengthen group values and a collective way of living. In short, the hope was that individual and communal interests would coalesce through this collective process.

Phases of Implementation: Comparisons and Contrasts

Thus, we find that there was a significant difference in the actual building of New Gourna and Mexicali. The New Gourna approach was conventional because it involved distinct designing and construction phases with the construction based almost entirely on detailed drawings prepared by Fathy. On the other hand, we have seen that at Mexicali, no drawings were involved in construction and hence such a system called for strong

visualization capabilities on the part of the design team especially and a full understanding of the system of operations for both the design team and the five families. Therefore, such a system can be termed as intuitive.

On the other hand, at New Gourna, though the Gournii did not participate in the construction process, there was considerable involvement of the craftsmen, thereby partly realizing Fathy's dream of a *trinity*. In this sense, the construction process at New Gourna can be seen as partly interactive, while at Mexicali, the process was interactive because the five families were actively involved in construction. Though the families were assisted by the design team, most of the labor contributed towards actual construction came from the families themselves. Another contrast between the two projects involves differences in the design and the construction phases. At New Gourna, the designing and the construction phases were distinct and one followed the other. In contrast, at Mexicali, it is difficult to say when the designing phase ended and when the construction phase began. Since the dialogue between Alexander and the five families existed throughout the project, there was an element of fluidity. This intermingling, however, does not mean that the stages were the same. Rather, both stages had their own characteristics and steps but maintained a continuity with the other stage, thereby helping to actualize the organic nature of Alexander's pattern language approach.

CONTROLLING COSTS OF IMPLEMENTATION

We next must consider how Fathy and Alexander dealt with the distribution and costs of labor and materials in their two experiments. Both New Gourna and Mexicali were to cater to low-income housing and, therefore, had to adhere by stringent cost-control measures. This situation required a decentralized system of cost control involving a person responsible for construction on site and not some centralized agency located at a distance. At New Gourna, Fathy worked out a detailed procedure for the regulation of labor and materials. At Mexicali, as we already know, the five families and the student apprentices provided most of the labor, thus Alexander had only to establish a method for controlling the cost of materials. We shall now discuss the ways in which Fathy and Alexander were able to achieve a high level of cost control, which potentially is one of the greatest strengths of a self-help system of housing.

Controlling Costs of Implementation at New Gourna

Before any construction work commenced at New Gourna, Fathy issued an "Assignment of Work," which detailed all construction tasks, the time required for their execution, the labor to be engaged, and the materials required to carry out the particular work. The Secretary of Works then completed two forms--the "Order for Labor" and the "Order for Materials." These two forms were sent to the relevant governmental departments to ensure supply of labor and materials. In order to have constant monitoring over the progress of the work as well as to keep track of finances and expenditures, Fathy himself had three forms completed daily:

(1) "Control of Progress," which indicated daily construction progress and deficiencies of materials or labor;

(2) "Daily Stock Sheet," which summarized stock in store and the daily expenditure of stock on hand;

(3) "Wages Balance Sheet," which listed all wages expended up until that particular day.

Further, Fathy divided the construction process into a series of activities, each of which was carefully analyzed in terms of materials, labor and costs. For example, table 6.4 shows the expenditures for making mud bricks, for which the making of 1000 units cost 132.9 piasters (approximately forty American cents) in labor. To this amount, the costs of raw material for the 1000 bricks was added to arrive at a total cost of 182.9 piasters (approximately 60 American cents). Fathy claimed that this system of cost analysis could be applied with confidence to any building project, irrespective of the system of labor adopted (cooperative or otherwise) or prevailing costs (Fathy, 1973, p. 197).

Fathy's main objective in producing such detailed calculations was to demonstrate objectively to governmental agencies the projects' need for particular quantities of materials and labor. In addition, this system helped Fathy to keep track of expenditures and thus worked to control the cost of the project as a whole.

Table 6.4: Cost of making baked bricks at New Gourna (Fathy, 1973, p. 210)

Item	Labor and Materials	Job	No.	Wage In PT	Days of Employm-Ent	Total Wages Piasters (PT)	Product-ion	Cost of 1000 bricks
1.	Mason	Stacking bricks in kiln	1	30	2	60		
2.	Assistant mason	Stacking bricks in kiln	1	17	2	34		
3.	Workman	stacking	4	10	2	80		
4.	Workman	Transporting bricks from stack	2	10	2	40		
5.	Workman for firing bricks	Night work	1	15	1 night	15		
6.	Ordinary workman	Night work	2	10	1 night	20		
7.	Workman	Unloading	6	10	1 day	60		
8.	Solar oil fuel, 4 barrels kgm each into 1.5					1020		
						1329	10,000	132.9
	Cost of raw bricks							50.0
	Total cost of 1,000 baked bricks							PT 182.9

Table 6.5: Final cost analysis of New Gourna at the time project stopped (Fathy, 1973, p.231)

ITEM OF EXPENDITURE	COST IN EGYPTIAN POUNDS (L.E)
1. Permanent labor on the job	5,159. 469
2. Casual labor	52,610. 608
3. Purchases of materials and equipment	23,551. 096
4. Purchases of lorries and fuel	10, 752. 004
5. Travel	916. 985
6. Rent of rest house and ferry boat	552. 400
7. Special duty allowances of supervising architects	577. 800
TOTAL	94,120. 362
Deduction for unused materials in stores and lorries	20,000. 000
ACTUAL EXPENDITURE	L.E 74,120. 362
Area of houses built 9,499.70 sq. m	
Area of public buildings built 9,802.20 sq. m	
Total area built 19,301.90 sq. m	
FINAL COST PER SQUARE METER OF BUILDING	L.E 4.0

All these procedures helped Fathy to maintain an ordered control of the labor and material costs at New Gourna. Thus, when the unfinished project was handed over to the Ministry of Social Affairs in May 1948, the cost of each building per meter (both public buildings and houses) was just four Egyptian pounds (approximately 1.2 American dollars). In short, Fathy was able to rehouse the Gournii at a cost of approximately eighty-four Egyptian pounds per house (approximately twenty-five American dollars) at a time (1948) when an equivalent Egyptian house built by contractors cost not less than 500 Egyptian pounds (approximately 150 American dollars).

Controlling Costs of Implementation at Mexicali

Just as Fathy's method of controlling costs at New Gourna centered on detailed estimates of labor and materials, Alexander's approach to expenses hinged on a step-by-step system of cost control based on building operations. As we have seen, Alexander outlined a step-by-step construction process based on a series of twenty-three building operations, which formed the basis upon which Alexander worked out detailed estimates of each operation. Alexander (1985, p. 268) explains that the backbone of the cost regulation system adopted at Mexicali involved a close connection between operations and cost accounts. Table 6.6 shows the twenty-three operations of the construction process and how these operations were utilized to arrive at the cost per square meter of each dwelling. The labor for construction was provided by the families themselves, thus, this table accounts for construction costs alone.

Drawing on table 6.6, we next describe the specific process used to by Alexander to calculate costs; he established four procedural steps, which can be described as follows:

(1) Each operation was "counted" in some specific system of units, like foundations in meters, slabs in square meters, doors in numbers, and so forth (column 1 of table 6.6).

(2) The team then made an analysis of the amount of materials required by each unit of operation and translated this into cost figures (column 2). Thus, for example, the costs involved for wall foundation (operation number 4), were 19.2 pesos per meter; for slab preparation (operation number 5), 9 pesos per square meter; and for door construction (operation number 19), 250 pesos per door.

Table 6.6: Cost of construction materials at Mexicali (Alexander *et al*, 1985, p. 271)

OPERATIONS	UNIT	UNIT PRICE (pesos)	Max. # of units allowed per sq.m of the house	PRICE per sq.m of the house (pesos)
1. Layout and tools	1	2800/house	*	37.3
2. Excavation	sq. m	8.3/sq. m	1.00	8.3
3. Corner stones	#	26.6 each	0.53	14.1
4. Wall foundation	meter	19.2/m	1.05	20.2
5. Slab preparation	sq. m	9/sq. m	0.77	6.9
6. Under slab plumbing	1	600	*	8.0
7. Slab	sq. m	18/sq. m	0.77	13.9
8. Columns	#	41 each	0.53	21.7
9. Walls	meter	93/m	0.97	90.2
10. Door frames	#	120 each	0.08	9.6
11. Perimeter beams	meter	30/m	1.10	33.0
12. Roof basket	sq. m	38/sq. m	1.00	38.0
13. Gable ends	#	112 each	0.08	9.0
14. Electrical circuits	rooms	110/room	0.10	11.0
15. Roof, first coat	sq. m	66/sq. m	1.00	66.0
16. Roof, second coat	sq. m	44/sq. m	1.00	44.0
17. Window frames	sq. m	121/sq.m	0.18	21.8
18. Windows	sq. m	148/ sq. m	0.18	26.6
19. Doors	#	250 each	0.08	20.0
20. Plumbing fixtures	1	3300	*	44.0
21. Electrical fixtures	rooms	85/room	0.10	8.5
22. Painting	sq. m	10/sq. m	1.94	19.4
23. Paving	sq. m	20/sq. m	0.30	6.0
24. Common land	1	500/house*	*	6.7
TOTAL COST				584.2

These calculations helped provide a clear picture of how much the material in each operation cost per unit of operation.

(3) The team then estimated the amount of each operation per square meter of the dwelling. Thus, as shown in the third column of table 6.6, there were 1.05 meters of wall foundation per square meter of a house (operation number 4), 0.77 square meter of slab per square meter of a house (operation number 5) and 0.08 number of doors per square meter of a house (operation number 19).

(4) Last, the team calculated the amount of labor required by each operation (both skilled and unskilled); this figure was expressed as the number of man-hours per unit of operation. Thus, the team knew how much the labor of each operation cost per unit of operation[1].

The result of these four calculations allowed Alexander and his team to determine a final cost for each house as summarized in the lower right end column of table 6.6. This figure was based on the product of unit price per operation (column 2) and the maximum number of units per square meter of dwelling (column 3) which resulted in the figure of the price per square meter of that operation (column 4). Finally, by summing the cost of operations (column 4) the team arrived at the total price per square meter of dwelling-- 584.2 pesos (approximately 65 American dollars).

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[1] The team calculated this labor figure to provide information on total cost that could then be used to secure loans from Mexicali financial institutions. As we have already seen, figures on labor were not crucial to Alexander, since the families and team members provided the work themselves.

Once the five houses were laid out, Alexander arrived at a more precise estimate of the price of each house as a function of its area and, this information was used by the families to secure loans from banks. The actual budget for the houses was 40,000 pesos each (approximately 4500 American dollars), including materials. If the labor of the families and the two architect-builders are included, these houses still cost less than 75,000 pesos (approximately 8400 American dollars). In 1976, the sale price for a comparably sized house was about 1,50,000 pesos (approximately 16,800 American dollars)--twice as much as the houses built by Alexander at Mexicali (Alexander, 1985, p. 290).

Thus, a look at the methods adopted for the regulation of implementation at New Gourna and Mexicali show procedures tailored to creating houses at a minimal cost. Fathy resorted to detailed calculations based on labor as well as materials (since both had to be paid for), whereas at Mexicali, Alexander emphasized the cost of materials, since all labor was provided by the families and the student apprentices of the design team.

As the above discussion indicates, there was a major difference in the two architects' methods of cost control. Using detailed calculations, Fathy arrived at a certain quantity of labor required for a certain amount of operation. Using aggregate amount and going labor rates, Fathy determined a final cost of labor for the operation. With respect to the cost of materials, Fathy based his calculations on the actual quantity of materials required for the activity and its cost. On the other hand, Alexander's method revolved around his system of construction operations. With prior knowledge of the amount of each operation required per square meter of dwelling, Alexander determined the cost of labor

and materials required for each operation as a function of the square meter of the house. Thus, while Fathy treated the amount of labor per operation as a constant, Alexander considered the amount of each operation per square meter of the house as a constant. Both approaches, however, were tailored to specific situations, and both methods seem to have provided an efficient means of cost control.

LOOKING AHEAD

From the preceding discussion, it becomes clear that a central strand running through both Fathy and Alexander's projects was the active cooperation between the designer and the end-users, though this concept did not materialize completely at New Gourna because the Gournii would not leave Old Gourna. At Mexicali, however, there was active cooperation between Alexander and the five families, especially during the implementation phase. Another similarity between the two projects involved the methods adopted by both architects to control costs of implementation. While Fathy's method of cost control was based on detailed estimates of labor and material costs, Alexander's method was tailored to suit the system of operations that he had evolved. In spite of this difference between the two systems, their overall aim seems to have been the same—cost efficiency in housing—and both these methods seem to have achieved a substantial efficiency in terms of the overall expenses.

Thus, we see how, beginning with the framework for implementation and working towards the stages of implementation, both Fathy and Alexander were able to actualize their designs on site, achieving a high level of cost efficiency. Unfortunately, both

projects were terminated before their scheduled completion and as a result, both Fathy and Alexander were able to complete only a part of the originally proposed whole. Thus, the full successes and failures of the two projects cannot be completely known, though in the next chapter on goal, we will make at least a partial effort to provide an evaluation.

CHAPTER 7

GOALS OF NEW GOURNA AND MEXICALI

Having examined the first three sources of the tetrad—the ground, instrument and direction—we move to the fourth source of the tetrad, the goal, which is the end product or the final result of an activity. Every activity is performed with the intention of achieving a certain completion and, ideally, every activity begins with a vision and ends with a result, whether the specific result is intended or not. Examining the goal of any activity helps one to compare the actual result of the activity with its original vision. Thus, at the beginning of every housing project, the designer envisions what ultimately the site will be as a workable residential environment. Through the instrument and the direction, this vision is brought into reality as the actualization of the goal. The quality of the finished product—the relative success of housing and neighborhood--forms an important aspect of the goal, especially with respect to large-scale residential projects for the poor.

At New Gourna, Fathy's overriding goal in building a village was to find the missing link in his search for continuity in the Arab architectural tradition. At Mexicali, on the other hand, Alexander's overall vision was centered around the achievement of wholeness, not only in the individual houses but also in the communal environment. Though the two architects' overall goals were in terms of cultural continuity and environmental wholeness respectively, their immediate goals centered around the creation of workable houses and neighborhoods.

To facilitate a better understanding of the relative success and failure of New Gourna and Mexicali, we need to evaluate not only the strengths and weaknesses of the designs and building processes but also the strengths and weaknesses of the village design as a whole and the design of individual dwellings. Evaluation of these issues will bring to light the extent to which Fathy and Alexander were able to actualize their original visions. This discussion will help us judge the relative success and failures of the two projects. Accordingly, the following two themes are examined in this chapter on Fathy and Alexander's goals:

(1) successes and failures of the site plans as a whole;

(2) successes and failures of the individual dwellings.

The discussion of the goals of New Gourna will draw largely upon three sources—Fathy's brief review of New Gourna several years later (1973), a review by Steele (1997) and, finally, a report by Hassan and Plimpton (1989). Fathy (1973, p. 192) presents a brief review of New Gourna based upon his visit to the village again in 1961, thirteen years after the project was halted. Steele (1988, 1997) gives a more elaborate account of the condition of the public buildings in the mid-1990's; this report indicates their current condition and extent of use today. Finally, Hassan and Plimpton (1989) undertook a study of New Gourna in 1985, thirty years after the project had halted. These anthropologists conducted several interviews with the then-current occupant-squatters of the houses originally built for the Gournii. These researchers also studied the dwellings and evaluated the modifications that the occupants had made to the original designs. In this work are included plans of the modified peasant houses, which gives some indication of how these houses might have been used by the Gournii if they had moved into New

Gourna. Overall, these sources provide a major contribution towards understanding the extent to which Fathy's designs might have been successful. However, it is also important to emphasize that these sources are all incomplete, since the village was built specifically for the Gournii, who never left their old village.

In contrast, there exists a more comprehensive picture of the success and failure of Alexander's Mexicali project. In 1985, seven years after the five families had moved into their new homes, former team members Doritt Fromm and Peter Bosselmann returned to Mexicali and conducted interviews with all five families (Fromm and Bosselmann, 1984). These architects also provide drawings of modifications the families had made to their houses and outside spaces, thereby providing a foundation for evaluating the houses and the common land. In addition, the interviews conducted by Fromm and Bosselmann provide valuable insight into the extent to which the five families were satisfied with both the block layout as a whole and also the individual houses.

SUCCESSES AND FAILURES OF THE SITE PLANS AS A WHOLE

Drawing on these various sources, we next discuss how the Gournii and the five families responded to the two projects. In order to evaluate the successes and failures of any housing project, it is important to consider the extent to which the end-users accepted their new environments, since the main aim of housing—especially self-help housing—is to ensure that the designed environment is tailored to meet the actual needs of the end-users. At New Gourna, as we have already seen, Fathy had to discontinue the project after three years of construction work due to severe bureaucratic obstacles. Nevertheless,

during that time, Fathy managed to complete some 100 houses and seven public buildings. All Fathy's efforts, however, ended in failure, since the Gournii, opposed to the project from the beginning, never moved to New Gourna. In contrast, at Mexicali, the five families were eager to have their own dwelling and worked in cooperation with Alexander's design team, and moved in to their completed houses immediately. Hence, we notice this striking difference in terms of the responses of the end-users to their respective built environments.

In evaluating the goals of Fathy and Alexander, we first examine the relative success of the overall layout of the two projects. As we have already seen, the final incomplete layout of New Gourna consisted of some 100 houses besides several public buildings, though none of them were ever used by the Gournii. At Mexicali, on the other hand, the final layout included the five houses and the only public building of the project—the builder's yard.

Successes and Failures: New Gourna as a Whole

Since New Gourna was never completed nor occupied in the way Fathy intended, it is difficult to evaluate the relative success and failure of the village design as a whole. Figure 7.1 shows the public buildings and the houses that comprised unfinished New Gourna in 1948. This construction included 100 houses and seven public buildings—a mosque, a boys' primary school, a crafts school, a crafts khan, a market place, a village hall and a theater.

In 1961, when Fathy revisited New Gourna thirteen years after the termination of the project, only the boys' school was functioning while all the other buildings were unused (Fathy, 1973, p. 192). In the 1990's, however, Steele (1997, p. 65) explains that the mosque is the only building that has continued to be well-maintained and therefore appears to be in the same condition today as it was when it was constructed. Steele also mentions that several students of Fathy restored the theater using the same construction techniques that Fathy had originally used. However, Steele points out that the two doors that lead to the gallery of the theater are always kept locked and the building is never used for performances (as was originally intended by Fathy). Thus, while the other public buildings are severely damaged, the mosque and the theater remain well kept, thanks to the efforts of Fathy's friends and followers. The houses, which we shall discuss shortly, have become occupied by squatters.
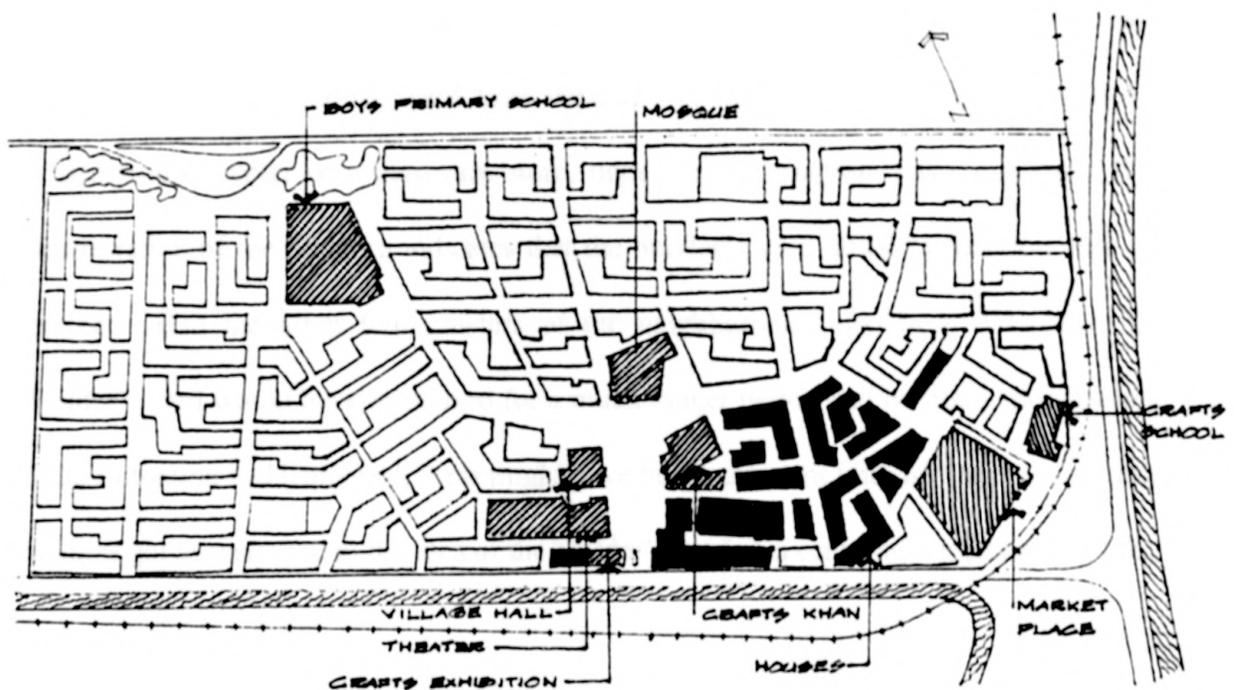

Figure 7.1: Layout of constructed buildings at New Gourna (as drawn by author from Fathy, 1973, Figure 66)

Successes and Failures: Mexicali as a Whole

In 1984, when Fromm and Bosselmann revisited the five families at Mexicali, there were several changes that had taken place, both within the common land and within the individual houses. It is important, however, to reiterate the fact that the same five families that originally built the house in 1975 continued to occupy the houses in 1984, immediately suggesting that there was an element of permanence in terms of occupation. However, the overall layout was not without significant changes, many of which were contrary to Alexander's concepts.

When Fromm and Bosselmann revisited Mexicali, the only public building of the project—the builder's yard (the center of daily activity during construction)--was abandoned. Windows had been broken and graffiti had appeared on its walls, thereby indicating a complete lack of maintenance (Fromm and Bosselmann, 1984). As we have already seen, the builder's yard was expected to take on various functions like a neighborhood center or a hardware store, once the construction was completed. The deterioration of the building indicates that the builder's yard failed to function after the project. Had the other four clusters of the neighborhood also been completed, the builder's yard would have been used for a much longer period and by many more people. If this situation had happened, there might have been sufficient time for the neighborhood to have got accustomed to the idea of the builder's yard as a center of neighborhood life.

Based on Fromm and Bosselmann's report, figure 7.2 shows the plan of the cluster in 1984 and indicates the changes that the five families had incorporated to the common space originally in the center of the cluster. The plan shows the subdivision of the original common land into parts adjoining each house. All the families except the Cosios had erected some manner of fence to separate their houses from their neighbors. In effect, Alexander's central theme of communal living—the pattern of housing cluster-- had been undermined. The changes suggest that the families preferred to live in a private rather than a collective manner. From their interviews with the five families, Fromm and Bosselmann (1984) were able to establish two reasons why the common land concept did not work at Mexicali. Firstly, the families cited personal security as a reason for cutting themselves off from the shared space. The families felt that the common land had been used by trespassers—including outsiders as well as children living in the other houses of the cluster. Moreover, when Julio Rodriguez died in 1979, his widow felt further insecure and decided to build a wall to provide personal security. Thereafter, the other families followed suit and raised their own walls until there was no common land at all.

Secondly, Fromm and Bosselmann's interviews indicate conflicts in personalities among the five families. Once families started to complain about one another, they were no longer friends and decided to isolate themselves from their neighbors. Moreover, in the beginning, each family was responsible for the maintenance of the common land. With time, as incompatibility led to the construction of fences, the families decided that it was best to have a part of the common land as their own rather than as a single area that

belonged to everyone. Thus, we find that that the issues of security and incompatibility among the families were central reasons behind the failure of the common land.

Figure 7.2: Layout of the whole at Mexicali in 1984 (Fromm and Bosselmann, 1984, p. 78)

These changes in the common land also altered the entries to the cluster and to the individual houses. As figure 7.2 illustrates, once the fences were built, the original main entrance to the cluster from the east and the secondary entrances from the north and the south could no longer function as entries. The families preferred to locate their new

entrances in relation to the parking lots where they kept their cars rather than to the common space. Thus, we find that all these modifications to the common land seriously undermined one of Alexander's major premises—communal living in a cluster. Fromm and Bosselmann (1984) acknowledge that both the builder's yard and also the common land did not work at Mexicali. From the changes that the families undertook at Mexicali in the seven years after the five houses were completed in 1976, it becomes evident that the families attached more importance to privacy and security than to socializing in a communal area, thereby bringing to light an important difference in what Alexander envisioned versus what the families later wished to have.

SUCCESSES AND FAILURES: THE INDIVIDUAL DWELLINGS

Having looked at the success and failure of the site layouts of New Gourna and Mexicali, we next move to an evaluation of the individual dwellings at New Gourna and Mexicali. This topic brings to light the success and failure of the plan of individual dwellings and the extent to which they were able to meet the actual needs of their users. This discussion gains importance in light of one of the most important premises behind self-help system of housing—that of tailoring the houses to the actual needs of the users. As we have already seen, at New Gourna, the Gournii never occupied the houses and hence they were appropriated by squatters. However, according to Hassan and Plimpton (1989), these occupants took over the houses and gradually made modifications to the internal layout of the houses, thereby altering Fathy's original designs. Similarly, at Mexicali, just as the five families made substantial changes to the common land, they also made significant changes within the houses.

Successes and Failures: The Houses at New Gourna

Figure 7.3 shows the ground and upper floor plans of a modified peasant house at New Gourna. According to Hassan and Plimpton (1989), this house was in the process of being modified when the researchers carried out their investigation of New Gourna in 1985. A look at this layout immediately suggests that there were modifications made with respect to openings, doorways and windows. The overall layout remained the same, with the distribution of functions around a central courtyard. The exterior side of the house entryway had been re-plastered, changing its shape from that of an arch to a rectangular form and this was done to accommodate a rectangular door frame. The interior of the doorway, however, retained the same arched profile. Similarly, the entrance to the guestroom near the entrance of the house was replastered in a rectangular profile so as to accommodate a rectangular door frame, while again, the interior side of the room maintained the original arched profile.

This guest room had two windows, as shown in the plan of figure 7.3; the one on the north overlooked the street and the other, facing south, overlooked the internal courtyard. The north-facing window was originally arched but only the exterior face of the arched portion of the window had been bricked up and plastered so as to accommodate a rectangular window frame. Vertical bars were fitted into this window frame and double shutters were fitted to its interior face. On the other hand, the south facing window was originally an arched doorway that opened into the courtyard. The lower two-thirds of this former door was bricked up and plastered, leaving the upper portion to form a window. The stairway that led from the courtyard to the roof did not originally have a railing and

was open. However, the occupants had added a solid adobe railing to the open end of the stairway.
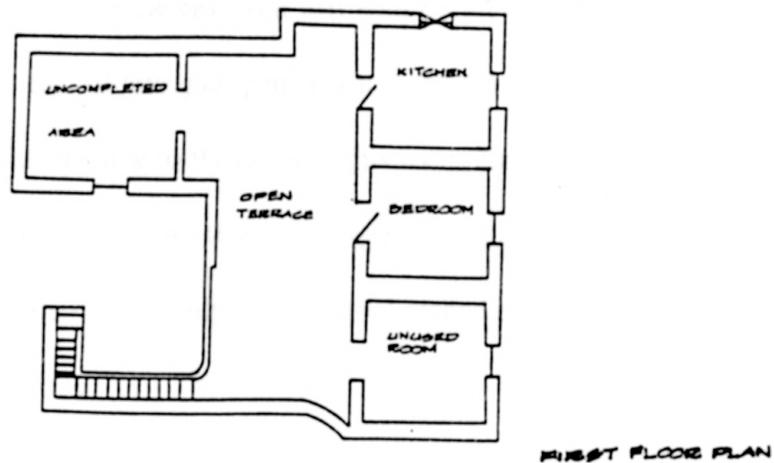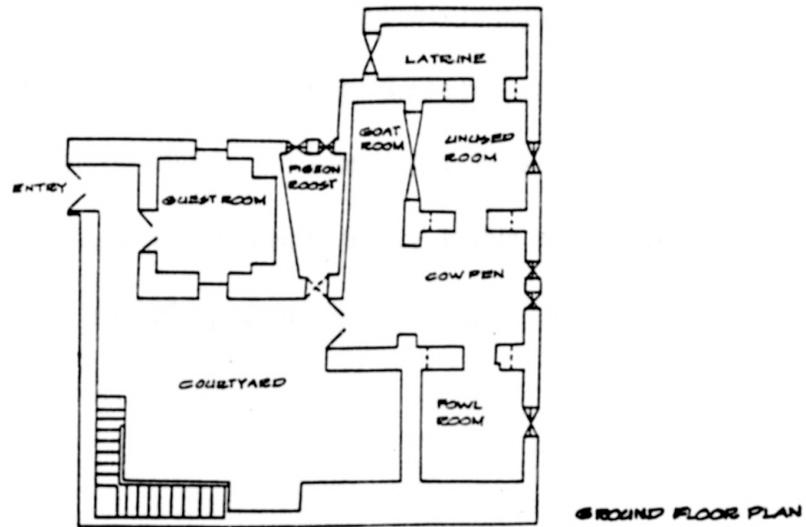
Figure 7.3: Plans of a peasant house at New Gourna in 1985 (Hassan and Plimpton, 1989, p.75)

The room adjoining the guest room on the ground floor was converted by the squatters into a pigeon roost. In making this change, the squatters first blocked the original arched entry located on the northeast corner of the courtyard with bricks to a height of one-fourth the original opening. This change was to keep out animals from entering the

room. In addition, along the two walls of this room, nests of bricks had been added and plastered to house the pigeons. The original two narrow windows to the north of this room were completely blocked with bricks, probably to prevent other birds from entering into the room. Immediately adjoining the bricked-up door of the pigeon roost was the doorway that led to the dwelling's rear section that housed the animals. The original single arched opening had been widened to form a double opening and, again, the arched portion at the top was bricked up to accommodate a rectangular wooden frame and a double door.

This door led one to a goat pen, which was immediately to the east of the pigeon roost. According to Hassan and Plimpton (1989), this space originally appeared to have been a passage. A large archway on the east wall was entirely bricked up, thereby helping form the goat pen. To the east of this goat pen was a room the east facing window of which had been blocked. The opening to the north of this room had been narrowed down from a large archway and led to a lavatory that was originally designed as a rear entrance to the house for use by animals. Accordingly, its original arched entryway was blocked up with bricks.

As figure 7.3 shows, the room located in the center of this space was where the cows were tethered. The original two narrow arched windows of this room had been blocked. The doorway to the south of this room was originally a large archway that had been narrowed into a rectangular opening. This doorway led to a room where chickens were kept. Again the windows on the east wall of this room had been blocked completely by

bricks. Thus, we find that there were several modifications especially in terms of blocking of doors and window openings in the entire ground floor of the house. Doors were usually blocked to modify the original room layouts to accommodate different functions and the windows were bricked up to buffer the rooms from pedestrian traffic on the adjoining street.

On the upper floor, too, as indicated in figure 7.3, there were several modifications made by the squatter-occupants. A low wall had been built next to the open terrace so as to prevent one from falling into the open courtyard below. The room at the southeast corner of the house had not been changed but was unused because of the fact that it had no roof. The room to its north was used as a bedroom. The shape of the original arched openings of the door and the window openings of this room had not been changed, but rectangular frames and door and window shutters had been inserted into the openings. The room to the north of the bedroom was used as a kitchen. Similarly, the arched profiles of the door and the east-facing window of this room had been fitted with rectangular frames and door and window shutters, while the north-facing window had been blocked completely. However, the most extensive modification involved the roof of the bedroom and the kitchen. The original vaulted roof had been replaced by traditional roofing of palm beam rafters and thatching of cane stalks and brick caulking. In addition to this, the occupants were also in the process of adding two new rooms on the northwest side of the house over the areas of the guest room and the pigeon roost on the ground floor.

It is interesting to note that in spite of all these changes to the walls and openings of a typical house in New Gourna, there is no mention of any changes made to the courtyard, the use of which has come under criticism. In this regard, it is useful to review the criticisms of Fathy's courtyards, as presented by Hassan and Plimpton (1989). These anthropologists claim that Fathy's use of courtyards at New Gourna was a "luxury". They argue that agricultural land was scarce in the Gourna region, and Fathy had wasted precious space by the use of courtyards, both at the level of the house as well as that of the *badana*. However, other critics (Al Sayyad and Bourdier, 1989) argue that the use of courtyards was absolutely justified at New Gourna for cooling houses in a hot and arid climate like that of New Gourna. Since the courtyard had the ability to mitigate extreme temperatures, deflect or channel winds, and moderate humidity, the design helps enhance the microclimate of the surrounding area. In addition to these climatic benefits, Fathy also wished to maximize socialization within the *badana*. However, due to the fact that none of these courtyards were put into use, it becomes extremely difficult to evaluate the success and failure of these courtyards.

Thus, a look at the modifications that the occupants had undertaken on one typical New Gourna house indicates that several changes were made to meet changing needs of the occupants—for example, widening door openings to accommodate cattle, blocking doors to change a room layout, and replacing vaulted ceilings with easier-to-construct timber roofing. However, Hassan and Plimpton (1989) argue that from the very start of Fathy's project, there was a discrepancy between his architecture and the Gournii's architecture and, more often than not, Fathy was guided by his own discretion rather than the actual

needs of the peasants. These critics base their evaluation on the modifications that the occupants had made to their houses.

However, it is important to remember here that these occupants were not the Gournii, for whom Fathy had actually built the houses. These houses, as discussed earlier, were occupied by squatters and they modified these houses, thirty-seven years after the dwellings were originally built. The needs and functional requirements of the peasants is bound to have undergone a change over a period of more than three decades and this possibility becomes evident in these alterations. But these changes do not necessarily mean, as Hassan and Plimpton conclude, that Fathy's original design was at fault. Again, had the Gournii occupied these houses, then observation of their way of living would have provided a much better evaluation of the relative success and failure of Fathy's' dwellings for the Gournii.

Successes and Failures: The Houses at Mexicali

As we have already discussed, the five families had made several changes to the common land, which also necessitated changes in the individual layout of the houses. Figures 7.4 to 7.8 show the axonometric views of the five houses, in 1976 and in 1984 respectively, and these drawings indicate the modifications that the five families had made up to about 1984.

We begin with the Tapia house, shown in Figure 7.4. We immediately notice a change in the entrance to the house. The Tapias had created a new dwelling entry from the street

that included a covered porch and a carport. In addition, more windows had been added to the house and a six-foot brick wall was built to close off the shared courtyard. The original patio was enclosed to function as a kitchen. At the time of the interviews in 1984, the Tapias were also thinking of building a room at the end of the hall to put in a book store because it seemed to be a good business venture, in view of the fact that a school had recently been built nearby. The Tapias also had plans to build a larger dome over the one existing to insulate the house better and also to give the dwelling a more prominent appearance from the street. According to Fromm and Bosselmann's interview, the Tapias were very happy with the house and felt confident in making construction changes.
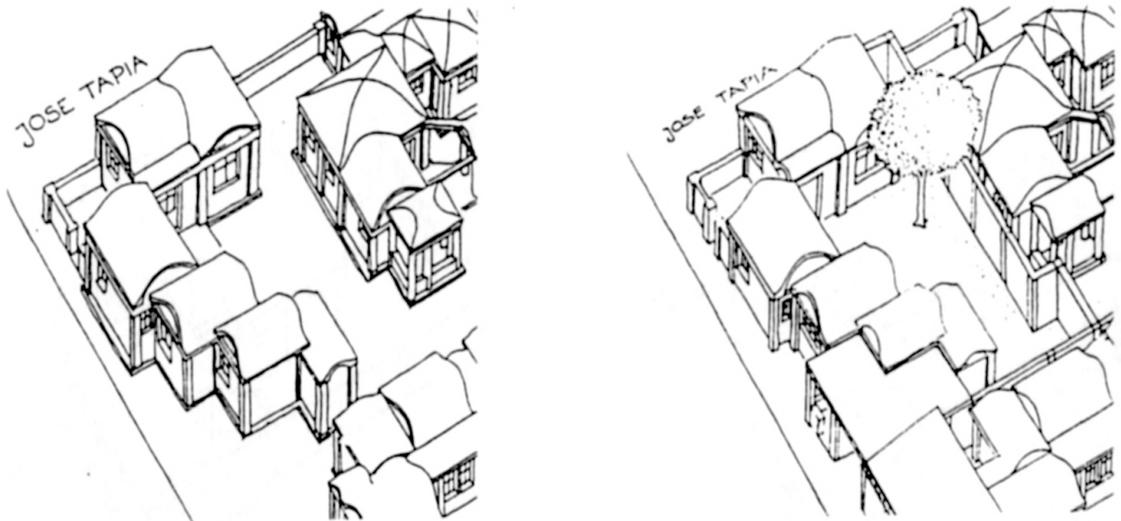

Figure 7.4: Layout of Tapias house in 1976 and 1984 (Fromm and Bosselmann, 1984, p. 81)

We next examine changes in the Cosios house, shown in figure 7.5. This house was the only house in the cluster that still maintained the original entrance as indicated by the arrow in the figure. Cosio did not prefer to have an easy, direct access to street parking because she traveled by bus to work. The walls built by the Tapias ran next to the Cosios' living room and therefore cut the sun off from the dwellings' living and dining areas. Walls built by the other families defined Cosio's front yard and walls also surrounded her back yard, thereby creating an enclosed atmosphere on all sides. This house had the least changes of the five dwellings, though Cosio had plans of combining the living room with the porch and also expand the back portion of her house. In the interview with Fromm and Bosselmann, Cosio mentioned that while she was confident that she could make necessary additions to her house, she was not quite sure how she would roof the rooms in the original vaulted manner.
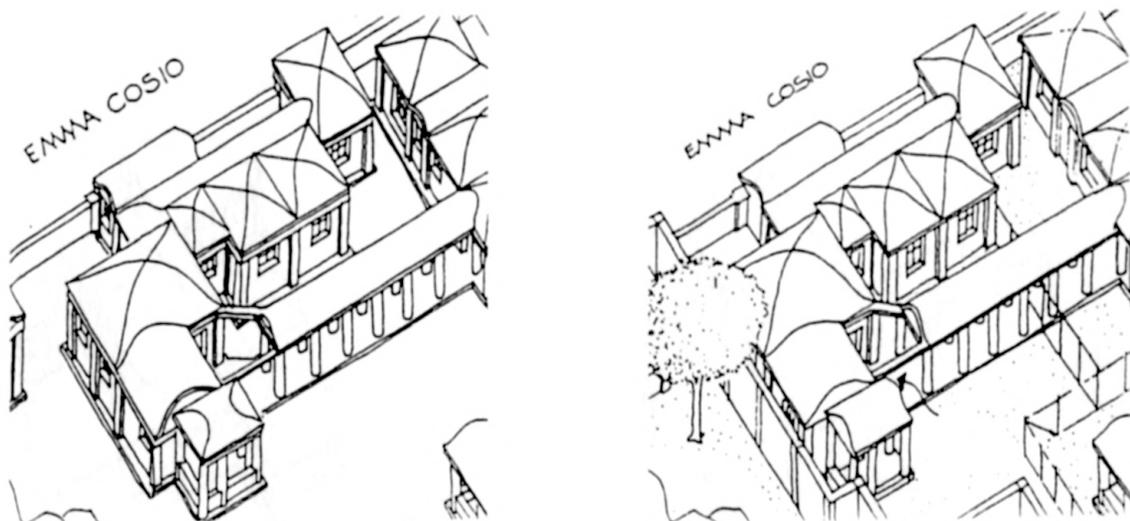

Figure 7.5: Layout of Cosio house in 1976 and 1984 (Fromm and Bosselmann, 1984, p. 83)

Third, we examine the Rodriguez house shown in figure 7.6. Mrs. Rodriguez was the first of the five families to construct a wall in the communal space after her husband died, since she felt the need for additional safety and privacy. Rodriguez had the dwelling's original entrance from within the cluster altered to become a direct entry from the street. A new porch was also added and given a pitched roof which strikingly contrasts with the original rounded domes of the project. The house was also fenced off from the adjoining road by a brick wall and a wire fence, so as to keep away transients who sometimes wandered in the common area. Iron bars were also added to the windows for added security. Besides these changes, Rodriguez also planned to make the living room into a dining room, for she no longer felt the need for a large family area. In the interview with Fromm and Bosselmann, she explained that she was very comfortable in the house and wished that the builder's yard had continued to function, since she had no help in repairing a leak in her roof.
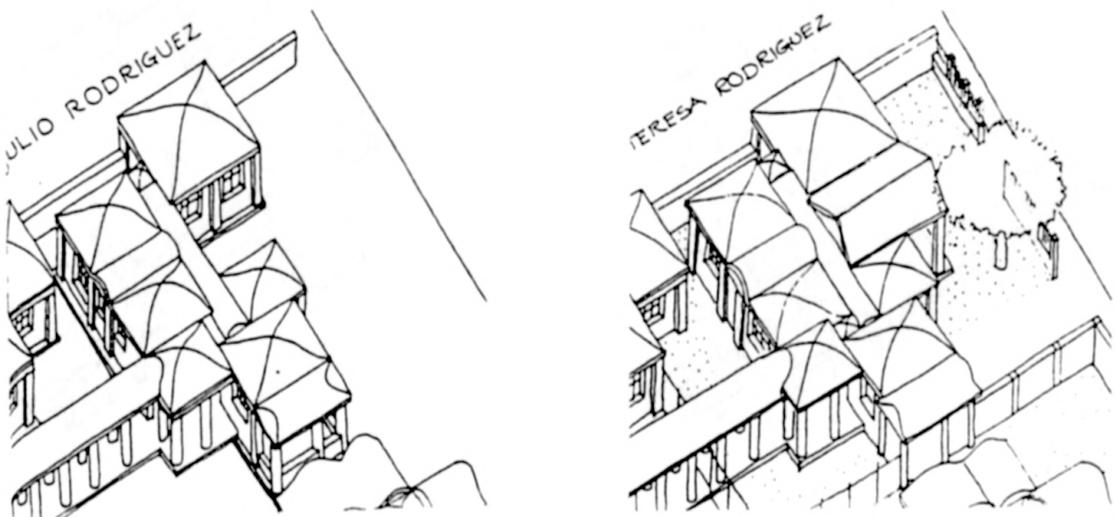
Figure 7.6: Layout of Rodriguez house in 1976 and 1984 (Fromm and Bosselmann, 1984, p. 85)

Next, we discuss the Duran house shown in figure 7.7. The Durans had eliminated two dwelling entrances and had converted their living room into a barber shop. Using a wire fence, the Durans divided the arcade, which formed part of the original main entrance to the cluster. In addition, a metal-link fence and a brick wall separated the house from the road that adjoined the entrance. At the time of the interview, the Durans had plans of extending the kitchen and building a two-story addition that would include a barber shop and a room for their new baby. In her interview with Fromm and Bosselmann (1989), Duran expressed satisfaction with her house and mentioned that she would like to see more houses built in the same way.
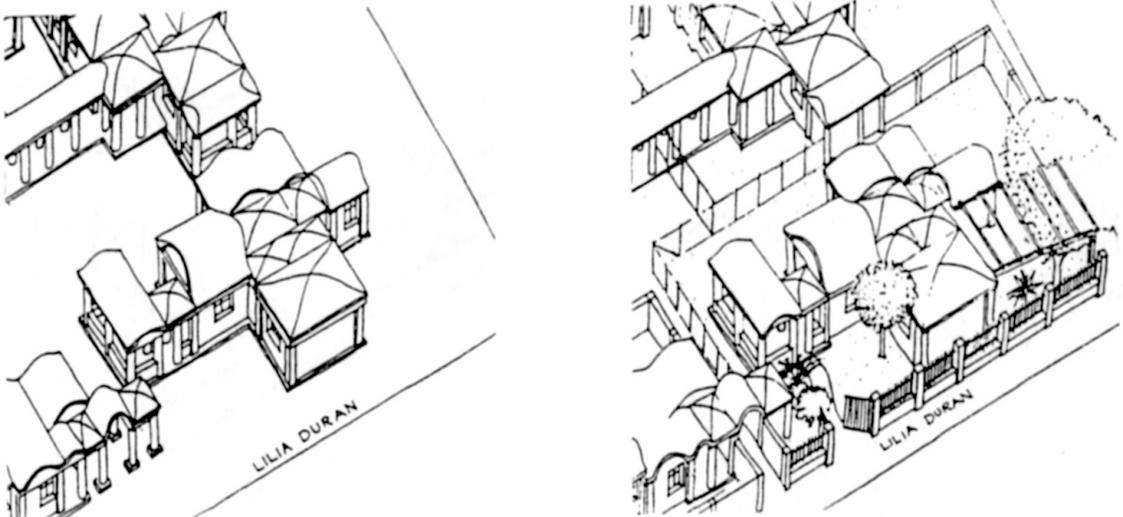
Figure 7.7: Layout of Duran house in 1976 and 1984 (Fromm and Bosselmann, 1984, p. 84)

Finally, we consider the Reyes house shown in figure 7.8. By 1984, this house was surrounded on all sides by tall walls; the only entrance to the house was through an eight-foot metal gate at the southeast end of the house. As a result, this house was the most enclosed of the five in the cluster. Because this house was located closest to the builder's yard, sometimes used as shelter by transients, the Reyes family felt the need for protection and built high walls all around the house, which cut off light severely within. The interior spaces of the house were the best finished of the five houses, mostly because of the Rodriguez family took great care both in construction and in maintenance of their house. The Reyes also had plans for expanding their living room and the kitchen. In her interview with Fromm and Bosselmann, Reyes expressed the opinion that, given a choice, she would prefer to build her house the way she originally did—with her own hands. The Reyes were happy with their house and only wished that more care had been taken in the choice of the families that were to occupy the cluster.
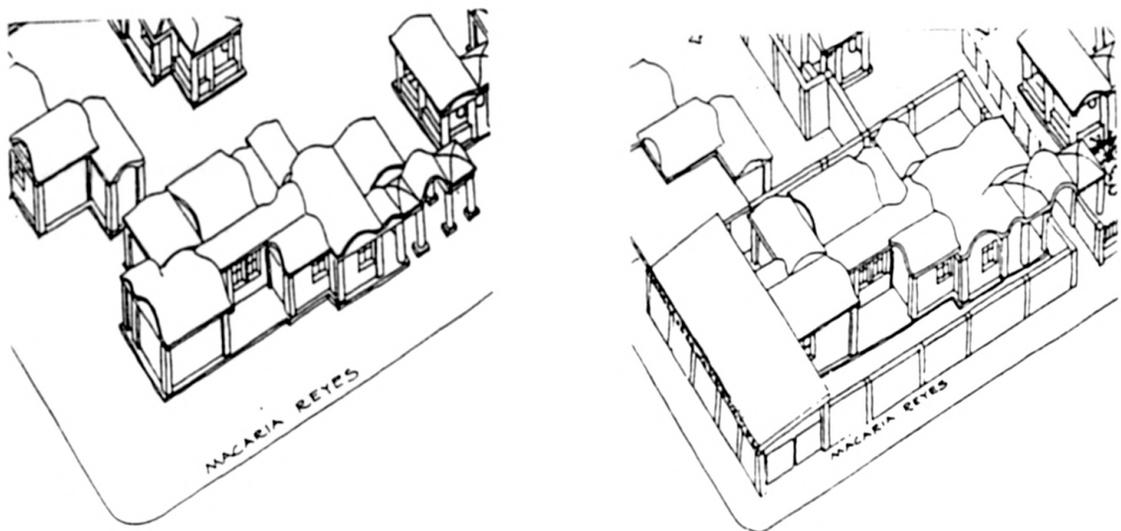

Figure 7.8: Layout of Reyes house in 1976 and 1984 (Fromm and Bosselmann, 1984, p. 87)

Thus, from figures 7.4-7.8 and the above discussion, we realize that the five families had made many changes both to the common land and also to their individual houses. Over the seven year period, the priorities of the five families had changed and privacy and security were seen as more important than the concept of communal living emphasized by Alexander originally in his pattern of clustered housing. As Fromm and Bosselmann's (1989) interviews indicate, the families felt that the idea of a social life around a communal space was not workable, partly because the families were incompatible and partly because they seemed uninterested in maintaining a sense of neighborhood cohesion. On the other hand, the families they seemed extremely happy and proud of their individual houses.

While they admit that Alexander's effort at community-making was not successful at Mexicali, Fromm and Bosselmann (1989) argue that the experience certainly helped individual autonomy of each family to grow. With the skills of construction at their disposal, the families were free to incorporate future changes in their dwellings that they deemed necessary. Having constructed their houses themselves, they possessed the necessary expertise for making modifications to their houses and this ability made them confident of making house additions and alterations. This skill also relates to the attachment the families felt for the houses that they themselves had built. They had developed the confidence to decide and meet their constructional needs, and this sense of confidence is a major benefit of the self-help housing process. At Mexicali, the houses of the families were their homes and more importantly, as Alexander hopes, would continue to be so for a long time.

CONCLUSION

Hence, from the preceding discussion of the success and failure of individual dwellings at New Gourna and Mexicali, we find that the individual dwellings in both projects underwent considerable modification. At New Gourna, these modifications were not effected by the intended users of the houses, whereas, at Mexicali, the five original families made all changes. One striking difference between the two projects is the nature of the modifications undertaken: at New Gourna, most of the alterations made by the squatters related to smaller changes—for example, blocking doors and windows or adding a timber roof. At Mexicali, on the other hand, the modifications were more substantial and involved major changes in not only the layout of the common land but also with respect to the reorientation of house entries, thereby undermining the original concepts behind Alexander's designs. However, it is important to recognize that the families gained the confidence to make these changes on their own, partly because they had gained the necessary expertise at building during the construction of the houses.

Reviewing the New Gourna and Mexicali projects as a whole, we find that there exists various strengths and weaknesses in Fathy and Alexander's approaches to self-help housing. Beginning with the choice of families involved in the construction process, we conclude that it is crucial how the individuals and families are chosen for participation in self-help housing. The fact that the five families at Mexicali did not know each other before the construction and had to live together in a cluster after, did not work well, thereby resulting in the failure of Alexander's central concept of communal living in a cluster. However, Fathy did not have to face this problem since his users—the Gournii—

were already interrelated by blood and social ties. Had the Gournii moved to New Gourna, there is a high probability that they would have lived together therein. Hence, these two efforts establish the importance of compatibility of the participants involved a self-help housing process, and this aspect deserves significant attention in future self-help housing projects.

We next consider the differences in Fathy and Alexander's approaches to design. At New Gourna we find that Fathy's approach as an empathetic insider was instrumental in getting to know the exact needs of the Gournii, even though they never wished to participate in the project. On the other hand, Alexander's own concepts based on the pattern language controlled the programming stage at Mexicali. Thus, at the designing stage, Fathy's empathetic approach seems to have been more successful than Alexander's pattern language approach in terms of incorporation of actual users' needs. However, the pattern language *per se*, as we have discussed earlier, worked as a useful tool in acquainting the five families with a comprehensive knowledge of architecture in general terms. While the pattern language should be used to educate people about the importance of an organic approach to building, such an approach should not be rote mimicking of patterns, but should be tailored to meet actual user requirements. In Mexicali, it appears that the housing-cluster pattern was at odds with the actual desires and needs of the five families. The result was a set of patterns for the overall site layout that failed in the sense that the families eventually divided the common space into privately-held yards.

While Fathy's empathetic approach seems to have been more successful than Alexander's pattern language approach during the design phase, Alexander's method seems to have gained an upper hand during the implementation phase. As discussed earlier, implementation at New Gourna turned out to be a "one-man show," with Fathy in charge of the entire operation. At New Gourna, Fathy failed to get the Gournii involved in the actual construction and, hence, he could not reestablish the significance of the trinity of the architect, users and craftsmen. However, Fathy's effort was partly successful in bringing the craftsmen into active construction, particularly Fathy's efforts to train people of the local villages to become masons and other types of craftsmen.

At Mexicali, in contrast, the implementation phase involved a collaborative effort between the design team and the five families. Alexander was able to institute a step-by-step construction process which made it convenient for the families to construct their own houses, even though they had no prior knowledge of building. Thus, Alexander was able to educate the families in construction procedures, and this knowledge proved useful to the families several years later, when they found it necessary to make changes to their individual houses and yards. The construction experience at Mexicali gave confidence to the families, especially with respect to making decisions regarding spatial requirements and layouts. Thus, we find that Alexander's step-by-step approach to construction seems to have been more successful in educating the users in the very act of construction. It is important to recognize that such an approach seems crucial for generating houses to meet the exact needs of the participants and therefore serves as another significant precedent to future self-help housing projects.

However, one strong point for both New Gourna and Mexicali involved the adoption of efficient methods of cost control. By resorting to decentralization of expenses and by closely monitoring overall expenditures, both Fathy and Alexander were successful in achieving high cost efficiency in their projects. Such success is another significant factor for housing for the poor; its efficiency as established by both Fathy and Alexander proves that it is one of the major benefits of self-help housing projects. At the same time, however, it is important to emphasize that, in order to be effective in any housing project, the cost control methods need to be compatible with the system of construction adopted-- as was the case at both New Gourna and Mexicali.

In spite of the various successes and failures at New Gourna and Mexicali, we recognize that both Fathy and Alexander's efforts were directed towards creating successful housing and neighborhood designs. Fathy's efforts at New Gourna leads us to believe that, had the Gournii occupied the village, it would have proved functional and successful. On the other hand, Alexander's effort at Mexicali appears to have been more successful at the level of the individual houses than at the level of the community.

At a larger scale, Fathy and Alexander's attempts were not just aimed at achieving immediate aims of successful housing and community designs but also involved addressing larger goals involving the direction of contemporary architecture and society. While New Gourna was an experiment in Fathy's overall search for cultural continuity in the Arab world, Mexicali was an experimental ground to test Alexander's concepts of

environmental wholeness. In this regard, it is important to review New Gourna and Mexicali in terms of these larger goals in order to understand the wider social and architectural spectrum of which the two self-help housing experiments form a part. Such discussion will give a better picture of the success and failure of the two projects in a broader conceptual framework. This discussion is the crux of the concluding chapter.

CHAPTER 8

CONCLUSIONS

As we have seen in chapters 4-7, the four sources of the tetrad—the ground, instrument, direction and goal—as reflected in New Gourna and Mexicali, provide a common ground for the comparison and contrast of the two projects. These four sources were instrumental in viewing the similarities and differences as well as the strengths and weaknesses of the two projects. The discussion in chapter 4—the ground—centered around the discussion of the human and environmental base of New Gourna and Mexicali. This analysis brought out the characteristics of the Gournii and the five Mexican families. This chapter also discussed the site and situational contexts of New Gourna and Mexicali. Next, chapter 5—the instrument—centered around how the empathetic insider approach of Fathy, grounded in his concern for enlightened tradition, was instrumental in the realization of New Gourna, and how Alexander's pattern language approach to construction formed the framework for construction at Mexicali. This chapter brought out certain similarities and differences between New Gourna and Mexicali in terms of the programming and design process.

This chapter was followed by the discussion of the direction in chapter 6, which revolved around the practical methods of implementation adopted at New Gourna and Mexicali. This study made explicit the similarities and differences between Fathy's *trinity* approach and Alexander's efforts to create a dialogue between designer and users. The final source of the tetrad—the goal—was discussed in chapter 7, which evaluated the final designs of

New Gourna and Mexicali. This chapter identified differences in the results achieved at New Gourna and Mexicali and discussed how these results were in agreement with and different from the goals originally intended by Fathy and Alexander.

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                        goal

              ends        │
                          │
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  instrument   ───────────┼───────────   direction
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                          │       means
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                      ground
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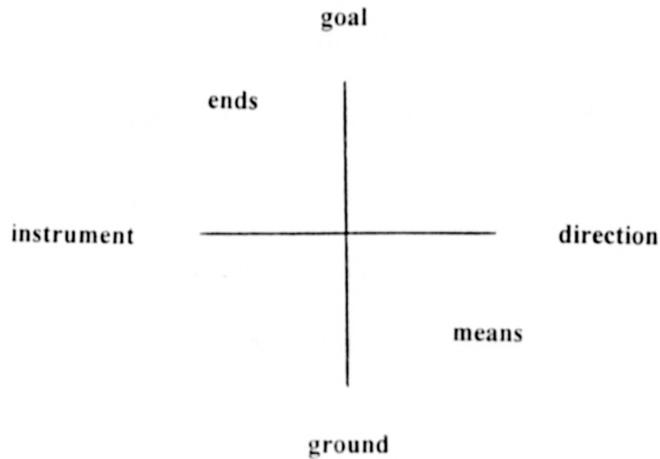
Figure 8.1: The means and ends of the tetrad (as drawn by author from Bennett, 1993, p. 66)

Thus, we find that the discussion in chapter 4-7 indicates that the resulting constructions at New Gourna and Mexicali are largely the result of design concepts and the methods of implementation—i.e., the means to achieve the ends of an activity, actualized through instrument and direction and indicated in figure 8.1 by the horizontal line. These concepts and implementation methods are directed and given force by the ends—in other words, by the sense of vision marked by the goal as it is actualized from the ground—as represented by the vertical line of figure 8.1. Therefore, we realize that successful design is guided by a specific vision that arises from a specific site and from a strong design concept grounded in theory and a feasible method of implementation. Extrapolating this idea to that of housing, we can say that a successful housing project is the result of two basic impulses—first, the ground and vision that form the backbone of the design concept

and, second, the conceptual awareness and method of implementation that allow the vision to be actualized through design. In the preceding chapters, we have seen how the various instrumental and directional differences at New Gourna and Mexicali led to certain variations in the goals that were finally achieved. However, in order to evaluate the overall success and failure of New Gourna and Mexicali, it is not sufficient just to review the two projects' immediate goals but also to view these experiments on the broader spectrum of housing as a whole. Such an evaluation will help us view the larger goals achieved by Fathy and Alexander at New Gourna and Mexicali, thereby making explicit the projects' strengths and weaknesses in a wider perspective.

In order to view Fathy and Alexander's achievements at New Gourna and Mexicali on a broader spectrum, we need to establish some framework of evaluation. Based on the work of Fathy, Steele (1997) arrived at a set of six principles which he claims guided Fathy throughout his career. Though Steele applies the principles only to Fathy, we will use these six principles here as a way to evaluate both Fathy and Alexander in broader architectural terms, especially in terms of housing. These six principles are (Steele, 1997, p. 16):

   (1) primacy of human values in architecture;

   (2) importance of a universal rather than a limited approach;

   (3) use of appropriate technology;

   (4) need for socially-oriented, cooperative construction techniques;

   (5) role of tradition;

   (6) re-establishment of national cultural pride through the act of building.

The overall goals of the New Gourna and Mexicali projects will be compared in light of these six principles, with the discussion of the New Gourna project first, followed by the Mexicali project.

1. PRIMACY OF HUMAN VALUES IN ARCHITECTURE

According to Steele (1997, p. 16), the ideals and aspirations of clients and users should be reflected in the places designed for them, thereby calling for a humanistic approach to architecture rather than a materialistic approach. Steele believes that incorporating human values in architecture is of prime importance, since he believes the ultimate aim of architecture should be user satisfaction. Thus, actual human beliefs and requirements become centrally important in environmental in design. At New Gourna, Fathy made every attempt to incorporate the needs of the Gournii, while at Mexicali, Alexander made every attempt to tailor the houses to meet the needs of his users.

Primacy of Human Values at New Gourna

In the preceding chapters, we have seen the extent to which Fathy sought to incorporate the experiences and values of his users--the Gournii--in his design and construction process. Fathy believed that his clients should never be suppressed and forced to live in whatever houses he designed. On the contrary, he believed that every user had the right to participate in the design and construction process, irrespective of his social or economic status. He set himself apart from the majority of the practitioners of his time by rejecting the temptation to reduce the users of buildings to anonymous ciphers (Steele, 1997, p. 16). In his search for a feasible solution to the problem of housing the poor,

Fathy attached much importance to the beliefs of the poor. Fathy was concerned not only with solving the housing problem within Egypt, but also with the plight of the homeless throughout the world. By trying to involve the Gournii in the construction of New Gourna and by making an attempt to bring the craftsman back into the construction domain, Fathy tried to reestablish the significance of the *trinity*. Though his efforts were not successful, Fathy, through his Architecture for the Poor has proved beyond doubt that human values are central in the construction and rehabilitation of any community.

Primacy of Human Values at Mexicali

At Mexicali, Alexander also made sure that human values and needs were uppermost in his neighborhood design. The entire process at Mexicali hinged on a close working relationship between Alexander and the five families. By this cooperative act of construction, Alexander sought to achieve wholeness in the houses and the neighborhood—a wholeness arising out of the human rhythm of the building process. This attitude clearly indicates the importance that Alexander attached towards the incorporation of human values in construction. As we have already seen, Alexander and his design team helped the five families design and build their homes, taking into consideration their specific requirements. The families were given the opportunity to express their free will and also an opportunity to express their opinions in the design and construction process, thereby indicating their significant contribution to design, especially during implementation.

Thus, we find that at both New Gourna and Mexicali, human values were indeed held in great esteem. Though a close working relationship with the Gournii did not fully materialize at New Gourna, Fathy's goals were, nevertheless, focussed in such a direction. The extent to which the five families at Mexicali were attached to their houses, as discussed in chapter 7, clearly indicates the human bond that arises out of such a cooperative construction process when it proceeds successfully. It is important to note here that, Fathy attached more importance to the actual needs of the Gournii at the designing stage, while the maximum contribution of the five families occurred at Mexicali during the implementation stage. However, we do find a strong similarity between the New Gourna and Mexicali projects in terms of the importance attached to human beliefs and values in design and construction.

2. IMPORTANCE OF A UNIVERSAL APPROACH

Steele (1997) feels that it is necessary to approach architecture from a broader perspective, drawing upon other fields like sociology, anthropology, the natural sciences and other relevant studies. Since every design calls for a wide range of expertise ranging from human needs to technical details of construction, it is necessary to draw understanding from many different disciplines and backgrounds. Both Fathy and Alexander were able to draw from their knowledge of other fields. While the importance of sociology seems to have guided Fathy, an earlier training in geometric principles and spatial symmetries seem to have been the backbone of Alexander's search for wholeness.

Fathy's Reliance on Arts and Sciences

Fathy was not limited by a narrow functional or technical view of architecture, but saw it instead, as an act that involved every aspect if human endeavor (Steele, 1997, p. 17). In his search for the missing link in the Arab architectural tradition, Fathy did not restrict his search within Egypt but studied the entire Middle Eastern region. Besides the strong influence of his religious beliefs in his works, theology, sociology, science, music, literature, art and dance also guided his architectural efforts. At New Gourna, besides playing the vital role of a designer, Fathy also assumed the role of a sociologist. He believed that if the Gournii were to be rehoused in a new village, then his designs for the new village should reflect their existing living patterns. Irrespective of the fact that the Gournii were uninterested in the entire project, Fathy studied the spatial layout of Old Gourna and tried to recreate, to the best extent possible, a similar spatial pattern at New Gourna.

Moreover, rather than just concerning himself with housing the Gournii, his efforts were centered around a larger perspective of the rehabilitation of the entire Gournii population. Thus, we find that Fathy's solutions were not restricted only to the domain of architecture but involved a much broader realm—the full world of human life. Rather than scattering his energies, he was able to bring them to bear on his architecture, which he considered to be the mother of all arts (Steele, 1997, p. 17). New Gourna, proved to be an experimental ground wherein Fathy could concentrate all his expertise to realize the goal of designing a successful community.

Alexander's Reliance on Spatial Geometry

Likewise, in many ways, Alexander's efforts at Mexicali, point towards a universal approach to architecture. Though Alexander's immediate aim was the achievement of wholeness in the houses and neighborhood of the five families at Mexicali, he was also concerned with a larger problem--achieving wholeness in the entire environment. Alexander firmly believed that the way to achieve this wholeness was through incremental, piecemeal growth. This idea was actualized at Mexicali by the step-by-step construction process. Alexander was also trained in mathematics and chemistry; other interests included painting and music. His major concern was geometry, therefore, his search for wholeness centered to a large extent on geometric properties of structures in the environment. This interest in geometry brings out another facet of Alexander, which has a direct effect on his designs—his interest in very early Turkish carpets. Alexander believed that these carpets were his teachers and were instrumental in revealing how geometric parts interact to create wholeness. At Mexicali, Alexander's overriding aim was to achieve this wholeness at the level house and community. The route to achieve this wholeness was through a system of architect-builders, builder's yards, and a cooperative way of building. Mexicali was an experiment to test the feasibility of such an approach.

Thus, New Gourna and Mexicali both exemplify the universal approach to building as adopted by Fathy and Alexander. Though the extent to which these approaches were universal varied, the aims were similar. Since the New Gourna project was larger in scale, the opportunities for the incorporation of universal values were more than at

Mexicali. Nevertheless, both these projects clearly indicate that both Fathy and Alexander were strong proponents of a universal rather than a limited approach to architecture.

3. THE USE OF APPROPRIATE TECHNOLOGY

Just as important it is to draw from other related disciplines in architectural design, it is equally important to make sure that innovations meet the local needs of people. One significant means here is to draw upon appropriate technologies for solving design and construction problems. The use of appropriate technology especially gains significance in light of the fact that housing needs to be sensitive, both to locational and to temporal contexts. At New Gourna, Fathy believed that technology should be used to make the lives of the Gournii better, thereby eliminating habitual copying of earlier methods. At Mexicali, Alexander adopted the same principle of tempering technology to suit the local needs. However, a major difference between the two architects' approaches is the fact that, while Fathy resorted to modifying traditional techniques to suit contemporary needs, Alexander conducted several experiments with modern construction materials so as to make them fit the exact needs at Mexicali.

Fathy's Use of Appropriate Technology

According to Fathy, technology should be applied in a way appropriate to both its users and its environmental context and be controlled by what he describes as "the innate knowledge that came directly from the emotions without study or analysis, or from what psychology called the subconscious" (Steele, 1997, p. 17). Fathy strongly believed in the

idea that technology should be adapted to meet specific human needs, and the New Gourna experiment provided evidence of this belief. Fathy's use of courtyards and public squares as natural ventilating devices demonstrate that his efforts were centered around benefiting human needs by the use of natural devices. His specific technological innovations are illustrated by his experiments with the laundry pit, the Austrian *kachelofen* (the oven-stove) and the *malkaf* (wind catch).

In order to evaluate the extent to which Fathy was successful in modifying technology to suit local needs, let us consider the example of how Fathy sought to solve the problem of heating the rooms of peasant houses in winter. Traditionally, the Gournii had used either a baking oven or a charcoal brazier. The baking ovens, usually occupying a large space within the bedroom, had no chimneys and hence let smoke into the room. On the other hand, the charcoal brazier gave too little warmth and let out poisonous carbon monoxide fumes (Fathy, 1973, p. 97). Hence, judging the inefficiency of both these methods of heating, Fathy decided to seek an appropriate solution to the problem of heating the Gournii houses in winter.

This search led Fathy to Austria, where, in the villages of Tyrol, he came across the *kachelofen*--a kind of stove used by peasants to heat their houses during winter. As figure 8.2 shows, this stove used a very intricate system of partitioning to direct hot gases of combustion forwards and backwards, so as to allow more time for the heat to radiate into the room before it escapes (Fathy, 1973, p. 97). In Austria, these stoves were made of fire clay tiles on the inside and glazed decorative tiles on the outside. Fathy decided

that this system would work efficiently at New Gourna, and he worked out modifications

in the original design, so as to meet the local heating needs of the Gournii.
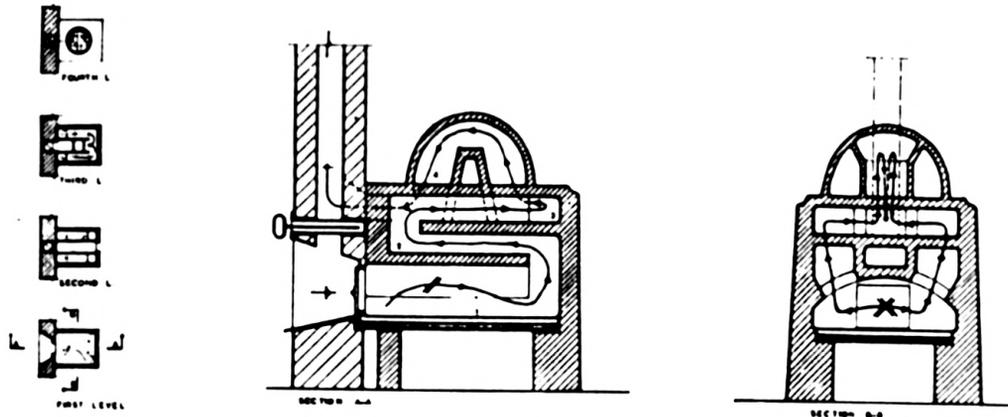
Figure 8.2: Sections of the Austrian *Kachelofen* (Fathy, 1973, figure 115)

After having studied the principle behind the working of the *kachelofen*, Fathy decided

that, in order for it to be used in New Gourna, it should be locally made at an affordable

price. Fathy located a local woman who made traditional baking ovens and taught her to

make *kachelofens* out of mud and donkey droppings (figure 8.3). These stoves were

designed to burn anything, including household sweepings and kitchen refuse (ibid.). In

order to make them affordable to the Gournii, Fathy ensured that they were available at a

very nominal price of just thirty piasters (approximately ten American cents). One type

of these ovens incorporated a baking oven and was set inside the bedroom against the

wall, with the oven door opening outside to the courtyard. The houses were also

designed with flues to release the oven's smoke. These modifications illustrate how

Fathy modified and improved traditional technology to improve existing living conditions

and to meet local needs of the Gournii.

FIRST LEVEL PLAN   SECOND LEVEL PLAN   SECTION A-A
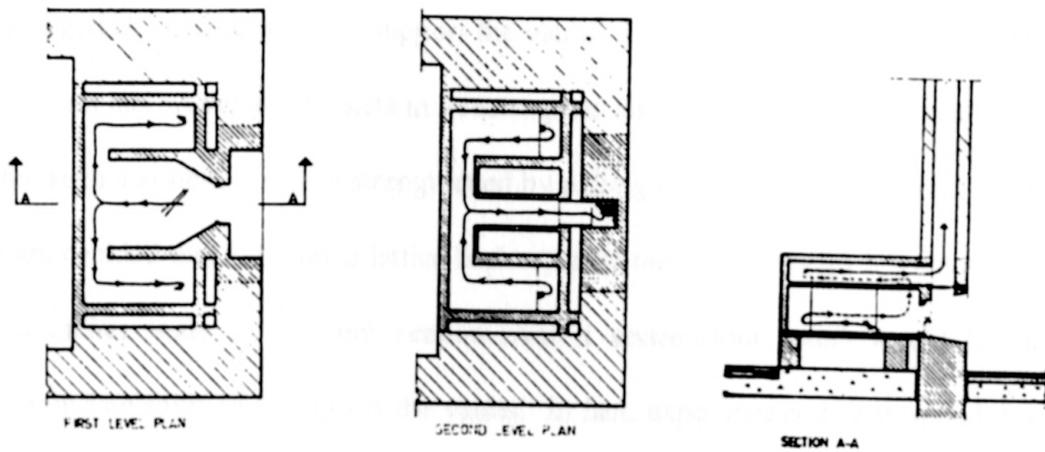
Figure 8.3: Sections of the mud brick *kachelofen* developed by Fathy (Fathy, 1973, figure 116)

Alexander's Use of Appropriate Technology

On the other hand, Alexander relied on modern materials of construction for the

realization of his objectives at Mexicali. Alexander believed that the construction

possibilities for concrete were far more that what builders and engineers claimed.

Alexander realized that it was important to experiment with concrete so as to arrive at a

house design that met not only the structural requirements but also aesthetic criteria. At

Mexicali, Alexander used interlocking soil cement blocks and ultra-light weight concrete

vaults over lightweight woven wood baskets. It is useful to examine how Alexander

arrived at the design of these baskets to hold vaults designed to roof the houses at Mexicali.

Had Alexander resorted to building vaults in the regular fashion, it would have involved costly formwork for supporting the vault during construction. Therefore, Alexander had to work out a simple and affordable alternative to formwork which involved steel plates arranged in a basket form to support the vaults (see figure 8.4). At first, Alexander and his team had woven the baskets in a rectangular fashion. Further experimentation proved that such a system could be strengthened by nailing each intersection. Finally, the design team decided that a diamond lattice basket (made out of steel strips 3/8 an inch thick and 1¼ inches wide at one-foot centers over a sixteen-foot span) would be the most appropriate solution to support the vaults. In fact, experiments demonstrated that such a basket could support a man spread-eagled on it (Alexander, 1985, p. 105).
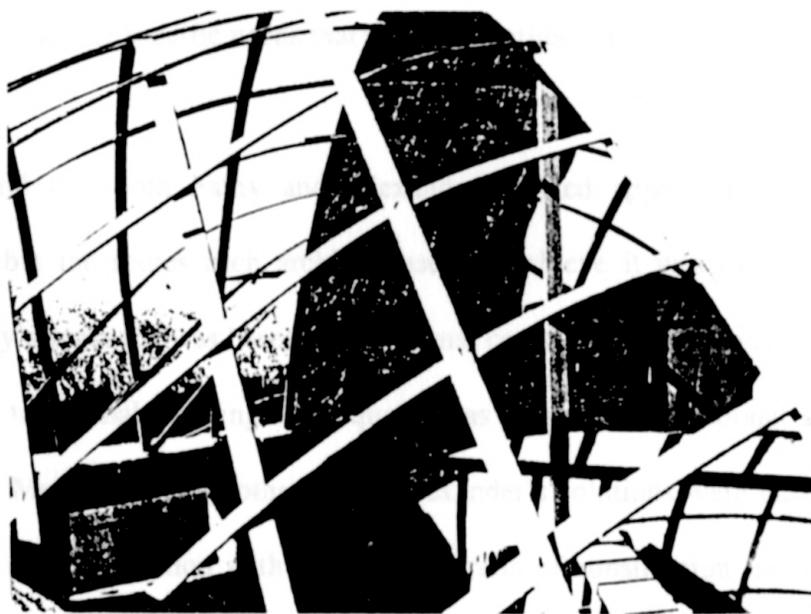

Figure 8.4: Roof baskets designed by Alexander and his team at Mexicali (Alexander *et al*, 1985, p. 246)

This effort illustrates how Alexander and his design team experimented and modified technology and materials to suit local needs. Instead of using an ordinary mix of concrete, in which vaults would have called for heavy beams and reinforcements, Alexander experimented with various mixes of concrete to arrive at a lightweight and efficient design. Hence, the vaults were made with a mixture of volcanic pumice (a black, lightweight rock locally available) and perlite (an ultra lightweight and more expensive aggregate brought from California) (Alexander, 1985, p. 105). Besides this effort, Alexander and his team also designed and manufactured special corner blocks, wall blocks, round column blocks (figure 8.5), foundation blocks, and molds to prepare these various blocks. The materials that went into the walls and roofs were also determined only after several experiments. As we have already seen, all these experiments were conducted in the builder's yard, which was the center of activity during the building process. By virtue of all these experiments, Alexander ensured that the technology and the materials for house building were appropriate not only to meet financial constraints but also to provide the specific needs that the five families had for their houses.

Thus, we find that both Fathy and Alexander utilized appropriate technology for construction but the routes each architect used to achieve it was different. At New Gourna, Fathy's approach was based on traditional construction techniques and materials. He modified traditional building techniques so as to suit the situational and temporal contexts. At Mexicali, on the other hand, Alexander's solutions were based mostly on research and experimentation with modern materials of construction like concrete. In spite of these differences, both efforts called for innovation on the part of the designer

and the motivation to use technology creatively to meet human needs. In this regard, both Fathy and Alexander's attempts aimed at the same objective—sustainable technologies meeting people's real, everyday needs.

Figure 8.5: Manufacturing of column blocks in the builder's yard (Alexander *et al*, 1985, p. 101)

4. COOPERATIVE CONSTRUCTION TECHNIQUES

Besides the use of appropriate technology, it is also important that people come together in the act of construction. This cooperation forms the basis of self-help housing and helps not only to reduce the overall cost of the project (since most of the labor is provided by the users themselves) but also helps in fostering a sense of community. Though it was Fathy's original intention to involve the Gournii in design and construction at New Gourna, it did not materialize due to the indifferent attitude expressed by the Gournii.

However, at Mexicali, this aspect of cooperation worked well and the families through cooperative labor actualized their housing cluster.

Fathy's *Trinity* at New Gourna

Fathy believed that the solution to the problem of housing the poor was in cooperative construction. Given the poor economic condition of the Gournii and realizing the high costs of manual labor, Fathy believed that the problem of peasant housing could be solved only if the peasants built their own houses. At New Gourna, Fathy envisioned that by involving the Gournii in the construction of their village, he could achieve two things. Firstly, the new village would turn out to be a living entity, replete with the enthusiasm that would arise from the participation of the users. Secondly, the village would be cheaper to build, since user participation would eliminate hired labor. But this vision of Fathy did not materialize, as the Gournii refused to participate in the process of relocation and thereby forced Fathy to resort to hired labor for construction. In the close working relationship that Fathy tried to achieve between the architect, the Gournii and the craftsman, there did turn out to be a certain coordination between the architect and the craftsmen at New Gourna. We can therefore infer that Fathy's dream of user participation did not materialize at New Gourna, at least to the extent to which Fathy had originally intended.

Interestingly, Fathy's one other attempt at cooperative housing—the village of New Baris in the Kharga Oasis of Egypt—did not materialize either, thereby making it difficult to assess the success and failure of Fathy's efforts at self-help housing. This later project,

which began in 1967, was to provide housing for 250 families of an agricultural community in the Egyptian desert. Since the inhabitants of this community were to be settlers from other regions of Egypt, Fathy was not able to get to know his users and therefore resorted to a more prototypical approach to house and village design.

Figure 8.6 shows the plan of a pedestrian street at New Baris, formed by five houses. Fathy arrived at this layout after a careful study of traditional villages of Egypt's Old Kharga region, which were characterized by winding streets and introverted house forms (Steele, 1997, p. 133). As the figure shows, each house had its own courtyard, similar to the houses in New Gourna and was designed by Fathy to counter the intense summer heat of the region. Unfortunately, none of these houses were constructed and the market place, or *suq*, was one of the few buildings to be constructed, before the Egyptian government halted the New Baris project due to war with Israel in 1967.
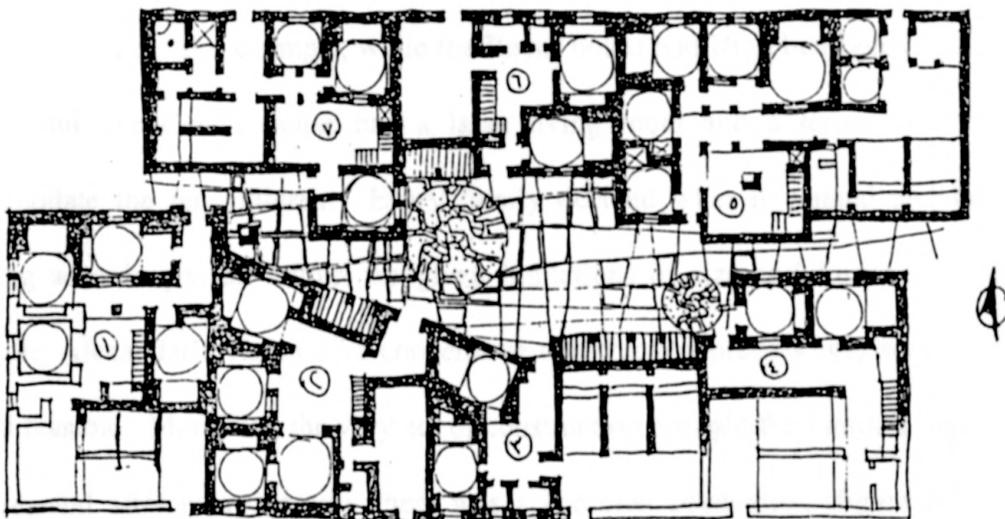

Figure 8.6: Plan of a pedestrian street in the village of New Baris, Egypt (Steele, 1997, p. 142)

Alexander's dialogue at Mexicali

At Mexicali, on the other hand, the entire construction revolved around a close cooperation between Alexander and his team and the five families. Alexander and his team of apprentices always worked in unison, commencing with the layout of the common land and finishing with the completion of the individual houses. Alexander believed that that the users knew more about their day-to-day needs than anybody else. Hence, this process of user participation made sure that these needs of the users—the five families-- were incorporated into design and construction. Thus, Alexander hoped that the resulting environments would be better adapted to the actual user needs.

Alexander was against any centrally administered planning and construction process, which paid little attention to the needs of the users. Working against such an inhuman system, Alexander and his design team helped construct the five houses at Mexicali, which were unique and tailored to meet the individual requirements of the five families. The families decided the number of rooms that they would require in their houses and their relative sizes. For example, while the Reyes house had large bedrooms and a small living room, the Cosios house had a large living room and a series of alcoves to accommodate the ten children. Every family decided what it wanted and built the dwelling accordingly, all within the given limitations of size and finances. Thus, at Mexicali, Alexander's vision of a cooperative construction process was successful and proved feasible. Moreover, the very act of construction brought the families together for a cause, and after every activity there was a common celebration (figure 8.7). This participatory process was more than just construction--it was a social activity. However,

based on Fromm and Bosselmann's (1984) reports discussed earlier, this aspect of cooperation did not continue to exist among the families, once construction was finished. Thus, Alexander's larger aim of achieving communal harmony arising out of people's coming together did not materialize at Mexicali.

Figure 8.7: Celebration after the completion of an activity at Mexicali (Alexander *et al*, 1985, pp. 20-21)

Just as Mexicali was an experiment involving user participation in a housing project, Alexander and his team also conducted an experiment to incorporate user needs in urban design. In New Theory of Urban Design (1987), Alexander proposes a totally new holistic approach to design of urban environments. This urban design experiment involved an urban proposal for the development of an area adjoining the waterfront in the San Francisco bay area. The main concept behind this experiment revolved around

Alexander's seven rules of wholeness, which were ultimately intended to achieve environmental wholeness at the level of the city. This experiment was conducted by students (taking the place of actual users) and a supervisory committee (taking the place of actual planning authorities) and tried to demonstrate how active user participation coupled with participatory dialogue could be instrumental in the creation of a successful city. Figure 8.8 shows the final proposal for the development of the bay area, which centers around a distributed network of mixed-uses. Though this experiment was entirely theoretical and needs further real-world examination, Alexander's effort in New theory of Urban Design indicates the possibility and significance of user participation at the level of urban design.

Figure 8.8: A proposal for New Theory of Urban Design, San Francisco (Alexander *et al*, 1987, p. 106)

Hence, we find that, although both the New Gourna and Mexicali projects were intended to be cooperative ventures in construction, it was actualized effectively at Mexicali but not fully at New Gourna. Time was a major factor that proved to be an obstacle in both the New Gourna and Mexicali experiments. Since the self-help housing process involves active participation of the users and dialogue with the designer and builders, the projects took more time for completion than a usual contractual project. At Mexicali, the users, with no prior expertise in designing or building, took time to get used to the entire approach and hence the progress was gradual. This was seen as a disadvantage by the government officials at Mexicali and was considered a major reason for terminating the project before the construction of the remaining four dwelling clusters.

However, both the New Gourna and Mexicali experiments demonstrate that one major advantage of cooperative construction is cost control. Since the involvement of the users in construction eliminated hired labor to a very large extent, this helped in keeping the overall cost of the project within tight financial constraints. This cost factor becomes extremely important in light of the fact that, usually, budgets for housing the poor are low. Thus, New Gourna and Mexicali offer concrete examples of an effective system of controlling costs of implementation. The cost efficiency of self-help housing is a major reason why such an approach can be considered crucial for solving the problem of housing the poor.

5. ROLE OF TRADITION

While we find that both Fathy and Alexander integrated cooperative construction techniques into their experiments, the extent to which the two architects incorporated traditional values into design and construction varied considerably. New Gourna was situated close to famous architectural ruins and Fathy sought to represent a rich cultural heritage in his design of New Gourna. Thereby, he deemed it appropriate to adopt an approach to design and construction based on traditional values, beliefs and methods of construction. In every possible manner, Fathy tried to incorporate these qualities into his design. At Mexicali, on the other hand, such traditional lifeways were not immediately available, and Alexander and his design team were not able to incorporate local and regional values in design and construction.

Traditional Approach to Design and Construction at New Gourna

According to Fathy, tradition represented the accumulated result of an ongoing way of life and is loosely tied to the complicated cycles within each individual culture (Steele, 1997, p. 20). As a result of Fathy's strong concern for traditional values and beliefs, he sought solutions to his problems from within his own Arab culture. He believed in the fact that the solutions to the housing problems of Egypt was within Egypt itself. In accordance with these beliefs, the New Gourna project shows a strong reflection of traditional Egyptian vernacular architecture. The placement of the five tribes at New Gourna was arrived at after a careful study of their existing social patterns at Old Gourna. The concept of the courtyard, both at the level of the individual house as well as at the

level of the *badana*, indicates an approach that shows a reverence for traditional customs and methods of construction.

Even in the use of a traditional material like mud brick and the use of historic forms like vaults and domes, Fathy ensured that he carried forward a tradition that had been held in great esteem for several centuries. Besides his efforts to ensure this continuity in tradition, Fathy also made every possible attempt to revitalize the crafts industry. Not only did he construct a crafts khan at New Gourna, wherein apprentices would be trained in various crafts; he also made arrangements to sell these wares in a permanent crafts exhibition at New Gourna so as to make this venture economically feasible. Thus, Fathy was concerned not only with the incorporation of his concepts but also with the practicality of his ideas over time. Had New Gourna been completed and occupied by the Gournii, it might have become a perfect example in which to study the extent of applicability of traditional values in design and rehabilitation and also judge the extent of its success. Nevertheless, the fact that New Gourna was replete with traditional forms and beliefs has to be acknowledged.

On the other hand, it is also extremely important to acknowledge the severe impediments that such an approach based on tradition is likely to encounter in contemporary times. It is a undeniable fact that construction today is directed by motives of profit, expediency and speed, rather than by the effort to sustain human needs. In such a situation, traditional customs and beliefs--let alone traditional materials and methods of construction--are hardly ever considered. With the rapid modernization of the

construction industry, more and more machines dominate the site, which was once the realm of human beings, as at New Gourna and Mexicali. In spite of these rapidly changing attitudes, however, a few individuals continue to attempt a building system based on a reverence for tradition and heritage. Architects like Abdel Wahed El-Wakil in Saudi Arabia, Rasem Badran in Jordan (both disciples of Hassan Fathy) and Mexican architect Ricardo Legorreta (a disciple of Luis Barragan) are examples and work toward a critical reinterpretation of the past in order to constructively inform the architecture of the present (Steel, 1994, p. 2).

Pattern Language Approach to Design at Mexicali

On the other hand, at Mexicali, we have little idea as to whether or not Alexander and his team incorporated local traditions into their construction process or buildings. Contrary to Fathy, for whom New Gourna was an experiment within his own culture, Alexander was working with families whose cultural background was greatly different from that of his own. Alexander's pattern language approach draws considerably from traditional and historic examples of architecture, and the use of this approach at Mexicali indicates that the process of construction did have an indirect connection to traditional ways of building. The use of the courtyard, for example, was not only part of the pattern language approach but had also been appropriate in the traditional Mexican architecture involving the hot and dry Mexican climate. The layout of the houses in the form of a cluster surrounding a courtyard, the incorporation of the courtyard in the builders yard, and the use of private gardens indicate a climate-sensitive approach to designing and

building, though Alexander does not tell us whether these elements have any allegiance to vernacular Mexican traditions.

Similarly, the forms of the buildings constructed at Mexicali do not indicate any particular reference to a Mexican way of building. The use of the vault to roof the houses is not attributed to any vernacular custom and may have risen out of the material and financial restrictions that the design team had to face. According to Davis (1997), many of the final patterns had been arrived at after a careful study of the surrounding area. This is a clear indication of some incorporation of existing values and traditions. Since Alexander and his team were new to the Mexican region, they had to resort to the adoption of values based on observation. Hence we find that the pattern language provided some help to bridge this gap in culture and help the Mexicali design have some relation to its regional and historic context.

In this sense, the pattern language provides a platform for understanding concepts related to form, function and aesthetics, especially for laymen not trained in the fields of architecture or construction. It provides a language by which people involved in construction for the first time are able to visualize spatial criteria, functional requirements and aesthetic qualities, especially in the absence of detailed drawings as in such a system proposed by Alexander. Visualization becomes much easier for the participants and, with proper introduction to the pattern language, people will be in a better position to start the construction of their homes. In short, the pattern language becomes a vocabulary of

themes that people can use in their houses, depending on the specific location and context.

It is important to note here that the patterns are not intended to be picked from the mother volume A Pattern Language and incorporated on site. Instead, the spirit of the particular pattern is to be realized and must be molded and modified to suit the local spatial and temporal context. Hence, the pattern language is designed to act as a guiding force towards design and construction. However, this pattern language approach also has its weakness, since it calls for prior knowledge of the pattern language and its values. This requirement means that, in order to educate the participants of its virtues, there needs to be several architect-builders well versed in the pattern language at all those places where such projects are to be carried out. Hence, this system will not materialize on a broad scale unless there is a network architect-builders and builders yards already established.

From the above discussion, it becomes clear that both New Gourna and Mexicali had a reference to traditional ways of construction, but ultimately, Fathy made much greater efforts to incorporate tradition and reestablish customs than Alexander. Nevertheless, a central reference point for both projects was traditional buildings and construction methods. The difference between the two experiments is that this reference was direct and adapted at New Gourna, while at Mexicali, it was indirect and, overall, not thought out as thoroughly as it probably should have been.

6. NATIONAL CULTURAL PRIDE THROUGH THE ACT OF BUILDING

The last theme that Steele (1997) emphasizes in his overview of Fathy's architecture is the achievement of national cultural pride through the act of building. Architecture is not just about making buildings but also relates with the physical shaping of the environment for social and cultural ends. In this sense, architecture can be used to reestablish old values to promote new values. In short, architecture is one important means for educating large number of people. At New Gourna, Fathy hoped to make the Egyptians realize the significance of their own rich cultural tradition. At Mexicali, on the other hand, Alexander sought to establish the significance of a new paradigm in architecture which called for a humanistic approach to design and construction.

Re-establishing Egypt's Cultural Pride

Through his architecture, Fathy was determined to reawaken a sense of cultural pride among his countrymen and to make them aware of their rich architectural heritage. According to Steele (1997), Fathy's efforts, including New Gourna, have been instrumental in making many young people realize the importance of their own culture and beliefs. At New Gourna, Fathy's solutions, keeping in touch with modern Western architecture, could have revolved around concrete, steel and glass. In this sense, Fathy could have designed prototypical houses of concrete and forced the peasants to occupy them. Instead he chose the more difficult route to reestablish the vernacular expression of which Egypt and its villages were once so proud.

Fathy's use of mud bricks, vaults, domes and courtyards clearly indicate his effort to reestablish a vernacular identity amid changing times. In addition, his attempts to reestablish traditional crafts through the crafts khan, his activities with the traditional theater and in the village market show that Fathy made a great effort to reestablish customs and traditions that were being lost. In doing so, Fathy hoped to reestablish national cultural pride through the act of building. New Gourna is an exceptional example in this direction. Though it was not completed, New Gourna demonstrates a sense of pride and reverence for Egyptian culture and its values.

Establishing a New Architectural Paradigm

In contrast, Alexander's efforts at Mexicali were concentrated in a direction other establishing national pride. Al Mexicali, Alexander sought to achieve at the level of the house and the community. Through the act of a decentralized, step-by-step, cooperative construction system involving the users, Alexander hoped to renew the quality of the environment that existed in traditional towns and cities—what Alexander refers to as "the quality without a name" (Alexander, 1979, p. 25). Thus, while Fathy was primarily concerned with the issue of cultural identity, Alexander's efforts centered around piecemeal growth and wholeness in the environment.

From the above discussion of New Gourna and Mexicali, it is evident that both approaches have their particular strengths and weaknesses. However, one strong point that both projects share is their overall goal of achieving successful houses and neighborhoods with the active participation of the users themselves. The current need is

to experiment further with such an approach, so as to reduce the weaknesses and reinforce strengths. Further research on the adaptability of such a system in contemporary times and the modifications necessary in the current construction system to accommodate such a way of building should prove beneficial for moving toward a successful system of self-help housing.

In order for such a self-help housing system to flourish, it is important to carry out additional experiments like New Gourna and Mexicali on an increasing scale so that the merits of such a system actually reach the people, especially the poor. More importantly, such experiments need to be regularly evaluated so that the weaknesses of such a system can be overcome. With repeated experimentation, such a system may eventually be recognized as a significant alternative to the contractual, mass production of houses. In the end, the final result of both self-help and contractual systems of production is a house, but with one vital difference. The dwelling built by self-help housing is replete with human involvement and aspirations, while the mass-produced dwellings are not. This crucial difference leads us to the ultimate aim of all true housing—the creation of successful living environments that meet the exact needs of the users. Self-help housing is not just about making houses—rather, it is about people coming together in the act of creating a sense of place where they can live "the good life." In this sense, Fathy and Alexander's experiments are crucial models for emulation.

AN AUTHENTIC PLACE MAKING

Finally, this discussion leads us to the crux of place making as a whole—a sense of belonging. Although the ultimate aim of most construction should be creation of authentic environments with a sense of place, we find that, for various reasons, this objective is not always realized to its full potential. In Relph's (1976, p. 145) view, creation of such authentic environments involves what he calls "secularization"—an attitude which corresponds closely to self-conscious authenticity. This concept clearly indicates that a human being should first be true to oneself and his environment just as much as he should be in designing environments for other people. Finally, as Relph (ibid.) argues, what is needed in authentic place making is not a mathematical procedure that treats the environment like some machine that we are yet to understand but rather, an empathetic approach to the design of the lived-world of both everyday and exceptional experiences—an approach that is wholly self-conscious yet does not seek to create wholly designed environments into which people must be fitted; an approach that is responsive to local structures of meaning and experience; an approach that takes its inspiration from the existential significance of place and the need that many people have for a profound attachment to places. Whether or not we choose to adopt such an approach to place making is totally at our discretion. Housing experiments like New Gourna and Mexicali suggest that such opportunities at genuine place making do exist, though they are likely to involve many hurdles. Ultimately, we as human beings sharing a lived-world of experiences ought to decide upon the significance of such approaches to authentic place making.

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