Myron Goldfinger Villages in the Sun

Mediterranean Community Architecture With a foreword by Louis Kahn

Myron Goldfinger

Foreword by Louis Kahn

Villages in the Sun

Mediterranean Community Architecture



New York · Washington

BOOKS THAT MATTER

Published in the United States of America in 1969 by Praeger Publishers, Inc. 111 Fourth Avenue, New York, N.Y.10003, USA

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Library of Congress Catalog Card Number: 75–93045 Printed in Great Britain

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Acknowledgments

for June and Thira

to my mother and father, Bertha and William Goldfinger, two beautiful and humble people, who, by their early devotion, have inspired and will continue to inspire me through life

to Sibyl Moholy-Nagy and Bernard Rudofsky, who through their works and personal contact have inspired and guided my work for this book

to John Dixon and the staff of *Architectural Forum*, and David Travers and the staff of *Arts and Architecture*, for their enthusiastic support

to the Ford Foundation and the Architectural League of New York for their assistance in the completion of my research

and to the great anonymous builders of the Mediterranean who made it so easy to photograph, so reasonable to believe, yet so mystical to interpret

Foreword

Prevailance of order Prevailance of commoness Being is of order Desire to be of order is life To live is to express.

The spare atmosphere of Mars tells us of this prevailance to be; not of the attitude not of the choice, the vectors to the character of living forms and shapes.

In outer space the Earth is felt in wonder as if for the first time. This marble, blue green and rose, unique in our system makes us realize that man's work can be like no other.

The builder seeking a beginning is primed by his feelings of commoness and the inspirations of Nature.

Just a fragment of knowing steers wonder to intuition and to the acts of expression. In the presence of the mountain the water the wind the desire to express feels the possible. The site confirms the possible and encourages agreement on the beginning in the making of a man's place. A mere foothold is confident of the settlement, the first institution of man.

The works of man reveal his nature.

The time of a work holds its own validity from which the sense of truth can be drawn to inspire a work of another time. The city from a simple settlement became the place of the assembled institutions.

The measure of the greatness of a city must come from the character of its institutions established by those sensitive to commoness and dedication to man's desire for higher levels of expression.

The places of the island the hamlet the mountain draws us to them for their simple truth.

To leave them for the city must bring revived faith in new beginning. A city must ever be greater and greater.

Commoness is the spirit Art A work of art is an offering to Art

Louis Kahn

A community architecture

A community architecture must provide for the means of communication which can enrich and substantiate a true building art. Communal architectural survival must go hand in hand with a spirit of touch, see, and be. Barriers can only divide and cause aloneness and aloofness. A community architecture starts in the streets, extends into the parks, and reaches the rivers. It depends on public response for its very existence and therefore reflects the will of the people. What is achieved is a place for human experience, a rich variety of forms and spaces in which to live, a structural framework which permits the expression of the individual, and the participation of all.

Myron Goldfinger

Introduction

In architecture today, there are many branches of development that have become separated from their roots; poor building results from a lack of understanding of fundamental problems and from the superficial adaptation of expedient solutions. While our knowledge of technology and psychology has increased, we have not applied new techniques and methods to building, nor have we substantially increased our understanding of the basic problems of shelter.

The builders, the politicians, and the business-oriented architects are not alone at fault. A generation of serious architects has misunderstood and misinterpreted the social and psychological needs of the people. It has failed to make a significant contribution to housing, and it has not effectively guided public opinion, which is essential to promoting new ideas today. Only now, a new generation of architects is beginning to respond to this urgent need in a meaningful way, with thought, research, and determination.

Until this century of greatly accelerated achievement, man had built his habitat of local materials, in a strong, natural, and simple manner. His plan was direct and certain, based on function and necessity. And he took pride in his structure.

Now, with the confusion of mass materials and mass building, in response to technological development, population growth, and urban centralization, this direct relationship is terminated. But, despite these demands for rapid solutions to the need for more housing, we must not forget our relationship to the sun, the wind, the rain, and the land, the social and pyschological demands of our society, and the ingenious ways man has for centuries sheltered himself. Through our research into the valid aspects of an earlier community architecture, we can discover the basic roots of the development of community architecture and proceed with an enlarged vocabulary and clearer ideas to better planning and building of our own urban communities.

Today, there are two major problems raised by the changing conditions within our cities. First, there is a lack of cohesive order and sound judgment in the multiplicity of isolated structures; speculative ventures have created a disorder of anonymous high-rise residential structures in the midst of our urban centers. Second, the vast development of anonymous public residential structures has created large and monotonous expanses of building conformity lacking any vital ingredients for the enhancement of living. Together, these extreme conditions have completely destroyed neighborhood patterns and identity and have drastically affected the social orders of the original neighborhood residents while achieving nothing for the new urbanites. There is absolutely no feeling for urban unity, and less feeling for the urban community. About our cities, another blight has developed. The once harmonious landscape has been transformed and distorted by endless and anonymous suburban villages. The search for escape from polluted and claustrophobic urban living conditions has led many city dwellers to seek refuge in peripheral areas. In addition, the vastly accelerated urban-center population growth, coupled with lack of adequate rebuilding programs within our cities, has created a demand for even more perimeter housing. The speculator investment builders have catered to the immediate needs and financial capabilities of the desperate populace and bulldozed vast acreage adjacent to our cities into grids of separate but identical units stretching endlessly across former farmland and forest, hill, and marsh, creating continuous monostructures of isolated cells. Separation and isolation, uniformity and conformity, oneness and sameness are the banal standards in luxury, middle-, and low-income suburban planning-building, as they are in urban areas.

In our search to improve our conditions, we may look for spiritual guidance to the towns and villages of the Mediterranean—contained communities similar in size and scale to our new suburban villages or our urban neighborhoods. Mediterranean villages have developed organically within economical and repetitive forms whose roots are similar to our own community structures.

What is achieved is a harmonious working arrangement with the site: coming to terms with rather than pompously destroying it, building it rather than levelling it, defining it rather than distorting it.

What is achieved is a place for human experience; a rich variety of forms and spaces in which to live; a structural framework that permits the expression of the individual and the participation of all the community.

For architects, students of architecture, and the interested public, this book is intended to serve as an introduction to the popular architecture of the Mediterranean. I have chosen what I consider the most representative examples of the numerous villages that reflect the culture of the Mediterranean popular builders. There are many factors that relate these villages conceptually to each other; centuries of trade and conquest have diffused ideas and forms. However, the great common bond has been the honest, intelligent, and natural way man has solved his problem of shelter.

We cannot repeat the Mediterranean structures; we do not want to repeat their designs. We have new social orders that demand new approaches. We have new materials that demand new responses. We have new technology that demands new creativity.

However, the human living condition persists, and, with it, the need for shelter, for storage, for privacy, and for communal experience; the need for









air to breathe, for sun for warmth, for nature to enjoy and respect. These obvious, simple, and pedestrian needs will remain no matter how technological and sophisticated our societies may become.

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It is my hope that our architecture and our planning will respect these needs, that a humanism in architecture will evolve not an artificial picturesqueness or quaintness, but sound and strong statements reaffirming the dignity of man and affirming his progress.

History

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Since ancient times, man has formed communities for protection, because of economy, and to fulfill his need for human contact. The earliest villagers built with local materials on selected protective sites or burrowed within the earth itself. A constant and organic development of shelter has occurred in all parts of the world. Although it is possible to isolate certain characteristics in relation to such natural conditions as climatic changes, earth composition, and water resources, artificial political or racial boundaries have never distinguished building types. In forested areas, man lived in trees or built from wood; in rocky regions, man lived in caves or built with stone. Sometimes, there was an abundance of natural wealth. However, limited resources encouraged man's own genius to discover and work with the simple materials within his grasp. Therefore, it is entirely logical that human beings, although isolated from each other by bodies of water or mountain ranges, would arrive at similar solutions to identical problems in many regions of the earth.

Isolated unit

The nucleus for the development of the village form has been the isolated unit or farmhouse, which eventually became the basic unit of habitation, or housing type. This unit was developed primarily for human shelter as protection from extremes of temperature, rain or snow storms, and strong winds, and as protection from man's enemies, both human and animal. In addition, it provided storage for foods and tools, and sometimes protection for domestic animals. In the most primitive dwelling, this was accomplished in a single, simple space, with a solitary access door and perhaps an additional aperture for ventilation. As life became more complex, needs and families increased, and additional chambers were constructed, sometimes vertically, in additional levels, or horizontally, as additive building units or walled separations within the basic volume. Forms always evolved from internal space needs, and the dwelling's size, shape, and number of apertures also reflected specific functions. External influences also affected the plan. The atrium or courtyard house developed in response to the need for a private outdoor workroom or family room, protected from enemies, windstorms, or some other local consideration; a steep hillside generally suggested a plan of several levels to take advantage of the contours; flooding conditions at rivers or seashores determined a dwelling type raised on pilings.

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Village development

It was advantageous for family or tribal groups to band together for collective defense or work, and communities were formed of units either isolated in space or, more often, attached in rows or clusters. This new relationship limited expansion of the unit, but the communal advantages obviously outweighed the disadvantages of isolation. Materials were gathered collectively; scaffolding was re-used; more tools were available; common paths were constructed. The atrium house took on a new function; it provided privacy more than protection. Other dwelling types developed projecting balconies and roof terraces to compensate for territorial limitations. In each instance, there was a sound economic basis for the development of the community, and this superseded such considerations as privacy, expansion, and individuality. Therefore, within the established structural framework, zoning for privacy was introduced, maximum utilization of space was intensified, and a search for individual expression and identity









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was established. This encouraged new approaches toward both the living experience and the building process. It promoted new solutions in response to the new challenges.

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Characteristics

From the beginning, very different community systems developed in response to such local and regional characteristics as topography, climate, and available materials, and to such social requirements as family groups, community organization, and livelihood of the settlers. Although a great variety of very different social forms and town organizations existed, certain basic concepts common to all vernacular villages may be identified. The six major characteristics are: relationship to natural environment, organized town composition, the importance of negative spaces, a unit of habitation, the exceptional building, appropriate use of materials and detailing.

Relationship to natural environment

The first important consideration is the unique relationship of the village to its natural surroundings. A proper balance with nature is necessary. A dominant landscape demands a submissive village form, while a flat, spacious terrain welcomes a powerful, sculptural form. Generally, there are two basic types of villages: the organic and the articulate. The organic villages relate most closely to their natural environment. Of these, the most obvious are the troglodyte communities, which are virtually one and the same with the earth and insulated by it. In some instances, openings and shafts for light and ventilation pierce the surface and are accentuated by their form and color. However, the openings enrich rather than disturb the natural form, and the over-all harmony with nature is preserved. Villages built of local materials left in their natural state also relate closely to their surroundings. Some, built on precipices or hills, actually accentuate the configuration of the terrain and thereby reinforce the natural form. The second type, the articulate village, is expressed apart from its natural environment either by its particular form or through the use of color. In the first instance, although the tone and texture of the village may be the same as its earth base, its scale and configuration creates a dynamic massing that tends to dominate the natural topography. In the second instance, unit habitations are generally painted white or another reflective color that clearly distinguishes the community from nature. However, the forms of the village generally follow the configuration of the terrain—sometimes hill, sometimes peninsula, sometimes crescent-shaped water's edge—and thereby also create a distinct yet harmonious relationship with the natural condition.

Organized town composition

The second characteristic is the over-all unity and density of village form. Urbanity is achieved by the close association of like building forms, always economically conceived within the limitations of the site. Although the village may take a linear form terraced on the slope of a hill or may be composed of a cluster of structures in a valley defined by forest, farmland, or water, its individual components link up to form a tight, unified plan. The village structures generally develop toward a single, large, negative space that may serve spiritual or commercial needs, or both. This space may be the harbor, the river, the oasis, or the town square, and it may include one or more exceptional buildings—foreground buildings, whose strong forms play against the backdrop of the fabric of unit habitations.

The negative spaces

The paths, streets, bridges, and tunnels defined between the habitations link the units and direct traffic to the harbor, town square, or other local public center. There is always a progression of spaces that express function and emphasize movement. The length and width of these spaces depend on circulation needs as well as on natural terrain limitations. Thus, the size of







the viaduct depends on the job it does. Negative spaces, varying in size and shape, serve also for the natural organization of community life. A dynamic vitality is brought about by the interaction of the human spirit and spatial variety. Wider passages become the market streets, since the constant flow of inhabitants toward the nucleus encourages the natural development of commerce. Usually, the lower floors of the habitations are converted into shops to serve this need; and therefore the commercial establishment fuses with the living quarters to create a convenient family enterprise, similar to those still existing in some form in our modern cities and towns.

In addition, neighborhood squares appear along the street, sometimes taking the shape of a small courtyard defined solely by the habitations and serving the perimeter family groups. The larger plazas become the gathering place of a neighborhood grouping, and in these areas, cafés develop where people can meet, rest, view, and become part of the activity of the street. The combination of courtyards and plazas relieves the rhythm of the unit form and creates diversion alcoves along the passages, giving order and direction, and an important sense of place.

Each order of open space serves a different need; the narrowest paths offer protection from strong winds and harsh sun, and provide a psychologically soothing intimacy. Neighbors are close to one another and may sit on porches or balconies and work or watch the passing activity. The local plaza or courtyard serves as the playground for the young and the gossip center for the elderly within a protected, shaded environment. The major square is where the action is—it serves as a combination business center, festive hall, promenade, visual focus, and link with the outside world. Here is where the pageant is held and the business deal concluded. The interaction of the human spirit and the spatial variety within the village brings about a dynamic vitality that further supports the social benefits of communal development.

Unit of habitation

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The most important element in the village is the basic living unit, which, when repeated in relation to natural conditions, defines the outdoor spaces and forms the total physical expression of the village. Generally, the buildings are attached or semidetached dwellings whose plans may vary according to specific needs within the limitations of the building order. They always include a major living space, sleeping chambers, and a kitchen-and-work space. In addition, each dwelling has some sort of outdoor space: it may be an interior courtyard, a front or rear yard, or a roof terrace. A protruding balcony or recessed porch is sometimes included to provide for specific functions.

There is a great efficiency of design. All the spaces, interior and exterior, are simply and economically conceived; none is wasted or misused. Available materials determine the structure, and the lack of wood or metal produces many variations in vaulted roof surfaces, the most common of which are the barrel vault, cone, and cupola. In some villages these forms are clearly exposed and become the dominant visual element of the community. In others they are covered over and flattened to achieve a more useful roof surface for work, recreation, and the drying of food, household materials, and clothing. As a result of these visual expressions, the articulation of the wall surfaces is emphasized and the roof underplayed, creating a more cubic geometry. The unit of habitation functions in two important ways: as an adequate family shelter, providing a reasonable expression of the individual and the amenities particular to the region; and as the primary element in a cellular system of orderly growth that freely permits expansion and contraction of the village form, as necessary, without disturbing the unity of the whole.

The exceptional building

In some villages, the dynamic siting, the contained harbor, or the large

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when necessary and are positioned by sun orientation and wind direction.

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interior square relieves the repetition of the unit architectural form. But within the total unit plan, the exceptional building appears, serving either as a pivot point in the streetscape or as a terminal focus of the town. Since political and social life generally centers about religion, this form of building in all instances is the church or chapel. In villages where a more personal religion predominates, abundant chapels appear among the dwellings. The simplest of these structures are of the same building order as the houses but have contrasting roofs that include bell tower or minaret and that distinguish them from the habitations. Often, the chapels take individual sculptural forms that express their particular internal functions and become constant focal reliefs along the village passageways. Larger chapels or village churches occupy prominent positions and dominate the major squares. In some communities they become the apex of the village form and are identifiable from great distances. The strong plastic form of these structures offers a necessary contrast to the relative conformity of the repeated dwelling unit, for no matter how well planned a community of like structures appears to be, the repetition creates a monotony that can be relieved only by the exceptional building.

Materials and details

The sixth major characteristic common to all vernacular villages is the honest derivation of the forms, textures, and colors of the surfaces and details of the building units. Sizes, shapes, and locations of apertures in the walls and shafts in the roofs reflect the need for light, ventilation, and the movement of men, animals, and goods. Therefore, living areas that need considerable light have larger windows, while the sleeping chambers have only small openings, primarily for ventilation. The door is sized up for the job. If animals or large carts are part of the household, a wider opening or double door is provided; otherwise, it is designed smaller to accommodate man only. When opened, the door serves another function—to admit to the interior additional light and ventilation in pleasant weather. All openings appear only Roof surfaces have always served the purpose of psychological security as well as actual protection. In many villages, roof forms and textures are quite pronounced and are an important exterior physical expression. The use of stone, thatch, or paint over cement has made the roof surface an important natural decorative element in the unit design.

Wall textures and colors relate directly to climatic conditions. Stucco is applied as protection from moisture; and whitewash is applied primarily for its heat-reflective qualities. Paint is used to protect exterior wood surfaces, such as doors, window frames, stairs, and balconies. The popular builder's inherent genius leads him to choose these areas for his individual expression of color and decorative design. Interiors are generally painted white or some other light color to reflect the limited light entering through the relatively small openings in the exterior walls. Built-in wood furniture or extensions of the stone walls are common integral forms within the volume of the dwelling unit and serve to unify the interior spaces. Utilitarian objects and planters are hung on the walls, set on the floors, and recessed in niches to provide an impressive sculptural display against the neutral surfaces, both indoors and outdoors. In addition, personal artifacts, including framed photographs, drawings, paintings, and decorative plates, are proudly hung on interior walls. Within the basic order occur any variations in details that strongly express the identity of the individual. These do not destroy the unity but rather add a richness and a vitality to the over-all appearance of the architecture.

Human needs and response

Important psychological considerations are reflected in the design of vernacular shelters and villages. In the immediate dwelling, there is the need for certain spatial relationships of the rooms and the need for privacy; amenities such as courtyards, terraces, roof gardens, and balconies that have been generally conceived more as work spaces than as social centers nevertheless play an important part in the creation of a vital and variable



diversity of spaces for mental well-being. The very nature of his being creator and artisan and builder of his structure gives the dweller great pride and satisfaction, and, within the framework of the flexible unit design, he freely expresses himself in many of the details. Outside the home, the popular builders work in harmony to pave streets and create public courtyards and small squares, always built in size relative to their function. Communal effort has provided the spaces where neighbors meet and the community gather. and has given the residents respect for themselves and their neighbors and pride of significant accomplishment. They continue to work at their independent tasks and work together to keep order and cleanliness in their community. The synthesis of this building order has been the creation of a human scale of building with interesting spatial relationships and diversity that grow from an honest, creative use of materials, methods, and site. This fact underlies the building process of all vernacular villages, from the most primitive in the North African desert to the most sophisticated in the Aegean islands.

Dwelling types

Vernacular villages are generally composed of either negative or positive dwelling types. Negative habitations are natural ones found in, hollowed in, or excavated from the earth. Man has taken advantage of certain geological and climatic conditions to develop easily and economically a shelter with little or no actual construction; this dwelling is actually a part of the natural terrain and only very subtly disturbs the existing landscape. Positive dwellings, on the other hand, are buildings constructed of local available materials above the surface of the earth. Although both types work in harmony with the landscape, positive structures stand erect and distinguish themselves as totally manmade rather than as a development of a subterranean formation. Many combinations of the two types exist and take advantage of the local geography.

Troglodyte dwellings

Among the earlier dwelling places, certainly the simplest and most economical are cave or earth dwellings, which afforded man protection against animals and enemies and insulation from rain, snow, wind, and extremes of heat and cold. Early troglodyte habitations have been discovered in such diverse areas as China, Turkey, Italy, Tunisia, and the United States. Many are still occupied today. Just as a variety of surface building types occur, so do variations in subterranean habitations, from the simplest natural cave to the completely artificial underground complex. Invariably, differences occur because of the natural earth composition. When the rock is hard and difficult to work, the cave remains unaltered; when the rock is soft or tools better, variations occur.

There are basically four types of troglodyte habitations: the natural cave, altered natural caves, altered natural caves with additions, and artificial caves. The primary type of underground dwelling is the natural cave, where early man settled. These are inconspicuous in exterior appearance. The interior volume varies with the natural condition, and some caves are quite small, with just enough space for a man or a small family, while others contain extensive caverns with multiple entrances and were once inhabited by whole tribes.

When the rock was workable both horizontally and vertically, individual natural caves were sometimes connected to form a network of tunnels and chambers, such as exists in the steep cliffs at Pantalica, Sicily. Man also enlarged and developed voids in rocks that had been eroded by winds and rain. At Göreme, in the Anatolian region of Turkey, there are conical mounds of volcanic rock that have been developed into complex apartment dwellings that are still inhabited.

At Guadix, Spain, the inhabitants hollowed out additions to their cave dwellings from the soft rock and also added structures to the faces of the caves. Clusters of white, conical chimneys were built to ventilate the interiors, and white stucco walls were constructed to define the private yards and to retain the earth. In the southwestern United States and in the Lascaux







Cave region of southwestern France, the early cliff dwellers added less elaborate structures to the surface of their cave dwellings.

The most unusual type of troglodyte house is an entirely artificial cavity excavated from the earth, with private chambers dug out about the perimeter. At Matmata, Tunisia, these take the form of large, oval cavities, suggesting a moonscape, sometimes 200 feet in diameter and about 30 feet deep, in which neighborhoods of up to 100 people live. They are serviced by long ramptunnels that extend from the surface above to the bottom of the wells. A similar underground village of quite different geometry exists near Tungkwan, in Honan Province, China. It is composed of well-defined squares arranged in crisp, geometric patterns, carved out of loess, with L-shaped staircases leading to the habitations below. Both artificial underground villages exist beneath flat plains above, which serve as their farmland.

Fabricated building types

Man has constructed his shelter of almost every available natural material: snow is employed as the building block of the temporary Eskimo igloo hut in the Arctic; animal skins supported by wood posts are used for a portable tent structure by the desert nomad. Extreme and isolated conditions have produced many intuitive solutions and a great variety of building types. However, most of the positive dwelling structures developed by the popular builder can be classified into four general types: reed, wood, wood-masonry, and masonry.

Reed structures

The lightest, easiest to build, and least permanent of the positive dwelling types are the reed structures indigenous to tropical regions but also found in many areas with temperate climates. These structures are disposable or portable and are actually the oldest form of man-made building. The flexibility and strength of the fibers enable them to be twisted, tied together.

and easily bent into the shape of a domed, conical, or barrel-vaulted unit of considerable strength and rigidity. Layers of thatch, leaves, or skins are generally applied as the protective roofing. The size of the unit was determined by the diameter of the hoop frame, which varied in response to individual needs and depended upon the strength of the fibers. Because of this construction method, these units were all independent forms expressing a solitary major space, with limited provision for expansion. Villages were established by the grouping of these units as a protective ringed enclosure about an oval central outdoor space. This is the most primitive village form, and it has been the basis for the development of most defensive towns and villages throughout history.

Wood structures

Wood as a building material is considerably stronger and more durable than reed. It was used very early in the primitive Swiss lake dwellers' defensive villages, which were erected on pilings in the lakes and connected to the mainland by bridges. Although vulnerable to fire, strong windstorn s, and termites, timber structures are rapidly constructed and today account for most of the small-house construction in the United States, Scandinavia, and Japan. The rich forest resources of New England influenced the development of the wood box-style houses of colonial America. Fishing shacks along the seacoasts of Massachusetts and Maine, as well as farm structures inland, are preserved examples of this early American building type. Similarly built but more cohesive as a village form are the wood structures at Palheiros de Tocha on the Portuguese coast. They are built on pilings elevated from the beach as protection from high tides, just as more primitive huts on stilts along tropical rivers are protected from flooding. Most villages constructed with timber are made up of individual units, since common buttressing walls are not needed and separation offers better protection in the event of fire. The composition of wood communities is comparable with the forest that produces the structural material, for both













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communities and forest consist of related but isolated units in space. Advantages of wood construction are ease of alteration in response to changing needs and relatively guick repair in the event of damage or destruction.

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Wood-masonry structures

The wood-masonry structure is another universal building type occurring in regions where both materials are generally available. Because of its strength and durability, masonry is chosen for foundations and supporting walls. It is used in the form either of stone or rock cut or broken into easily workable sizes and shapes, or of manufactured, sun-dried clay buildingblocks. In some cases, mortar is used between the joints, but in many villages the masonry is laid dry. The walls are generally of considerable thickness for added strength and insulation properties. Wood joists and beams capable of spanning reasonable distances are desirable for the flat spans of flooring necessary to construct a multiple-level building. The simplest pitched A-frame roof, a type of structure common to most Andalusian villages as well as to Swiss mountain houses, affords an economical attic storage space that further insulates the living quarters below. The wood roof frame is reasonably lightweight and easily assembled, and may be covered with a variety of surfaces, such as tile, stone, wood shingles, or thatch, depending upon local considerations. Combined wood-masonry structures offer good, unobstructed interior space, strong and durable perimeter walls, and excellent insulation.

Masonry structures

All-masonry structures are found where little or no wood is available. The primary difficulty of this type of building is in the roof construction. Since only a very limited distance can be spanned by a heavy stone lintel (which, in addition, is difficult to cut, move, or erect), the popular builder had to invent

alternative means to roof his structures. A variety of vaulting systems were developed, creating in some instances interesting high-ceilinged interior spaces, while expressing themselves boldly in the exterior form. Although many variations of these methods exist, the basic vaulting systems most repeated are the barrel vault, groined vault, cupola, and cone. Additional bracing was required in order to counter the roof structure's diagonal stresses and outward forces. This led to a considerable increase in the thickness of the supporting wall surfaces and to the development of an interdependent buttressing system among the unit habitations, which actually helped to mold the form of the village. Common supporting walls are the most economical and logical means of building where masonry roof structures are necessary. The very limited wood resources were used for scaffolding, which supported and formed the roof during construction, and which was employed over and over again by the whole community to build their village. Additional wood, if available, was used for doors and framing.

Mediterranean type

The Mediterranean basin generally lacks forests but is abundant in assorted rock, stone, clay, and sand resources, and it has developed a vernacular architecture primarily of masonry. When wood is available it is used in the most economical manner for scaffolding, roof structure, doors, frames, and balconies. The Mediterranean climate is generally dry and temperate and three types of dwellings are consistently found: the patio house with a contained courtyard, the terraced house stepped down the hillside, and the simple row house that defines the street corridors in relatively flat land. The open-courtyard dwelling is found in substantial variations from North Africa to southern Spain to the Greek islands. It provides protection from wind and thieves and privacy for work and recreation; it affords a flexible outdoor space for celebration, meditation, or work. The terraced house takes advantage of the natural site conditions for light, view, and ventilation. The basic row house on relatively flat land has front or rear yards or projecting





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balconies and roof terraces for its outdoor space. Sometimes combinations of these unit types occur within the village because of terrain conditions. This, in turn, creates a complexity within the order of the community, although one type always dominates.

A variety of village plans exist, depending upon site conditions and historical development, but the cohesive elements that link the diverse Mediterranean communities are the unity and solidarity of form, the organic cell-like additive nature of development, and the strong definition of the relatively dense urban structure and cubistic volume enclosure. Since conditions of modern society have altered the nature of the villages in some areas, and tourism, rather than agriculture or fishing, has become the dominant livelihood of the inhabitants, many of the town characteristics are undergoing subtle changes. The market square or the harbor have developed additional cafés. New shops have appeared along the streets and passageways. The plasticity of the stucco and whitewash over rubble surfaces has given way to the crisp definition of the cement wall. The crooked, textured paving has been replaced by machine-cut slick surfaces. Although the impurities introduced by modern society are leaving their imprint in some areas, the whole structural framework of the village is so strong and the spaces so vital and dynamic that the totality of the village form survives. This is an important consideration for us today. If an environmental architectural statement is successful, it must allow within its structure for minor compromises, no matter how unfortunate, that express the will of some of the members of the community; however, its organization of spaces and dominant physical form must supply the over-all unity and continuity and permanent background for the community development. The Mediterranean village provides for us an excellent study, within a limited region, of the diversity and the association of the unit form in response to the needs of the individual, and of the dynamics of space in relation to human activity for a relatively high-density living condition.

Modern architecture

The first inclination of the early modern architects was to re-evaluate forced spatial disciplines, to throw off the superfluous and applied decoration, and to respect the new materials and manufacturing processes. Most chose to break completely with the past, to shut their eyes to their environment, and to think in fresh and completely new terms. Thus, the revolution in architecture began. Innovators fought long battles with the architectural establishment on the one hand and with the unaware and confused public on the other. Established bonds were broken, and half a century later we still have not recovered.

Le Corbusier

One of the early leaders of the architectural revolution, Charles Edouard Jeanneret-Le Corbusier-now universally known and respected as the greatest architect of this era, chose to travel, search, and discover; to sketch and interpret for himself the conditions in an area of his particular interest, the Mediterranean basin. His journeys took him to Athens and the Acropolis, and beyond, to the islands of the Aegean, where he discovered a public architecture that varied uniquely from island to island, established by local conditions and influenced by trading and past conquest. This popular architecture was native to all parts of the world, yet here the sun was brighter, the shadows sharper, the chiaroscuro more dynamic, the lesson most obvious. Here, exposed, was a certain clarity of form and honesty of spirit, an architecture at once humble and magnificent. Even ideas from across the Mediterranean in Africa were suggested here, and it is remarkable that certain structures in North Africa bear a striking physical resemblance to Le Corbusier's work, although he never traveled there. He continued to draw upon these experiences throughout his life work. There is no 'Corbu' building that does not reflect in some manner, in some detail, his respect and deep understanding of the principles, as well as the physical forms, of









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she elements that Le Corbusier observed in Greek island architecture, and that
re a he carried into his own work were: the relationship of the village to the
earth—organic, yet articulate and independent; the fearless yet controlled
expression of physical form, both plastic and simple geometric; movement
and moods of light upon surfaces; subtle uses of bold color; the always
evident human scale, the common denominator of building.

Search and research

Through the work and vision of Le Corbusier, the spirit and forms of Mediterranean architecture have been interpreted and translated for us, and his direct influence on the development of modern architecture has served as the vehicle for transmitting them.

In addition, modern architects have traveled a great deal to the Mediterranean region, particularly to the Greek islands, and have studied the villages firsthand and analyzed their responses. These direct experiences have contributed much and should lead to more personal interpretations in the future.

The search by modern architects for imaginative designs that relate to the economical use of modern techniques and materials in order to achieve meaningful human environment, relates closely to the intuitive, direct, and honest approach of the popular builders in creating a satisfying environment within the imposed limitations of their climate and terrain, available materials and structural knowledge.

Therefore, in the examples of modern architecture presented here, various degrees of influence have, in combination, helped to develop the spirit and, in turn, to mold the physical forms.

Modern architecture in Mediterranean lands

In 1960, in response to the necessity for rebuilding on the Greek island of Santorin, where a violent earthquake in 1958 had destroyed considerable housing, a team of architects led by Constantinos Doxiadis designed adjacent

Mediterranean architecture and the inspiration he derived from them. As he once wrote in *Towards a New Architecture*, 'I have felt myself become more a man of . . . the Mediterranean, queen of forms under the play of light; I am dominated by the imperatives of harmony, beauty, plasticity.'

In his early designs (1948) for the vacation colony at La Sainte-Baume along the Riviera in southern France (1), the repetitive forms of the barrel-vaulted roofs relate directly to the simple primitive ghorfa living-and-storage structures in southern Tunisia (2); and his more refined design statement at Cap-Martin of a year later resembles the more sophisticated vernacular dwellings on the Greek island of Santorin. In both examples, the roof forms create an over-all harmony and rhythm, and strong village identification, while the horizontal sweep of these buildings working into the hillside is characteristic of many Mediterranean communities, such as the village near Tizi-n-Tichka pass in southern Morocco. In his most original creative design, of the chapel at Ronchamp (3), we may discover forms borrowed from the vernacular architecture on the Greek island of Santorin, such as the bold projecting rain-water spouts and semicircular shafts. In addition, the free, sweeping lines of plastic form at Ronchamp also bear a close relationship to the minor mosques on the island of Djerba off Tunisia and to the Paraportiani church on Mykonos (4), sculptural forms shaped and reshaped by man and nature. Le Corbusier also studied the modest but always comfortable interior spaces of the vernacular dwellings. Of particular interest is a comparison between the typical interiors on the Greek island of Skyros, where a sleeping balcony extends over the kitchen-storage area within the large cubic volume of the house, with the living units in the apartment house at Marseille, where a similar space device is employed to create a dynamic living area within the modest limits of the apartment bay.

It is, therefore, correct to acknowledge that Le Corbusier masterfully absorbed the elements of Mediterranean community architecture into his designs and was the first international architect to go beyond the purification process with a bold energy, a sure hand, and a fresh approach partially derived from and surely inspired by his Mediterranean experience. The major



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to the existing villages new neighborhoods (5) of a design that is sympathetic to the established building on the island (6). The barrel-vaulted roof has been retained to express the major interior spaces, and the walls, paths, and terraces of a good human scale harmonize with each other and with the nearby freer, more sculptural existing villages. Doors and windows sharply puncture the thick walls and are painted in bold colors, a treatment similar to that of the older buildings. A planning decision was made permitting the islanders to rebuild the existing neighborhoods in their free, intuitive manner, a slow but certain process. Therefore, the pattern of the native village has been preserved, the sympathetic new buildings form a new urban cluster, and the two related yet independent communities reinforce one another with a common scale and order and sense of unity.

Near Badajoz, in southwestern Spain, José Luis Fernandez del Amo designed the new village of Vegaviana (7) to replace antiquated housing for the local farm workers. The red-tiled roofs, pitched and ripple-textured, and the whitewashed stucco masonry walls are consistent with typical Andalusian vernacular building, such as at Mijas (8). In general, prevailing wind conditions, rainy seasons, and solar orientation have influenced the design of the unit form and the size and location of apertures. A simple, honest, and derivative plan has been conceived to which the inhabitants can easily adjust. Unfortunately, the houses are set in parallel rows of limited interest which tends to create a pattern of conformity and monotony. Perhaps, in time, when the individual responds to his changing needs, and when his sense of independence is reaffirmed, a more interesting physical expression will develop.

In Accra, Ghana, a group of young architects of the Division of Public Construction have designed the Junior Staff Quarters at Government House (9) in a style responsive to the spirit of North African vernacular architecture. Modern materials and construction methods, such as concrete blocks for walls and poured reinforced concrete for floor slabs, have been used to develop an interlocking building form that identifies itself with local tradition yet is obviously uncompromisingly modern. The sharp articulation

of the forms, the deep visual penetration of the walls, and the narrow, sunsheltered areas are typical of many North African villages, such as Tinerhir in the stone desert of Morocco (10). Although typical dwellings are repeated, the clustered arrangement of standardized units of alternating heights creates a rich interplay of forms and a complexity of experience. An orderly plan of identical units has achieved a result similar to an organic development over a long period.

Mediterranean influence in modern architecture

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A further development of the Mediterranean influence in modern architecture, notably in housing, has been carried out, particularly in northwestern Europe and in the United States.

In 1961, near Bern, Switzerland, the Hallen Housing Estate (11) was built as designed by Atelier 5, a group of young architects who were former employees and associates of Le Corbusier. It consists of a series of cubistic masonry units, tightly knit, in several horizontal rows parallel to the contours of the sloping hillside, and connected by narrow alleyways and paths. These dwellings, with their terraces and roof gardens, provide reasonable privacy and individuality within the units, yet are attached, interrelated, and have an over-all visual harmony. The natural siting that takes advantage of the slope and the organization of units in horizontal rows are similar to designs employed earlier by the popular builders of the farming community of Mijas in southern Spain (12). A striking similarity in form, also exists between the roof gardens of Hallen Housing Estate (13) and the roof terraces in the Moroccan village of Tinerhir (14).

In 1958, architect Edward Barnes designed the Haystack Mountain School of Crafts (15) at Deer Isle along the rugged Maine coast of the United States. The boxlike wood structures sheathed in cedar shingles are similar to the simple forms of the fishing shacks typical of the New England coast. However, the proximity of the units, the disciplined plan, and the organized spatial relationships constitute a more complete environmental statement









and bear a closer visual order to the groupings of dwellings and storage structures of the Portuguese fishing village of Palheiros de Tocha (16). Although the Haystack Mountain School is situated on a rocky and precipitous slope, while Palheiros de Tocha is built upon a flat, sandy shore, in each case the isolated repeated forms clearly express their wood structure, relate very well to their environment, and establish a strong village unity and total form.

In 1961, architect Paul Rudolph conceived a village of housing for married students at Yale University (17) in New Haven, Connecticut. This development, which was substantially simplified due to cost considerations and, as built, does not have the visual richness and unit privacy of the first stage of the project, was designed for a difficult, sloping building site. Rudolph created an exciting three-dimensional-unit form of warm, human scale in brick and concrete that offers such amenities as private, walled gardens, together with visually interesting stepped paths and public courtyards. The stepped, interlocking massing of the cubes creates a dynamic complexity of related forms similar to those in the intricate design of the fortified desert town of Tinerhir in southern Morocco (18). Moreover, the spatial experiences and the soft relationship to terrain conditions are similar to many Greek island towns. The informal repetition of the unit form breaks down the scale, ties the buildings firmly to the natural condition, and enables the creation of variable spatial experiences and meaningful public areas.

The patio house is a very early dwelling form that provides protection, privacy, interior lighting, and ventilation for the individual family unit. Because high land costs in urban areas necessitate higher density housing and this type of building cannot comfortably rise more than two or three stories, it is rarely constructed today. However, two handsome clusters of one-story patio houses were designed for Chicago (19) by architect Yan Chun Wong in 1960, within a neighborhood of three-story apartment houses. Closed to the street by a severe, formidable brick wall, each dwelling unit is brightly lighted by its private interior court, which serves as visual focus for all of the rooms as well as outdoor living center during the summer months. Within the limits of the site, the design is successful; however, a larger development would have demanded considerable variety to offset the monotony in the continuity of the perimeter walls. A similar building system was developed into a complete village in central Morocco near Khenifra (20). The linear streets are defined between the series of dwellings, and the square private courtyards serve for work and recreation. In addition, the inhabitants may take advantage of their flat roof surfaces for drying foods and laundry.

In his designs for the dormitories at the Indian Institute of Management at Ahmedabad, India, architect Louis Kahn has worked with a bold scale and simple but powerful repeated forms to establish a community structure of unusual dignity and strength (21). Similarly, at Ait-Benhaddou in the Moroccan stone desert, the imposing building cubes take command of the desolate landscape (22).

Expression of details

In addition to the many relationships seen in total village concepts and forms, the honest expression of detail has led to a richness in fenestration and a humanization of scale without the introduction of applied decoration or sculpture. At the Monte Vista apartment project in Monterey, California (23), by Moore, Lyndon, Turnbull, and Whitaker, the architects have created a complex wall of fenestration in which door, windows, entrance canopy, and sunshields work together as a composite design. Similarly, the façade of a typical cave dwelling at Cuevas del Almanzora in southern Spain (24) is broken up, by the expression of functional needs for the interior, into a composition of interesting and related forms.

In his early design for an American Consulate in Luanda, Angola (25), in 1959, architect Louis Kahn used the protective arched T-opening, which permits light, ventilation, and privacy, and which reduces glare. It is also used in the primitive troglodyte dwelling ot Matmata, Tunisia (26), where the center section may be closed and the arms conveniently used for placing objects. In his Meeting House at the Jonas B. Salk Center for

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Biological Research at San Diego, California (27), Kahn has refined the earlier double-wall design into a dynamic façade of arch forms and rectangular openings in order to create both a sunscreen for the interior and a strong sense of wall envelopment. Although totally conceived in one stage, Kahn's façade bears a great similarity to the richness of the façade along the harbor at Procida, Italy (28), developed through centuries.

The staircase is an element of design that may be used not only for escalation, but for sitting or playing. Landscape architect Paul Friedberg, in his 1964 designs for the Riis Playground complex in New York City (29), has integrated stair and plaza into a multilevel experience. A similar system is employed in the front steps of a dwelling near Alberobello, Italy (30). In either case, a simple stair would have sufficed in order to change levels. However, imagination and creative effort have transformed an ordinary functional element into a rich form of multiple usage.

The details in good modern architecture, as in their vernacular village counterparts, can express the human functions and become the decoration of the building. They can, in addition, be the areas where the individual may leave his imprint on the anonymity and impersonality of the total design.

Future neighborhoods

Parallel to and responsible for the direction of modern building has been the rapid development of mass production with its prefabricated elements from small components to complete package structures. So far, this has had little effect upon the building industry in the United States because of age-old problems of lack of public response and the unions' fears of automation. Accepted and applied, prefabricated structures could bring us closer to village forms completely consistent with the principles of Mediterranean community architecture. Systems of flexible architectural units must be employed in order to solve the rising population needs and urban concentration. Buckminster Fuller explored this thesis in the 1930's, and the lightweight space frames and concentrated building packages that he

pioneered are finally being developed into architectural design components. But a system is not an end in itself. It must provide for variety and privacy and all the amenities that present mass structures, traditionally constructed, do not provide—and at lower cost. It must also relate to, and not destroy, the existing conditions of settlement and natural surroundings.

Habitat

For years, the younger architects and architectural students have been exploring the methods and means of creating total neighborhoods. Numerous proposals have been put forth and a number of interesting projects have been created.

Based upon a development of his thesis project at McGill University, Israeli-born architect Moshe Safdie has designed the prototype of the complete package—Habitat, at Montreal, Canada (31). This is the first and, therefore, primitive expression of the total neighborhood or village. Its over-all form resembles that of the pyramidal coastal town of Positano, Italy (32). In addition, the stepped dwellings with terraces (33) are quite similar in pattern to the cubistic houses on the Greek island of Skyros (34). Habitat embodies the spirit, order, and principles of Mediterranean vernacular architecture, yet it respects the technical and productive climate of our present society. This fact is its strength. It is not imitative, nor does it try to emulate the picturesqueness of its ancient Mediterranean village counterparts. It draws from them a totality, a scale, and a vision, and strives to achieve a pleasant human environment.

As a prototype, Habitat is imperfect. It is massive, heavy, lacks flexibility and spatial variety. But as an idea, it is sound. It implies a complete reorganization of our buildings system, and it opens doors to the future of housing for our society. It evolves directly from the building principles of Mediterranean community architecture. Only the materials and methods have changed. Habitat is in a sense an experimental laboratory for the future of urban environment. Man suddenly has a new relationship to his planet.







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Unit designs

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The first step in resolving the economic problems of a unit system is the further refinement of lighter-weight structures which can be rapidly assembled. Two areas of development are presently being pursued.

One approach is the flexible partition-and-slab system. Units may be brought to the site in small component parts and then either assembled on grade and hoisted into position or assembled in place. This method allows for easy trucking to the site, convenient replacement of defective parts, and considerable flexibility of arrangement for interior space requirements. However, as it is used today, it is really only one step farther along than present archaic construction methods: it has been used with limited imagination primarily for industrial structures, school classrooms, small office-buildings, and vacation houses. Larger elements must be preassembled and utility cores introduced to make this technique practical for future use.

The second buildings system is the package unit, which can be completely factory-assembled on the site, as was Habitat, or delivered by truck, train, boat, or helicopter from factory centers located in or near major urban areas. Production lines could control the quality of units that, in turn, would plug into a structural grid or stack to form the building. This kind of system ultimately must be the one to provide the breakthrough for our major housing needs. But we must first break through the barriers presented by the defensive building industry, slow to change primarily because of labor relations and of the fact that it is making good money with the present system. Next, we must refine the units to obtain a greater flexibility and a lighter weight. Then, in order to compete realistically with the existing building norms, we must set up an immediate market for the sufficient quantity necessary to mass-produce the units profitably.

Paul Rudolph has developed a unit system for multistory housing using completely fabricated units similar to mobile homes (35). These units will be suspended by cables from platforms that, in turn, will be supported by

central service shafts. Several living decks will be grouped together with communal balconies on different levels. The heights of the housing clusters may vary, depending upon siting conditions, the need to create special vistas or variety among units, and requirements of adaptation to urban environmental conditions.

Robert Oxman, of the Planning and Design Division of the Land Administration of Puerto Rico, has developed a planning and structural system for use in erecting fishing villages in Puerto Rico (36, 37). Precast columns and beams form a three-dimensional skeletal grid that encloses standardized housing units or communal open spaces. Within the basic modular system, a large number of variations may occur in order to provide the inhabitants with a design framework for the continuity of their social living patterns in a sympathetic environment.

In his prototype for a vacation village (38), the author has developed a system of prefabricated wood boxes of a 15-by-15 feet modular grid with generous balconies and connecting bridges. The system may easily expand vertically or horizontally and adjust to variable terrain conditions. Standard sliding glass sections and metal circular stairs, together with prefab kitchenettes and bathroom units, are fitted into the structural shell of the design system. Units may be arranged from one to four stories high about central courtyards or in isolated clusters.

Urban continuity

The next step must be the development of these prototypes into total village forms and into workable units within existing neighborhood environments. In order to maintain urban continuity, these units must relate to and develop about existing grid patterns or transportation viaducts and certain dominant neighborhood structures or groups of structures. They must serve as a link to the past, provide for the needs of today, and suggest a course of development for the future.

The linear-city design by McMillan, Griffis, and Mileto for Brooklyn, New

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York (39), is proposed over a seldom-used railroad right-of-way. The railroad would be converted to rapid transit, with a motor expressway above and pedestrian terraces on the upper level, and both housing and community facilities along the promenade. The linear city would provide new use for an unsightly urban condition; it would revitalize and integrate the existing neighborhood clusters and create a continuous social center spine.

In his project for town houses in Philadelphia (40), architect Louis Sauer has developed a series of dwellings with continuously alternating outdoor public spaces and private courtyards, creating a rich configuration of human-scaled forms that relate very well to the existing traditional eighteenthcentury Philadelphia town houses in the area. Several of these buildings have been preserved on the site and have actually set the standard for the design. Note the similarity between the Philadelphia project and a small square on the Aegean island of Mykonos (41).

One of the unfortunate results of rapid urban development has been the misuse of potentially valuable recreation land. An imaginative housing project by Davis and Brody Associates along the East River in New York City takes advantage of its proximity to the river by creating a waterfront promenade that will serve as a park and marina with cafés and playgrounds (42). For centuries, the inhabitants of the port of Coricella on the island of Procida, Italy, have strolled down the hillside to congregate at the water's edge on the wide promenade that is also used by the fishermen to dry their nets and unload their vessels (43).

In a proposal by the author for housing in Brooklyn (44–47), the new buildings have retained the six-story scale of the traditional neighborhood structures, and entrance passages relate to existing entrance courts. In addition, street façades are simple in design and material, to conform to existing construction. However, the interior of the double block opens onto a hierarchy of outdoor spaces containing a variety of porches, balconies, and roof decks, all within the design system, as well as a central major communal space.

Visions

Beyond Habitat lie the numerous visionary proposals by architects around the world, many of which must wait until materials and construction methods are either developed or refined.

Japanese architects have been especially concerned with urban planning and housing because of the acute population problems in and about Japanese cities. In a design by a team of architects led by Kenzo Tange, new neighborhoods for Tokyo (48) would be constructed over Tokyo Bay. They would consist of triangular structures containing various neighborhood facilities and housing units on platforms over the water.

Architect Noriaki Kurokawa has also been working to develop an evolutionary master urban system for growth and change. His Helix City proposal for Tokyo (49) consists of fan-shaped structures, totally selfsufficient neighborhoods that are interconnected by a monorail system.

Architect-planner Yona Friedman in Paris has developed a Spatial Town system (50) consisting of a continuous open grid structure that affords complete flexibility for change. The skeletal grid is supported by service shafts about every 250 feet and stands about 50 feet over the land. Habitations and community buildings may occur as needed within the system to define further the outdoor spaces.

In England, architect Peter Cook has designed an experimental system consisting of diagonal structure and service grid, with plug-in units of housing and community facilities (51). The contrast of diagonal grid and in-filling units in turn creates an endless variety of dynamic three-dimensional communal open space within the cage.

Another kind of megastructure that could work within an existing urban context is expressed in a design by the author where flexible units may develop as horizontal or vertical additive structures (52). The major community spaces are expressed as exceptional forms that serve as identifying symbols and as a contrast to the modular design (53).

It is perhaps unfair to judge these visionary schemes by their physical

expressions, since they are ideas rather than refined design statements; nevertheless, one may question the seemingly endless continuity of the structures. Where and how they terminate are an important consideration. The Mediterranean town has built-in limitations of site, size, and relative population. The interest of the diverse multiple-unit systems of the Mediterranean villages are maintained by these limitations. Complete domination of an island or continuous linkage of similar systems without relief would destroy the uniqueness of the system and the village form. A continuous monostructure as envisioned in many of these future designs has the built-in problem of overwhelming scale and of dominating the population it intends to liberate. There is also the danger of mass-producing inferior artificial copies, as we have seen in the degradation of the Mies glass box by its imitators. On such a scale of building, the result would be disastrous.

It is my hope that, by better understanding the nature of the unit form as developed earlier by traditional Mediterranean builders and by a deeper awareness and concern for the social needs of people today, we may eventually solve the problems presented here. Since population demands will soon force the rapid development of buildings systems, we can return to the spirit of the Mediterranean village not through imitation or romantic interpretation, but through our productive capacity to develop the unit additive form out of advanced technology and through our belated concern for man's spiritual and spatial needs.

Repetition without monotony was characteristic of the earliest human settlements. Just as the technical limitations of the past led to repetitive form in housing, the advanced building techniques we will have to apply to our massive future needs will lead naturally to standardization. Whether the result is satisfying order or numbing monotony will depend on the sensitivity of architects to human needs for variation, privacy, and community identity. Whether their ideals will be realized will depend upon public awareness and support.

In quiet places reason abounds; that in quiet people there is a vision and purpose, that many things are revealed to the humble that are hidden from the great. I hope and pray that I can remember the great truths that seem so obvious here but so obscure in other places.

Adlai Stevenson

Greece

Architecture on the Aegean islands of Greece attains a classical serenity, order, and dignity. Although the unit architectural forms vary from island to island, they are related by a subtle response to natural surroundings, and although the brilliant white cubes contrast sharply with their dark rock bases, there is always a harmonious relationship to the natural environment.

The islands have great variation in form and size; some are rugged and protective, while others are relatively flat and vulnerable. Communities were established for various purposes: defense, control, or open trade, each of which structured the village forms differently. In general, there are two types—the defensive town high on a hill, such as Oia on Santorin, and the harbor village open to the sea, such as Mykonos.

The lack of forests and the abundance of stone has produced primarily a masonry architecture of considerable variety among the islands. Within this framework, the individual artisan-builder has expressed himself in the details with vivid color and imagination.

Within the village structure there are always smooth and easy associations of forms and plastic continuity. The exceptional building, which most often is the church or chapel, is not a focus but rather a part of the whole in the village form, or it serves as an important isolated sculpture in the total island plan.





Mykonos

The subtle, motionless grace of the harbor town of Mykonos recalls the forms of the nearby peninsulas and islands. A rich configuration of white cubes is concentrated about the active harbor and extends into the hills to terminate in isolated units. Urban density has been achieved here for commerce and convenience rather than for defense. Unlike the tight town forms limited by geographical or protective considerations, this former trading center opens up to the sea traveler and gently extends into the nottoo-precious rocky grazing pastures beyond.

The variety of spatial experience must come from within, because Mykonos does not have the advantages of a dramatic site as do other Greek island towns. This situation has been carried to its own ultimate advantage in the controlled spatial movement and human scale of the endless street. The drama of life occurs in the dynamic activity and movement of the streets. They bend and sweep out from the harbor into alleyways and passages in a natural order of movement, unified by the plastic continuity of the whitewashed surfaces, whose softened edges ease the sweep of vision from wall to wall. They are further enriched by the modulation of exterior stairs, the occasional bridges and tunnels, and the small areas of intense color on wood doors, window frames, balconies, and railings.

The many chapels of the village adhere to the order of the street; they express themselves, but do not dominate. Sometimes, a small neighborhood square forms an alcove that interrupts but never terminates the movement.

There are several housing types, but the typical dwelling is a masonry two-story structure, with living spaces below and sleeping areas above. Each unit contains a solid exterior staircase and storage or service space within Only infrequently do these modest row houses have rear yards or terraces; therefore, the small, simple interior spaces depend upon the narrow streets for light and air. Similarly, the inhabitants depend upon the streets to serve as extensions of their living quarters and as passages to the harbor or pasture land.




















Serifos

The cubic dwellings of Serifos occupy a protective high point of the island and spill down gracefully toward the orchards below. In past history the defensive-village form was entirely concentrated about the cap of the hill, with a dominant view toward the distant approach of enemies on all sides. Today, most of the upper village on difficult, craggy terrain has been abandoned, and the more recent habitations are stepped down the hillside toward their terraced farmland and the harbor. These dwellings are generally located along the leeward side and use the hill as a buffer against the strong winds. The contours have, in effect, determined several neighborhood 'finger' developments that reach out in opposite directions as the village continues to grow down the slope. Through this natural expansion the village has achieved a far more interesting form than in the past, and it has become an integral yet articulate part of its hill base instead of a dominating crown. The villagers have the advantages of a good view, ventilation, and natural recreational facilities.





Santorin

In modern times, volcanic eruptions and earthquakes have caused vast physical changes on the island of Santorin. It is full of dynamic contrasts, with rich soil of volcanic ash producing excellent grapes for wine along the outer shore, and sheer cliffs of formidable strategic importance dominating the interior bay. Although the outer edge of the island's crescent form rises gently from the sea in a gradual slope, the inner edge drops abruptly some 600 to 1300 feet. Here, the towns of Phira and Oia have for centuries stood defiantly, well protected from enemy attack but in a constant war with nature for their survival.

In response to the unstable nature of the island's topography and the ruggedness of the terrain, an architecture has developed consisting of habitations linked by an interdependent buttressing system, with individual units generally on different levels connected by sweeping walls and terraces, which serve to buttress the cliffs and anchor the dwellings. The repeated parallel diagonal lines of the jagged walls and the regularity in appearance of the vaulted roofs create unity and continuity in the free, organic plan. A town form has evolved that is at once plastic and sculptural.

The many levels are joined by complex stair configurations. The major streets are stepped ramps—built for the stride of the donkey, the island transportation vehicle—zig-zagging down the rugged slope to the small port below. Unlike the smooth, horizontal terracing of less steep hillside sites, these cliffs demand an angular interlocking architectural form.

The dominant architectural form in Santorin is the barrel vault. In the port the structures buttress one another in a row. In the upper villages they freely twist and turn, sometimes interlocking and sometimes terminating in a thick side wall. Openings are always at the ends of the dwellings, so as not to disturb the continuity of the structure, and generally they take the symmetrical composition of three windows about a central entrance door. Semi-cave dwellings and flat, terraced roof structures take advantage of the natural terrain conditions.

Communal activity is encouraged by the linked terraces and their proximity to the vertical street systems. Families have reasonable privacy, yet easily participate in the interaction of movement between the town and its port and share the distant vistas and dramatic views.



















Skyros

The town of Skyros in the Sporades is an example of a cubistic architecture that bends freely to the terrain, yet maintains a sophisticated order and unity. Since the village is situated on the hilly slopes of a great, rocky mound, the units sweep in horizontal concentric rings that conform to the natural condition and thus define continuous curvilinear streets.

The protected natural siting of the village overlooks rich olive groves and pasture lands of the island, and it is sheltered from the strong winds along the seaward side of the hill. In addition, the inhabitants have built on the least desirable agricultural land, while taking advantage of the excellent view and ventilation.

The cubes here, unlike those at Mykonos, are capped with roofs of a gray clay earth with good water-repellent and insulating properties. Each unit's whitewashed perimeter walls project above its roof in a low parapet. Viewed from above, this creates a cellular town structure distinguishing every building unit yet maintaining the unity and continuity of the whole. A brilliant white roof surface here would be unsuitable because of the blinding glare in the upper neighborhoods of the town.

Many of the houses are one-room cubic chambers with a high ceiling providing space for an interior wood sleeping balcony over storage and work areas at the rear. Most of the two-story dwellings are built onto the hillside and provide direct access to the upper level from the rear street or courtyard. The buildings in straight rows generally have rear yards, and semi-enclosed courtyards appear between clusters of houses. The occasional balcony is used for working and drying.

Most of the chapels are part of the street, differentiated in roof form only by the addition of a small bell support above the street façade. Major churches are isolated from the habitation units by their own courtyards and serve as neighborhood visual focal points.























Sifnos

In the interior pasturelands of the island of Sifnos, eight small villages link to form an interconnected network of concentrated neighborhood nuclei separated by greenbelts of terraced farmland. Each town is built about a series of minor squares accentuated by church or chapel, and the units of habitation are informally arranged to conform to local topography. No town occupies a strategic hilltop position because in the past the fortified coastal towns defended the island. Therefore, an easy association of forms occurs within the groupings without the domination of any village, and the hilltops are left bare except for an occasional windmill.

Compare this design to today's typical spread-out suburban developments around major towns and cities. The density is about the same, yet on Sifnos the clustering of dwellings creates a greater interaction of human experiences and affords a generous open space between the neighborhood groups. Town and nature more than coexist; they support one another and interact to create a dynamic association of man-made and natural form.

In the ancient fortified village of Castro on Sifnos, a network of bridges, ramparts, and alleyways was originally constructed to defend the town against invaders who might have penetrated the perimeter walls. These have been modified in recent times to provide double-level access to dwellings. From the upper street, bridges connect to the second-story entrance doors, creating an interesting visual experience and permitting generous natural lighting along the continuous alleyways below.









Post-Byzantine churches of the Aegean islands

Throughout the Greek islands, in sharp contrast to the continuity of the unit forms of the village, the church or chapel serves as the focal point and exceptional building of the village itself or the special place for pilgrimage within the island. Usually these chapels were constructed in the sixteenth or seventeenth centuries by individual families for private worship, and they are relatively small. Nevertheless, their plastic and articulate forms and painted roofs distinguish them as pivotal or terminal points in the village, or as dynamic isolated sculpture in the total island plan.

In Mykonos the churches are generally woven into the fabric of the community, and they heighten the experience of the street but never terminate it. Similarly, on Santorin and Skyros they serve as occasional dominant elements within the whole of the village. The most varied and interesting groups of chapels, however, are found within the linked communities of Sifnos or at dynamic isolated points of the island. The often-repeated plans consist of one or two barrel-vaulted bays defining the major central space with minor prayer apses and vestry and storage areas opening off and expressed from it. Sometimes twin chapels are joined in perfect harmony.

The thick stone-and-rubble walls are overlaid with coats of stucco and whitewash. They are pierced with occasional clear glazed windows of moderate size, permitting light to enter the interior space discreetly. The entrance door, extended or recessed, is well defined and elevated by several steps from the courtyard or street. The belfry is raised to express the dominant element in the facade.

Whitewash unifies the articulated elements in the over-all structure into a form of great continuity and is carried into the interior to reflect the light. The painted wooden altar, lectern, and pews become strong sculptural forms against the bare and undecorated interior surfaces, and the interior is further brightened by the traditional richly painted wooden iconostasis typical of the Cyclades. The slate floor paving serves to unify the transition from exterior to interior space and, in itself, is an important visual element. In the chapels at Sifnos, the paving joints are painted several times a year and are now raised considerably above the slate, strongly articulating the individual pavers. Occasional colored stones, in patterns that define burial positions, create rich and beautiful designs.




























Paraportiani church on Mykonos

The most unusual and inspiring church of the Greek islands is Paraportiani church on Mykonos. Actually a cluster of five chapels on two levels, it has been molded by nature as well as by man to create a great plastic external form of eternal poetry. The ground level consists of three interconnected chapels in a row, which express themselves strongly on the exterior, and of a fourth interior chapel. The fifth chapel at the second level is reached by an exterior staircase and is covered by a perfect dome that gracefully terminates the complex. The belfry is the culmination of a freestanding buttress that was once a wall of an enclosed area. Together with additional supporting walls and buttresses, it completes the form components. Man, nature, and time have united to create a moving architectural monument.







Italy

Italian Mediterranean architecture is abundant in variety and vitality. In this study we are concerned with the two diverse areas of greatest interest: the western coastal region in and about the Bay of Naples; and the valleys of Apulia in the east, near Bari.

The coastal villages near Naples were established by fishermen; their dwellings either terrace down steep hillsides to the water in horizontal layers or define harbors with a wall of four- to five-story structures. These systems have enabled the fishermen to observe the conditions of the sea. Their families, in turn, can watch for the safety of the men in boats. The harbor is the focal point of the village, and a broad quay is established for both community social activities and work areas. Masonry was chosen here for the major building material, presumably because of its durability, since wood is also available. Conceived with imagination and sensitivity, arch forms pierce the wall surfaces to create a variety of balconies, porches, and loggias and stairways project in bold configurations. Each basic living unit is further defined on the exterior wall surfaces by soft pastel pinks, blues, and yellows.

In the valleys of Apulia, however, an agricultural society has cleared the land of stone to plant olive and almond groves, and has created the unique all-stone structures called *trulli*, whose conical form goes back to neolithic civilizations. These unit structures occur as isolated clusters in the landscape, and at Alberobello link up to form a complete village of sweeping visual continuity and dynamic human experience.





Alberobello

One of the earlier forms of habitation is the cone. Various tent and thatch structures, easily self-braced, economically built, and generally portable, were developed by primitive man and are still used today. However, another type of less familiar conical construction exists: thick stone walls capped with a roof of concentric layers of stone. Similar structures of prehistoric origin were developed throughout the Mediterranean basin, including the *lalajots* of the Balearic islands and the *nuraghi* of Sardinia. The most complex and sophisticated, and those still inhabited today, are the *trulli* dwellings of Apulia in southern Italy. Thousands of isolated farmhouses, generally formed of three to twenty units, dot the fertile almond and olive groves throughout the region.

The most complete development of this unit construction is found in the old Rione Monte section of Alberobello where a series of narrow winding streets defined by *trulli* radiate from a central square. The unit structures buttress one another to form houses or groups of houses that open directly to the linear corridors. Each *trullo* consists of a square or rectangular base topped by a conical dry-stone roof with a chalk-coated finial. Although the sizes of the cones vary, the proportions are maintained, creating a variation in the repeated form. Square chimneys occasionally puncture the roof surfaces, offering contrasts to the uniform plasticity. Openings are limited to an arched entranceway and small, square windows. Stuccoed and whitewashed, the stone walls sometimes attain a thickness of 5 feet, offering good insulation and creating deep visual penetrations of the openings.

The domed interiors are plastered smooth and also whitewashed for good light reflection. The living space generally opens directly off the street and is surrounded by perimeter alcoves for kitchen and sleeping. Sometimes wooden rafters support a storage attic or balcony over the major space. A fresh-water cistern below the house is fed by a roof drain and is reached from the interior by a bucket-and-pulley system.

In the large *trulli* houses, there is an interesting progression of movement from unit to unit, with subtle changes in the height of the domed ceilings, variations in the openings, and carved niches in the wall surfaces. Small courtyards between dwellings serve as work spaces, and occasional projecting stairs, integral with the wall structure, lead to drying areas on the sloping roof surfaces.















Positano

The pyramidal town of Positano on the west coast of Italy, near Naples, consists of horizontal rows of pastel-colored dwellings stepped down the steep angle of the hill that overlooks the beach and sea beyond. Although it is today a well-known resort town, the over-all form has been preserved, and the dwellings, many of them altered from fishermen's houses into private residences, shops, and hotels, have retained exteriors generally sympathetic to the original façades. Although the economic subsistence of the village has completely changed, it continues to maintain the dignity and strength of the original design. This is primarily due to the rigid respect for the natural horizontal terracing and the tight concentration of structures, which give an order and solidarity of village form to balance the simple strength of the barren neighboring hills and promontories. The local church, located at the level shoreline, relates very well to the village, because it does not disturb the continuity of the ringed concentration of dwellings but serves as a focal point in perfect harmony with it.



Procida

There are two fishing villages on the small volcanic island of Procida in the Bay of Naples that offer double faces on opposing sides of the island spine in response to guite different terrain. Although the building types are of similar fenestration and color, the visual results are not at all alike. On one side, the port of Coricella steps down a steep hillside in a rich configuration of pastel-colored cubes that terminate in sweeping, projecting staircases on a wide, flat base. This base, protected from stormy seas by a parallel stone jetty, serves as both a work surface for the fishermen and a promenade and social center for the whole village. Architecturally, it serves as a firm stop for the cascading dwellings, a transitional element linking the hill to the sea in the most useful manner, and a dramatic stage setting for the inhabitants. Roof terraces, recessed porches, and pathways interlock to form a dynamic interplay of solids and voids and, in turn, establish many levels of communal experience, offering private, semiprivate, and public spaces. Although individual buildings are expressed in different colors, and a variety of staircases respond to different needs, the strength and solidarity of the over-all massing can support this, and the result is a total, monolithic village form.

On the opposite side of the island, the main port of Procida consists of four- and five-story row houses. Along the length of the harbor extends an outer wall of perforations, quite rich in form and variation, that has been molded to the changing needs of the inhabitants and that will continue to grow within a natural order of continuity. The visual expression of this order is experienced on three different levels: first, in the over-all expression of community; second, in the relationship and grouping of forms within the homogeneous facade; third in the penetration into the forms to uncover the elements of the ritual of daily life. An over-all harmony has survived the conversion and adaptation of the original forms of crescent and square into a complex system of variable openings. Variation has replaced repetition; needs have induced changes that have transformed a simple geometry into a pattern of complexity and a tension of distorted forms. Semimonumental apertures sometimes appear; scale is sometimes exaggerated. Within the total structure, the individual freely expresses himself yet does not destroy the unity of the whole.





























Corsica:Bonifacio

The town of Bonifacio, on the island of Corsica, is located atop a sheer cliff. The boldness of the buildings crowded up to its edge matches the boldness of the building site itself. The limitations of the protective site have led to a relatively high density of four- and five-story dwellings, no different from today's economically spurred vertical growth of urban concentrations. The Imposing shoreline composition has been accidentally achieved by the indecisive fallen-rock form at the base, the sharp horizontal strata of intermediate rock, and the vertical building cluster at the top. In this instance, severe contrast has evoked a dynamic visual response; yet the three elements work in unity to achieve a balance of total form. Such a determination of structure and organization is rare. Happy accidents occur frequently in our urban complexity, yet few attain such satisfactory results.








Spain

The communities of Andalusia in southern Spain are united by common climatic and geological factors leading to similarity in construction materials and techniques. The stone supporting-walls, stuccoed over and whitewashed, and the red-tiled pitched roofs over wood framing reappear consistently throughout the region. However, because of differing site conditions, a variety of village forms developed: the difficult site required a free plan that would bend to every natural condition; the hillside needed a responsive terracing; and the valley location demanded a tight form, in order to free valuable land for farming. In addition, the size and development of the dwelling unit varied in response to specific requirements. These factors have contributed to very different designs within a common denominator of material and structure.

Two contrasting examples are presented here. Arcos de la Frontera has developed freely around a hilly site, and its typical dwellings consist of chambers about private interior courtyards of great individuality and imagination. The farming community of Mijas is built upon one slope of a hill and has developed a linear form of parallel horizontal terracing.

In addition to the typical Andalusian village, there are two underground communities of special interest. The troglodyte village of Guadix near Granada takes advantage of the earth as insulator and protector and, further, sculpts its unusual natural environment to create a total form of great plasticity, accentuated by clustered chimney forms. The underground community at Cuevos del Amontagna is composed of horizontal tiers of cave dwellings carved into the rock formations.





Mijas

The Andalusian farming village of Mijas is made up of parallel rows of houses running along the contour lines of a steep hillside, facing outward toward a distant view of the Mediterranean. Because their depth is limited by the terrain, the houses present their broadsides to the elongated terraced streets. The continuity of the whitewashed walls and the slightly offset red-tiled roofs further accentuate the horizontality of the village.

The typical dwelling is laid out with the living room, of full house-width and with a fireplace at one end, opening directly off the street. A door leads to the kitchen, sleeping alcove, and storage space at the rear that face a yard cut into the hillside. Some of the dwellings are only one story high, but most have a second-floor attic reached by an interior stair that sometimes contains additional sleeping rooms. Although similar houses are joined by party walls, the inhabitants have built them at different heights according to personal needs; this accounts for the clear differentiation and expression of individual units within the linear village form.

The traditional symmetrical façade composition of two windows flanking the entrance door, with ventilating window above, also typical of Santorin in the Greek Aegean islands, has been altered for individual needs, giving additional variety to the façades. Similarly, doors, usually of double width to permit better ventilation, interior lighting, and ease in moving large objects, are brightly painted in many colors, and sometimes contain windows in one section. The openings are always cut sharply into the thick wall to produce deep visual penetration. The tile pitched roofs overhang in order to keep the rain water away from the wall surfaces and create additional sharp definitions of roof and wall. Entrance steps vary from house to house, and many façades are decorated with hanging, painted tin cans containing plants.

Because of the linear development of the village, each house overlooks its neighbors, receives excellent light and ventilation, and enjoys both intimate and expansive vistas. The terraced rows of dwellings are connected by a steep, vertical primary street that leads to a major square.



















Benalmédena

The typical Andalusian village of Benalmédena nestles in a quiet valley in southern Spain, separated from the nearest village by a wide greenbelt of orchards and farmland. The buildings are concentrated into a tight plan, so that a maximum of the valuable land can be utilized. The red-tiled roofs and whitewashed stucco walls create an order and unity to the free-form design that bends to the natural terrain. Even the church responds to this order, although it distinguishes itself by its mass. All the crooked streets work inward from the perimeter of the village into the central square, which is the generating focus of community life. Located tangentially to the highway, the village may expand outward at any point. This is another illustration of how clustered housing may free peripheral land for recreation and visual relief by utilizing the established land density for isolated structures in a meaningful way.





Arcos de la Frontera

The Andalusian hill town of Arcos de la Frontera twists to the natural terrain on a protective hill cluster at the bend of the Guadalete River. The dwellings themselves lack an apparent coherent pattern, yet are united by the similarity of the red-tiled pitched roofs and the whitewashed wall surfaces, and build up in mass to the churches that dominate the high points of the village. The crooked streets frequently change direction and meet to form complex geometric intersections, but they generally lack the interest and strong character that they achieve in many of the villages in southern Spain. Simple, uninviting, anonymous, rectangularly cut entranceways and windows lacking the vitality of traditional Andalusian ornamental iron-work dominate the street corridors. However, within these austere facades unfolds a series of private interior courtyards, rich in variation and adapted to the needs of individual families. The two-story houses, separated by party walls, are built around these courtyards, with living spaces on the ground-floor level, sleeping guarters on the second level, and a roof terrace above. The courtyard is the central focus and the activity center, and all the rooms relate directly to it.

All the dwellings have a common spatial experience. The street entrance opens onto a small, intimate vestibule, which in turn opens directly onto the courtvard. The courtvard is not large, but the white surfaces reflect the light and brighten the perimeter spaces. A roof terrace above, reached by exterior stairs, serves as a drying area and usually offers a dramatic view of the surrounding countryside. There are many variations within the central courtyards. Carved niches in the walls and extended platforms serve as work surfaces or display levels. In addition, plants, clothing, and utensils are frequently hung along the wall, adding rich color and sculpture against the brilliant white surfaces. The major sculptural element is the stair well, with either red tile or gray slate used in different patterns. Especially impressive is the sensitivity of the popular artist to color and form. Numerous containers, mostly brightly painted tin cans with a variety of plants, enrich and complement the strong architectural surfaces of the space and create a very warm human environment. Within this patio house concept, the individual has been permitted to express himself freely. The experience of moving from house to house is one of constant surprise and delight.





















Vejer de la Frontera

Vejer de la Frontera in southern Spain is a typical former defensive town, which crowns a hill site that still serves the farmer inhabitants today. The village is unified by the continuity of whitewashed wall surfaces and terra-cotta roofing tiles, with the vertical church spire breaking through the horizontal form of unit habitations. It is isolated, surrounded by vineyards and orchards, and connected by a solitary road to the passing highway. Of special significance is the interesting approach from this highway. At a distance the town is framed by a pine forest; then the observer is offered varying glimpses of it from different positions as he advances toward the town, thus experiencing a continuously interrupted movement of visual surprises.

Let us contrast this with the unusual lack of identification, interest, and surprise in the approaches to most of our towns and urban concentrations. We are universally greeted with the endless chain of gas stations, eateries, and used-car lots. There is no gateway but the town-limits sign. No superficial information station or welcome billboard can substitute for a genuine and meaningful spatial sequence as is experienced at Vejer de la Frontera.





Guadix

The foothills of the Sierra Nevada mountains in southern Spain are a region of extraordinary character. Tufa hillocks have been eroded by weather into curious shapes, many of them conical mounds. In this area, a tribe of gypsies has scooped caves out of the hillside and established an underground community of some 10,000 people. The earliest and most natural of man's habitations is the cave dwelling; and the advantages of subterranean living are obvious. However, the unique characteristic of this particular village is the ingenious way in which the inhabitants have molded the earth to their needs, imposed an order of design, and yet respected the natural condition. At a distance, the village is only vaguely identifiable by the exposed entrances and chimneys of the dwellings, accentuated by whitewash. The rugged terrain of soft limestone, clay, and loam seemingly remains unspoiled and natural, yet has been molded by man.

The streets have a flowing, sculptural quality, brought about by the relationship of the man-made forms and the natural rock formations, creating a variety of spatial contrasts. Most of the dwelling units are simple, connected cells; however, some contain as many as twenty chambers, and others have been enlarged by the building of an exposed addition of red-tiled roof and white stucco wall onto the basic unit. The chimneys shoot up singly or in clusters, setting up the major repetitive visual order of the village.

The interiors generally consist of a well-tamped earth floor with whitewashed wall surfaces. The chimney ventilates the interior space and, where possible, small windows are sometimes cut into the natural vertical surfaces for additional light and ventilation. The typical troglodyte habitation is generally more a part of nature than architecture. The village of Guadix, on the other hand, expresses a good balance between art and nature, and presents man as an earth sculptor.















Cuevas del Almanzora

Another type of troglodyte village that exists in Andalusia is at Cuevas del Almanzora. Here, parallel rows of cave dwellings have been carved out of the rocky cliffs to form three-story apartment buildings around large public squares. The size of the squares varies according to the terrain. The uneven cliffs and the irregular apertures of the housing units are softened and linked by bands of whitewash, which accentuate the horizontality of the terracing and clearly differentiate the levels.


Morocco

The roots of Mediterranean community architecture in Europe can be traced to the cubistic farmhouses and villages found in the vast stretches of south and central Morocco. However, there are two major differences. First, the local building materials – sand, stone, and red earth – are left unaltered, and therefore a close association of village form with natural environment is even further expressed; the towns sometimes blend almost completely into their surroundings. Second, height, so necessary for defense in the relatively flat terrain of southern Morocco, is expressed in a taller architecture of larger scale than in comparable European villages. Nevertheless, the Moroccan village and, more particularly, the *kasbahs* and *ksours* of the south were instruments of form transported through Moorish trade and conquest to a large part of the Mediterranean basin.

Within Morocco, there are climatic and geographic extremes that determine the variety in the structure and form of the villages. A temperate climate in the hills and in the mountain areas has influenced an architecture in which the flat, overhanging roof serves as protector and work surface, and is the dominant interlocking element that unites the village plan. However, in the hot and very dry climate of the flat stone desert, the architecture has great solidarity and sometimes attains a strength of form that dominates its natural environment. Defense from enemies and protection from the elements were primary forces behind the design of these desert villages; therefore, a complex organization of towers, walls, and interlocking structures served both as labyrinth for defense and as shelter from the harsh sun and desert wind. The protective wall structure dominates the architecture as it weaves, enfolds, and finally interlocks the elements into a powerful total form.





Village nearTizi-n-Tichka Pass

In the High Atlas mountains near the Tizi-n-Tichka Pass that links Marrakech to the stone desert of Morocco, a Berber village gently terraces down a hillside and overlooks the nearby valley where its inhabitants farm the land. They chose to build their village on the barren lower slope of a mountain, just high enough for protection, yet close to their fields. Similar systems of terraced levels have been employed in both village and fields. The terraces not only offer convenient level surfaces for building or farming, but establish a consistent linear, horizontal town pattern that ties into the contours of the natural landscape.

The interlocking houses are generally two-story, with living quarters on the second level and animal and storage shelter below, all within the same cubic shell. Each family has its own front yard, serviced by paths perpendicular to the hill slope, and, depending upon terrain conditions, there are some small, private interior service courts within or between buildings. The uncluttered, flat roof-surfaces, which actually form additional stepped terraces, are used for drying food and materials and are pierced occasionally by small chimney openings. Each house has, on the ground floor, a large square opening that serves as the only entrance to the unit and permits easy access for animals and large carts. On the second level there is one roughly squared window on each exposed surface wall that permits light and ventilation for the living spaces. This window is heavily framed and weather-protected with stucco and whitewash, and it is expressed as the strong decorative element of the façade.

Unlike most isolated areas of the Mediterranean, a variety of building materials was available here, and the inhabitants were free to choose appropriately for their building construction. The walls are of stone, stuccoed over for weather protection on the upper levels and left in exposed slabs below. This slab horizontally bisects the façade and visually expresses the separate internal functions. Wood is used primarily in the interior for lintels, floor and roof rafters, and upper flooring. A thick protective roof of mud and thatch overhangs the walls on all sides to permit good drainage away from the wall surfaces during the frequent rainstorms. The nature of the roof construction creates a soft, rounded surface of extreme plasticity that offers a sharp contrast to the articulated wall surfaces below. This protective cover becomes the unifying element in the total design, interlocking the terraced dwelling units of the village plan into a form of great continuity and solidarity, which gracefully extends into the surrounding natural environment. Such a village system could be extended in all directions in a natural order of development.











Village in the Valley of the Ourika

A fan-shaped cluster of dwellings, developed to fit the terrain, distinguishes a small village along a hillside in the Valley of the Ourika in southern Morocco, near Marrakech. Although there is no special hierarchy of building and the unit of habitation is a simple, cubic volume, the total monolithic form is one of great unity, richness, and solidarity. Within the village, a series of community spaces defined by the dwellings step irregularly down the hillside and are linked by narrow passages. In addition, the buildings themselves, with their sharply defined, flat overhanging roofs, also step down the slope, but in horizontal layers that parallel the natural contours of the hill. The synthesis of this building order is an over-all formal expression that is firmly tied to the land. In addition, the walls of rubble and earth and the roofs of mud and thatch serve to merge the village and the natural environment into an organic entity.





Ait-Benhaddou

Between the High Atlas and the Anti-Atlas mountains in southern Morocco, the towering silhouettes of *kasbahs* and *ksours* dominate the strange landscape of the stone desert. Most of these fortified villages rise above the flatlands in the Valley of the Dades, forming a continuous procession of cubistic geometry. However, near the oasis of Quarzazate, at the eastern approach to the valley, stands alone an unusual village of towers and walls that steps up the slopes of a hill and overlooks the dry riverbed of the Asif Mellah. In times past this fortified village, called Ait-Benhaddou, both protected and exploited the camel trade caravans as they moved from the desert regions to the city of Marrakech beyond the mountains.

The town plan consists of a series of *kasbahs* interconnected by lower structures and protective wall enclosures that step up to a natural hillock. This arrangement offered protection from both tribal enemies and the torrential flooding that occasionally occurs along the path of the riverbed. The intensity of competition of the crenellated towers and their terraced organization up the steep slope combine to form a soaring vertical movement of great power, similar to the spirit of the skyscraper cities of today, yet with a comprehensive order and monumental dignity. The small doors and windows and the vertical, pointed decorative recesses further emphasize the superscale form, and although only 40 to 50 feet high at most, the towers give the illusion of much greater elevation.

The basic *kasbah* plan of a large, square central space with four square corner towers is fused with lower structures and creates a rich and complex multileveled town plan. The uniform red earth-color and the repetition of cube and tower give order and organization and unite the total village form. The structures are primarily of mud and straw bricks, with occasional palm-trunk supports in the interior. Because of the thick exterior walls and narrow openings, which offer good insulation, the interior spaces are dark, intimate, and mysterious. Since this town was conceived as a total fortification, there are endless mazes within the village walls. Many streets terminate abruptly in dead ends. Small squares, yards, and narrow, crooked streets provide comfortable outdoor protection from the intense heat and the desert sandstorms and windstorms. This quality of space affords a necessary psychological security for the inhabitants of a village set in this harsh environment.





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Ksours in the Valley of the Dades

Along the camel trails of the Valley of the Dades are found many varieties of *ksours*, or fortified villages. Although they are related in terms of available materials and functions, individual developments have produced various personalities within the group. Some contain the suggestion of former lookout towers and the softened edges of pinnacled corners; others are composed of simple, crisp interlocking cubes, severe and defiant. Some are expansive, enveloping large courtyards within the protective skin; others are as tight in plan and form as a modern urban apartment house. Therefore, although the village architecture of the Valley of the Dades is consistent in material and purpose and creates a unifying order of movement along the camel trails, the contrasting forms and sizes of the villages provide for local identification and visual relief.





Oasis of Tinerhir

At the western end of the Valley of the Dades in southern Morocco lies the oasis of Tinerhir, set in the midst of an arid stone desert. The forest of palms and the green fertile fields are embraced by a wall of habitations that reflect the red earth-color of the surrounding flatlands yet stand apart as a result of the sharp articulation of the intersecting forms, thus creating a rich, crisp geometric chiaroscuro. This protective wall separates the harsh, arid landscape from the rich productive soil within.

The uniqueness of the village plan lies in the major focus provided by the large negative central space, with the buildings themselves forming the perimeter ring. This accentuates the special nature of the oasis green, which also becomes the grand courtyard of the community. With its symbolic visual relief as well as its practical role as harvest center, it satisfies both physical and spiritual needs. Although the spatial form may be compared to a large public park or green within the walls of a modern city, the contrast is here more intense and the psychological impact more satisfying, since it supplies not only an area for recreation but the water and food essential for survival.

The houses are generally two or three stories, with corner towers projecting an additional floor above the roofs. The walls of adjoining structures intersect to brace one another and create an interlocking system of buttressing, a pure form of great continuity and solidarity. The smallness of the variable openings, the multiple projecting rain-water spouts, and the absence of exterior decorative effects emphasize this impression.

Interiors are divided into intimate, dark spaces insulated from the harsh climate by the thick masonry walls of mud brick, rubble, and stucco. Roof terraces are used for the seclusion of women, as dictated by Islamic custom, as well as for drying areas and comfortable sleeping quarters at night. They also once served as an intricate network of escape during enemy attack, but they now offer pleasant views of the central green or the distant landscape.

The deep pockets and narrow passages between the buildings sometimes open onto public squares and bring to the inhabitants visual relief and psychological security, as well as comfortable shade. In addition, they provide an intriguing corridor linking the endless stretches of the surrounding red earth to the lush contrast of green oasis.



















Village near Khenifra

The one-story atrium house is the unit habitation in this small village, built along a stream near Khenifra in central Morocco. Building plots are laid out in regular square units; however, the size of the enclosed courtyard varies inversely with the volume of the interior spaces to create a diversified series of solids and voids when viewed from above. Privacy and protection are achieved in this simple, economical grid-design system. The major negative spaces, which in most villages are generally centrally located and defined by the habitations, are broken down into private cells within the individual dwelling units. The communal spaces are linear and occur primarily along the riverbank. There is a great similarity in diagrammatic pattern to the earthcavity dwellings at Matmata in Tunisia. In general, linear streets run between the unit groupings to a wider street that parallels the adjacent stream. The flat roofs of mud and thatch provide a surface for drying foodstuffs and clothing and are reached by ladders from the interior courtyards. Roofs overhang on all sides to provide good drainage away from the wall surfaces during the rainy seasons, and the exposed structural timber beams cantilever out freely to provide a textured and decorative roof edge.





Tunisia

There are no particularly uniform relationships among the villages of Tunisia. In response to climatic and geographic differences, a considerable variety of forms and villages appear, some among the most original structures about the Mediterranean region. In the temperate north, the village form develops from the repetition of the atrium house, and the most interesting of these, the Berber village of Takrouna, is dominantly located atop a plateau cluster. The dwellings are barrel-vaulted structures about courtyards, protected from the strong winds, with white, reflective roofs and natural side-walls.

In the south, very different solutions occur to a common hot, dry climate because of varying geography. In desert areas, some villages consist of isolated, rectangular-block houses in rows parallel to the wind direction, as at Kebili. Where stone is available, rude barrel-vaulted dwellings and storage chambers called *ghorfas*, some six or seven stories high, form protective, oval village clusters. Many villages are cut into the rock-cliffs in the mesa region, and an entirely artificial troglodyte community exists at Matmata, where the inhabitants have completely burrowed into the soft earth.

In addition to the mainland villages, of considerable interest are the minor mosques of Djerba, a flat, palm-groved island off the coast. These isolated structures are of varying plastic, sculptural form. They are centers of pilgrimage throughout the island and serve as reference points in the island plan, as the square or exceptional building serves the village.




Matmata

In the arid lowlands of southern Tunisia there is a unique village of artificial caves built about large man-made cavities in the earth. They were originally excavated and inhabited by troglodytes from the mountains and are among the more economical systems of permanent dwellings created by man.

The craters vary in size from 20 feet deep and 40 feet across to 30 feet deep and 200 feet across. The floor of each crater is connected to the surface by a long, gently sloping tunnel. About midway through this passage there is a large, hollowed-out chamber, where animals are generally kept or grain stored. Caves are dug into the vertical sides of the cavity for living quarters and storage rooms.

This extensive burrowing into the earth is made possible by the extreme workability and firmness of the dry sandstone, while the natural advantages of insulation and protection are easily and rapidly secured. Because of the unspoiled terrain, hostile tribes could pass at a distance, totally unaware of the existence of the village. At times of siege, the entrance to individual tunnels could be firmly secured.

Several thousand people live in Matmata today. Each neighborhood square services up to 100 inhabitants and becomes a natural front yard, rear yard, and storage and community space. The size of the public area varies in proportion to the population. Although there is some danger of flooding and cave-in from the infrequent rainstorms, a valuable advantage is that life below can move about uninterrupted during the violent windstorms indigenous to the area.

The plan of the village reveals a sophisticated network of communication and resultant sequence of spatial experience. Above, the natural surface between the cavities serves as the street with an undisturbed view of sky and horizon; the connecting tunnels are dark, intense, and mysterious; the public area is a contained space, yet very light and open; and the perimeter living spaces are quite intimate. In the daily ritual of the inhabitants there is a constantly changing experience from light to dark, from intimate to expansive. Therefore, within the limits of this primitive society, there is a basic order of design and a sophisticated variety of experience.



















Ghorfas at Metameur and Ghoumrassen Hadada

A group of fierce tribes who once inhabited the mountain regions of southern Tunisia were forced to migrate to the valleys because of the lack of food and water and grazing land for their goat herds. These troglodyte dwellers had lived only in mountain caves, and they recreated this protective atmosphere in their lowland territory with the available building materials and their limited building experience.

They proceeded to develop a unit system of simple, barrel-vaulted stone structures called *ghorfas*, whose small, dark, deep interiors echoed the intimacy and security of the troglodytes' natural cave dwellings in the mountains. These were arranged in both vertical and horizontal rows and formed a walled enclosure defining a large, oval courtyard that provided a protected community-space during periods of siege and a market place during times of peaceful trading. Occasionally, these tribal neighborhoods were grouped together to form a village of clusters, as at Medinene, where only isolated groupings now remain. More often, they took advantage of terrain offering better fortification by building about a hill, as at Metameur.

The *ghorfa* unit was both dwelling place and storage chamber, with the living quarters on the first level and the storage attic above. At one time they reached a height of six or seven stories; generally, only two- or three-story units exist today. The end facing the inner court contains one central rectangular opening per bay, with an exterior staircase of projecting stones reaching the upper levels. The outer end of the unit is entirely closed; however, in modern times, small openings have sometimes been pierced to ventilate the interior spaces. Each cell stands in complete isolation, with no interior connection disturbing the self-buttressing structural system. Sometimes an interior partition divides the unit into front and rear chambers.

Occasionally, once the perimeter defense wall was erected, a rise in population or a good harvest dictated building additional units within the security of the plaza space. Therefore, in some *ksours* a network of streets and alleyways has replaced the large public square, as at Ghoumrassen Hadada.

It is interesting to observe the variations in scale and spatial development brought about by the changes within the framework of the same unit architecture. The large public square at Metameur offers a grand spatial relief and community experience, in contrast to the tight individual cells of the *ghorfa*, and can permit the increased height factor of six or seven stories, which formerly existed and which would actually improve the definition of the space today. The narrow streets brought about by increased density at Ghoumrassen Hadada are at a good scale of two stories, but an increased height would have considerably impaired the sunlight and ventilation. In both examples the repetition of the unit creates a satisfying order and unity in village plan and a common scale of building. Although the individual in this society did not express himself strongly as artist, the imperfections in the building methods and the spatial definitions create enough interest to prevent monotony.



















Takrouna

About fifty miles south of Tunis the plains of Tunisia are broken abruptly by an outcropping that is really a cluster of three plateaus. On them, centuries ago, the Berbers built the village of Takrouna as a stronghold against Arab invaders. Now that the need for protection has passed, the villagers continue to live on and around this rare geological formation, where they may overlook their fields and olive groves and view the Mediterranean in the distance.

The village is composed of three neighborhoods on different levels, each commanding a separate view of the plains, with the uppermost part built on a rugged plateau boldly jutting out over one side of the hill. A camel trail winds up from the plain, pausing at the first level of the village, then spiraling past a second level to the topmost rock, creating a unique series of spatial experiences.

The village has been built up almost entirely by the repetition of a single distinct architectural unit, a barrel-vaulted, one-story rectangular block, which ties the three separate levels into a consistent whole. The use of stone for both walls and vaulting is in response to the local scarcity of wood and the need for maximum protection against heat and cold; a thick coat of white stucco reflects sunlight and reduces wind infiltration. The short transverse vault at the center of each block adds structural rigidity and gives emphasis to the central doorways.

Takrouna's dwelling units have been laid out to form closed courtyards, offering protection against the fierce winds sweeping in from the plains and privacy for family groups. Their basically square plan has been distorted in many cases to fit constricted sites. Twists in the narrow stone streets between these enclosures provide additional shelter from the wind. The street façades are severe, the only expression being the defined entranceways and occasional small, high openings for ventilation over the doors. Larger windows and doors open onto the contained private courtyards. The roofs provide ideal surfaces for drying foodstuffs and laundry.

There is a unique spatial relationship among the three neighborhoods, with no special hierarchy. Each is about the same size, has a consistent organization and building unit, and occupies a separate plateau. Everywhere one moves, there are views up toward projecting cliffs, down to other parts of the village, or out across the plain. There is at once the intimacy of protective enclosure and the exhilaration of dynamic open space. From the plain, the village seems boldly sculptured from the rock formation. From above, the interlocking buildings form a design system that relates to the order and organization of the orchards below and to the natural configuration of mountains in the distance.



















Mosques of Djerba

On the sandy, palm-lined flat island of Djerba, off the southern Mediterranean coast of Tunisia, stand approximately 300 mosques dedicated to two Moslem rites, Malekite and Wahabite. Some of these, such as the Mosque of the Turks at Houmt Souk, are monumental in size and are located within the villages. However, a great variety of humble mosques, unrelated directly to the village form but connected by lines of communication and pilgrimage, create strong focal points within the total island plan. Just as the exceptional building within an urban community serves as the focus and pivot point, these structures are the physical and spiritual nuclei of this small island.

Among the structures there is considerable variation in physical form within the demands of the rituals that dictate the spaces and their organization. There is a walled outer court with one entrance. This wall is sometimes very low; it does not serve as a protective barrier, as in traditional mosque design, but as a definer of space, establishing an atmosphere of welcome. This outer court is an important facility in which outdoor prayer ceremonies are held. In addition, pilgrims eat, rest, and park their camels here. The mosque is placed rather centrally within the outer court, and minor structures about the perimeter serve as shaded porticoes for visitors and their horses and camels, and as storage facilities. The well and its related canal system, and the prayer niches along the perimeter wall surface, are the minor sculpture of the court.

The mosque building itself is a large prayer room defined by square, regularly vaulted bays supported by a grid of columns, with the entrance door centrally placed. A minor interior door leads to the minaret tower. There is no source of light other than the entrance door and very small slot windows. The structure is primarily of baked clay and stucco, as are most of the island's buildings. In the exterior form, the vaulted roofs are either boldly revealed or concealed within the parapet of thick perimeter walls. Interior prayer niches express themselves in apse projections about the base, and fin buttresses of varying sizes brace and reinforce the shell. An additional important part of the expressive external form is the exterior stairway leading to the outdoor prayer platform that is attached to the building wall.

These expressive designs, together with their overlaid coats of stucco and whitewash, elaborate the total form into varied and beautiful structures of great plasticity. All are quite different, yet each is a strong and serene architectural statement.




























- 1 Skyros
- 2 Mykonos
- 3 Santorin
- 4 Sifnos
- 5 Serifos
- 6 Alberobello
- 7 Positano
- 8 Procida
- 9 Bonifacio
- 10 Cuevas del Almanzora
- 11 Guadix
- 12 Mijas
- 13 Benalmédena
- 14 Arcos de la Frontera
- 15 Vejer de la Frontera
- 16 Village near Khenifra
- 17 Village in Valley of Ourika
- 18 Village near Tizi-n-Tichka Pass
- 19 Ait-Benhaddou
- 20 Tinerhir
- 21 Takrouna
- 22 Matmata
- 23 Djerba
- 24 Metameur
- 25 Ghoumrassen Hadada



