ARCHITECTURE AND THE MEDITERRANEAN CLIMATE

Studies on the effect of climatic conditions on architectural development in the Mediterranean region with special reference to the prospects of its practice in the "Near East".

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by

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INTRODUCTION TO ARCHITECTURE

1. Architecture and Society - Ethical values
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PREFACE

After completing a course of study in architecture and civic design as an Iraqi government student at Liverpool University, I was allowed to continue architectural studies with the object of becoming better acquainted with Western scholarship and library facilities, and the result of this study is to be presented as a Ph.D. dissertation.

The impact of northern civilisation is bringing a definite transitional period of change in Mediterranean countries in general and non-European Mediterranean latitudes, referred to as "Near East," in particular. The confused styles of present buildings and the urgent need for new schemes in the near future demand that some attempt should be made to relate this material progress of our present civilisation to climatic environment and human culture. The attempt in the following approach is to cover the general and particular significance of climate in architecture, since it is felt that this approach would be more of a comprehensive attitude to a subject that has not yet been duly looked into.

The first part of the dissertation is devoted to an attempt to define what makes architecture an art of human expression. This seemed necessary as the recognised basis to help in the attempt of relating the values of human association, time and
space in a comprehensive view of understanding the artistic ideas implicit in architectural expression.

The climate and geographical setting of the Mediterranean region in relation to its culture and civilisation forms the scope of the second part.

Sources of information are referred to in footnotes and the bibliography. It is impossible to review these references since such a task falls outside a preface, but in connection with Mediterranean geographic conditions and its relation to ancient history the work of E.C. Semple was particularly valuable. In an address "The geographical study of Greek and Roman culture" J.L. Myres stresses the need for western European scholarship to relate classical studies to their geographical environment, not only in Greece and Rome, but the Mediterranean as a whole; the Fraser lecture of J.L. Myres 1943 in Cambridge was most interesting and stimulating as a sympathetic study of the vernacular primary Mediterranean society. More relevant to Eastern conditions was the work of D.G. Hogarth and the recent monumental topographic studies of Musil as a new contribution to the geography of the eastern Mediterranean in North Arabia.

The third part is a discussion of the historical development in architecture pointing out the significance of climate. Climate has had a deep social significance throughout the ages, and it is important to relate and discuss these influences with regard to the similar climatic problems of the present. Throughout
the changes and styles, it is possible to trace a dominant theme which varies in pattern according to local and topographical conditions. This Mediterranean theme proper is to be taken to correspond to a unity of climate in a subtropical latitude known as "Mediterranean" which is particularly distinct in the eastern and southern lands of the Mediterranean.

Ancient, Christian and Islamic are the chapters of this historical discussion. The latter two, Christian and Islamic art correspond in general to the regional distribution of an eastern, southern Arab-Islamic crescent and a north-western Mediterranean Christian zone.

The Renaissance is included as a second phase of Christian architecture since it more represents the spirit of the north-western Mediterranean. Alberti's work has been discussed in detail because of its relevance to Mediterranean climatic practice.

The valuable scholarly work of archaeological expeditions forms a reservoir of material recording monuments and topographic conditions of site. These with other folio works of architectural interest listed in the bibliography were studied.

Emphasising the scope of awaited organized and scholarly architectural expeditions in studying and recording local character and landscape architecture with the purpose of acquiring sensitive relationship between buildings and their details to
climate and topographic site condition to the need of revived and well nourished artistic continuity.

Islamic architecture has hardly been studied with due regard to the importance of relating it to Mediterranean climatic conditions, and an attempt has been made in this part to reveal some of its characteristics and decorative work in relation to building material and climatic environment. With regard to the written sources for this historic part, Atkinson and Bagenal's "Theory and Elements of Architecture" was one of the few works dealing with the relationship of building material to climate. Adrian Stokes' love for stone in the quality of Mediterranean light was a stimulating and inspiring imaginative source of architectural poetry relevant to its meaning in the rocky Mediterranean basin of Southern Europe. An illuminating article on Colour in Architecture by W. Harvey was relevant to the arid climatic conditions of the Mediterranean.

The fourth part discusses architectural and town planning problems of the present in the light of better future possibilities. Starting with cultivating and adjusting a happier relation between man and environment and its direct and indirect effect on architectural appreciation and symbolic regional expression in art, the scope of co-ordinated regional planning and landscape design in the present transition is there dealt with. The awaited material prospect offers possibilities which with the advance of
modern technics and scientific research work should enable, not destroy the sympathetic relation of buildings and settlements to environment. Relating climate to civic and rural design is a regional character of healthy indigenous growth that should not be overlooked in favour of confused modernism fostered by the alien impact of Northern latitude conditions.

There has been no attempt that I know of relating cultural expression in architecture to the scope of regional planning. Economic co-ordination for improved health and agricultural projects would obviously suggest themselves; the example of the Tennessee Valley has been recently discussed; also international reports and Housing and Town Planning Conferences show the more important work of McLean on the economic scope of regional planning are only particular aspects which are hardly concerned with civic and rural character in relevance to climatic and regional building conditions.

These with the many architectural and civil engineering periodicals on Mediterranean countries provided the written source for surveying the "modern" trend and its reflection and formed the basis of an attempted constructive criticism which is directed towards a better architectural potentiality.

The chapter on building material discusses the relation of efficiency to colour and texture of building material and the relation of such practical and aesthetic consideration to the
significance of climate and light. The use of primary building material and the prospect of particular scientific research is pointed out. Problems related to brick structures and the value of the right use of reinforced concrete to preserve and continue brick tradition are discussed.

I learned quite early from Mr Carter of the R.I.B.A. how scanty is the information regarding climatic considerations in architecture. Scattered technical information appears in various health and sanitation reports which present interesting data. In the course of visits and enquiries to the library of the Wellcome Bureau of Scientific Research and colonial library I had access to health and some technical reports, among those referred to is that of the advisory reports on town planning in Palestine. In connection with this chapter and also an early reference to brick structural problems I am indebted to an address by Mr. T.E. Richmond and followed by a discussion on building methods in Egypt; this address which was brought to my attention by Mr H. Bagenal in a reply to a letter of enquiry at the Building Research Station.

The last chapter is an attempt to relate a theory of climate to the elements of architectural design. Throughout the work it has been difficult to avoid repetition and expression has sometimes formed an obstacle which I hope will not detract from the argument.
Illustrations are grouped together as an appendix with relevant notes to illustrate the influence of climate on architectural character. Islamic Mediterranean architecture has been amply illustrated since this aspect of the work is not familiar, and some of the interior views of mosques and sahns have never been published before. For these I am indebted to my brother Dr Aziz Makiya whose contact with the various departments of education and antiquities has made it possible to include these photographs and other illustrated publications in the bibliography. Reproductions from various books have been prepared with the kind permission of the Cambridge University Library, the Victoria and Albert Museum and the Bodleian Library, Oxford. I am very grateful for the opportunity of studying the listed folio publications mainly in the Cambridge Library, the Museum of Classical Archaeology and the Library of the Society for the Promotion of Hellenic Studies. The last two provided easy access to folio volumes of topographical measured work and architectural sculptural details.

Books which were unavailable at the Cambridge Library or unfortunately destroyed by war damage at the British Museum were fortunately found in the excellent art library of the Victoria and Albert Museum. With regard to modern practice in Mediterranean countries, I made use of the various architectural periodicals stored during war time in the basement of the R.I.B.A. Also their specially arranged catalogues proved most helpful.
CHAPTER I

INTRODUCTION TO ARCHITECTURE
PART I

Chapter One

INTRODUCTION TO ARCHITECTURE

The importance and significance of a philosophic understanding of architecture in relation to the present.
The meaning in architectural "fine" expression is a synthesis of expression human values relevant to (1) Society, (2) Time, and (3) Space.

(1) Architecture and Society: Ethical values:
The relationship of the individual to a society and of that society to humanity. Architecture is a tangible means of expressing 'ethical values'. Relevance to the meaning of "fine art" in architecture. Plato on the reflection of "the good" in the arts. The effect of ethical values on the scale and composition of buildings: intellect and human purpose in the arts.

(2) Architecture and Time: Traditional values:
The individual and the family in the concept of time; the process of transmission, continuity and reaction. The value of time in architectural expression. Amenities. Objective quality of beauty and the subjective data. Inter-relation of theory and history of architecture in the continuous process.

(3) Architecture and Space: Cultural values:
Relation of time to environment; space, time and architecture. The physical and spiritual values of environment in everyday living; nature an eternal source of inspiration. Artistic creation and the response to physical and climatic environment. The particular pattern and the objective concept of beauty. Regional character and the vernacular quality of theme and variation; accepting climatic and physical limitation of space is a regional theme capable of infinite yet indigenous variations. Alien influences and their effect on regional character. Revival and continuation of art. Response to environment. Relation of geographic studies to landscape.
Architecture is an art of expression in visible three-dimensional structures we call buildings. Architecture deals with buildings but buildings do not necessarily make a work of architecture. If we ask ourselves 'what makes a building a work of art' then we must seek the underlying meaning which is reflected in the expression. The inter-relationship of meaning and expression must always be realised. This period of confusion and mannerisms reflects the complexity of the present society. A discussion of the idea of architecture is bound to enter many other spheres of thought and activity. The practical use of discussing 'the ideal' is to stimulate an understanding of the artistic and human approach towards architecture. Otherwise human energy and thought have a tendency to drift into expression which would lack the quality of a work of fine art however dazzling quantitatively such expression might appear. The art of architecture derives its meaning first because it is related to people; and thus ethical values are involved. Secondly, people in a society are part of past and future and therefore their activities are related to time. Thirdly, society exists in a climatic space and this involves its cultural relationship to environment. Thus the art of architecture first and foremost is necessarily linked with these three primary values, ethical, traditional and cultural. By paying more attention to these
criteria for objective judgment, we are less likely to be influenced by personal prejudice, cultural dogma or changing fashion. When a more fully co-ordinated view of fundamental values is observed, then criticism will be more and more constructive.

**Architecture and society**

The individual makes the world; he is an entity within a series of ever widening horizons. He is a member of a group within a society which belongs to a specific region; in turn the region is a part of the world in space; and the world in space is part of humanity at large in time past and future. The particular group must always bear a relationship with a wider concept in order to contribute to a harmonious whole.

Art should flourish so that the particular individual within a group may give tangible expression to this purpose. This idea of representation has been a part of humanity in every time and space. In the most primitive society the ritual and symbolic can be assigned to the beginning of a formative art. Hence religious buildings are the primary source of architectural art study. Though such buildings are of major interest in the art of architecture it is also important to understand the ethical values that underlie any other building. A group of buildings denotes a group of people. Just as the behaviour of people makes a society, so the visible expression of a particular
building bears a relationship to the village or town society. In a building or group, village or town, rural or civic art, there is an underlying purpose that makes some village mosque or church a work of art. What sometimes makes the monumental in architecture is the symbolic expression of the 'ethical values' attached to its purpose. In villages or small towns, there is often a representation in idea and practice of a community largely imbued with an inherent sense of composite relationship. In our resort to knowledge we must cultivate our sense of valuation of the good and attempt to pursue its expression. In an advanced society, therefore, responsibility for various activities is distributed amongst those whose vocation it is to master a certain craft of profession. If the artist builder or architect is to assume responsibility, then it is essential that he observes the reflected ethical values if his building is to be a 'work of fine art'. Hence there arises in this connection the relationship with that word 'scale' which is at once both familiar and difficult to define. Many humble buildings have the quality of 'fine art' because of the exact relation they bear to the purpose of human living. This characterizes the aesthetic composition and marks resentment against standardisation and indiscriminate copying. The right sense of scale in a particular pattern works towards a permanent appreciation of architecture. It follows that the aesthetic training of an architect must include a discussion of the idea and purpose of buildings. By these means he will be in a better position
to cultivate the right inspiration. Early in history Plato emphasizes the responsibility of learned citizens acting in public capacity to carry into expression the idea of 'the good'.

"Then we must speak to our poets and compel them to impress upon their poems only the image of the good, or not to make poetry in our city. And we must speak to the other craftsmen and forbid them to leave the impression of that which is evil in character, unrestrained, mean and ugly, on their likenesses of living creatures, or their houses, or on anything else which they make. He that cannot obey must not be allowed to ply his trade in our city. For we would not have our guardians reared among images of evil as in a foul pasture, and there day by day and little by little gather many impressions from all that surrounds them, taking them all in until at last a great mass of evil gathers in their inmost souls, and they know it not. No, we must seek out those craftsmen who have the happy gift of tracing out the nature of the fair and graceful, that our young men may dwell as in a health-giving region where all that surrounds them is beneficent, whenever from fair works of art there smite upon their eyes and ears an affluence like a wind bringing health and happy regions, which, though they know it not, leads them from their earliest years into likeness and friendship and harmony with the principle of beauty."

Architecture bears a heavier burden of responsibility than the other arts since it is expressed through a medium of more or less permanent character. The architect cannot afford to be an impressionist or a surrealist. While a canvas can be easily ignored or destroyed, this is not the case with a building. It is impossible to ignore the visible presence of a building. The first and normal approach to the problem should lie in that observance of intrinsic quality in relation to scale which provides an inner meaning to outward form. The aggressive and unsympathetic quality in many buildings today is the result of ignoring.

(1) Plato, Republic III (401)
the necessity for observing these fundamental human values. Intellect without reverence is not capable of producing a work of art; neither emotional fantasy nor superficial romanticism is in a position to produce something worthy of permanent appreciation. Adherence to ethical values would express itself in an intrinsic civility reflected in the manner and order of grouping and association of various buildings to correspond with a greater whole. Thus the idea of unity would find its meaning simply and naturally without any need for elaborate rules.

The question might be asked as to the service of beauty in human happiness. This question has been answered already in the discussion on beauty in architecture as the tangible expression of the good. When the human mind is not in a contemplative mood, the senses, consciously or subconsciously, are aware of environment. It is not necessary at such a time to think of the beautiful, instead we take it for granted. The more beauty we are allowed to see, the more chance we have of stimulating our potential awareness to it. If we become accustomed to good music and poetry, then in time we tend to resent hard meaningless and superficial composition. Reflected beauty is one of the greatest human needs. It represents the spiritual idea of God and thus helps us to live the 'good life'. Analysis and diligent consciousness to study and observe beauty is the prime concern of the architect; as an artist bestowing his gifts to his people. For those to whom the aesthetic appeal is not developed, reflected beauty will stand as a reminder and associated example of the
true and the good. In this respect fine quality in architecture will contribute greatly to the welfare and spiritual riches of a human being. In the space he occupies, in the street in which he walks, and in the square where he congregates, it sets before him a visible medium of composition in three dimensions: it is at once evidence of a tangible expression of beauty which he inherently and spiritually recognises.

Because beauty is good, the human intellect will always be directed towards it thereby working for the spiritual welfare not only of itself but of humanity as a whole. Man is at his best and so he is happy when emotion and intellect are fused to fulfil his purpose. In art and general attitude towards life, the individual tends to become more self-sufficient, thereby contributing towards his own society and the world at large. To depend solely on the services of intellect is to reduce man to the level of a machine and a slave. There will be no limit to his ambitious power and quantitative argument. When scientific thought and outlook is divorced from art and human values there is a lurking danger of a Frankenstein.

Thus so far the purpose has been to appreciate the underlying implication of spiritual values relevant to the individual and people and their effect on architectural sensitiveness proper/considerations of scale, character and site. For instance in an urban society this appreciation will help to mould and relate the diverse elements into one idea of a living entity - will set up
a code of manners and an idea of order for a spiritual harmony and stability.

**Architecture and time**

Past, present and future is the concept of time; any society, anywhere, anytime is part of a past flowing into the future. This continuous process is brought about through the life of the individual. The family forms the chain through which the individual is linked to the past by his relationship to his parents, and to the future through his own children. The smallest society is therefore the family which in itself represents the microcosm of a continuous humanity. The various cycles of human growth, old, young and infants, are all to be found at the same time, and they need to be catered for as such. Here the problem is not one of numbers only, but of different groups within the whole.

Each individual within his family society plays his part as an effective member in shaping his surroundings through the period in which he lives. He receives the accumulation of the past from his parents and in turn transmits this legacy enriched by his own life and experience to future generations. It is a part of the natural order that he would so transmit the best in idea and practice. What he would have wished if he had to live his life over again would be the legacy of purpose he would leave behind to those to whom he is closely related. This instinct is part
of the continuous process of life and progress. It is the ideal underlying the natural order and evolution relevant to human progress. However, the impact of external forces often handicaps the realisation of such a smooth normal order. The various degrees and intensity of reaction works as a major factor in the ensuing struggle to better or worse. In the state of any reaction it is imperative to keep hold of living values in relation to the individual and society, values that would inspire that cultivation which in turn can keep alive an idea of a broader and better conceived humanity.

Our respect and attachment to the past, thus, becomes humanity itself. The kind of respect we hope for ourselves in the future will be revealed in that same recognition we accord to past generations. This immaterial reward and acclaim has a spiritual and inspirational value for the arts. Through it we live our own lifetime fully and completely since the merely physical existence has been endowed with an enlightened soul. This quality distinguishes human beings from the animal world.

If we seek a wider concept of past and future in our artistic expression, as we must, then we must be inspired to reflect it. Art thus becomes the medium to symbolise time. This is the meaning of those 'eternal' and 'universal' qualities always associated with art. The importance attached to the historic is never a simple material or quantitative investigation. It kindles a spiritual valuation and objectivity that
are sometimes dismissed as useless by hasty opinion. This aesthetic-spiritual value of time partly inspires our loyalty to historic buildings even when they have little reflected beauty. In this sense it seems that time is the 'beautiful'. Such loyalty should inspire the present period with a greater sense of responsibility in fusing contemporary fashion with more of the timeless artistic quality. Human culture demands the cultivation of this time sense in our present civilisation. Time lives in buildings, and whether consciously or not they help to link us with the past. The visual expression of the value of time gives individuality to the building, or group of buildings that makes the site of village, town or city. The achievements of past citizens are found within the walls and streets, and no two towns will be exactly alike since the same society could never exist in two places at the same time.

Because beauty in architecture is not determined by a period of history, it follows that when we look at a good building and see excellence, our appreciation is not dependent on the century or other informative dates; though these will serve another purpose by fixing our investigation and giving information that will help us to systematise and classify our knowledge. If a building of the past is beautiful it then follows that its beauty is an eternal quality. In the same way if a bunch of flowers, or a tree, perfect in themselves could accompany us at any time and in any place, then a well designed lamp post in a street or an article of furniture in an interior should inspire
the same feeling. Beautiful buildings are those which bear frequent inspection and still remain beautiful though such qualities as they possessed appear to have been achieved by the simplest means. It is this virtue of permanence in appreciation and lasting inherent recognition that distinguishes the better forms in Art.

If the history of architecture is to be studied as an art, it cannot be separated from the theory of design. If art is to develop and shapes express a sensitive meaning, it is necessary to be familiar with historic forms. Art, therefore, becomes primarily the study of its history. This is true not only in the legacies of centuries of technical development but more particularly in the sensitive artistic composition of shape, form, colour and texture that underlay various styles and developments. When architects dismiss or are unsympathetic towards the study and analysis of past architectural form and composition, they have less regard for architecture as the record of human artistic achievement. They would lack the power of composing elements of design. As in literature, mastery of word composition and fine meaning is developed by familiar reading of the great works, so with architectural design we must absorb the work of past methods of composition if we are to release our own genius. Something startling, new and original does not necessarily mean progress, in fact we are even now in danger of a decline in the arts.
Artistic scholarship in the history of architecture does not only make the acquaintance of the art of the past but it also relates the common bases of human artistic achievement to the present. Without such an attitude, there is a danger of breaking the link in the continuous process of progressive tradition for the sake of indulging in fashionable building experiments. Such a definite break in the arts would have to run its course and leave a trail of unworthy creation in visible surroundings. Looking back, then, should act as a spur to the sum of human knowledge and the serious thinkers so that they may gather the necessary force and strength to move forward objectively. A time of sharpened tendencies consolidated more in opposing views and thoughts as for instance 'modernism' versus 'traditionalism' is bound to emerge. Looking into the past in times of conflict will benefit humanity since it might supply the impetus for a revived constructive attitude. A resort to the style of the past without fully understanding their meaning and expression results in counterfeit versions which easily lend themselves to attack and reaction. To impose the stylistic manner of the past without being versed in the conditions and limitations of its growth would be to create expression divorced from the essential real meaning.

Architecture and space environment

Man's relationships with his fellow men at any time besides being linked with past and future are related to a definite space
and environment. Nature provides the permanent setting for human life and activities. Thus the subject matter of history is bound up with geography. And history as well as the present is simplified by the acceptance of its environment. Continuity is therefore assured. It is unwise to uproot ourselves from our physical surroundings, as such a course reflects an unhealthy attitude to life.

In cultivating our vision and ideas with understanding of nature, we are less likely to drift towards stagnant tradition, mystic fantasies or any excessive intellectual abstraction. However ingenious or skilful some creations of the human mind might appear, we feel the lack of a fine art quality. If we are to have this fine quality it is directly essential for us to derive artistic inspiration by the resort to a genuine understanding or sympathetic observation of nature. We can only master nature by first understanding her. Such understanding would be revealed directly or indirectly in our creations.

By referring to tradition in the light of geographical environment instead of dealing with the two separate aspects of history and geography we benefit by a more critical constructive approach to architecture. By means of geography we can understand history; correspondingly we should know space by means of time. History and geography are brought into close relationship in any attempt to unfold the human story of the past, to learn its meaning or to derive its essential lessons thereby more nearly
approaching our own objective ideal. Values of time and space are thus closely interrelated in the art of architecture.

Besides the source of food, shelter and clothing for our material existence, there is a sense of spiritual association which not only recognises the abundance of Nature's gifts but also the source of beauty essential to complete human living. It is in nature and beauty that we find a cultural and civilising value. Man's lust for material power alone is dangerous, since it will always fail to satisfy completely. In nature there is beauty for all to enjoy provided we respond in the right way. Our response should lead to understanding in itself our most treasured possession, a vigorous and genuine source of inspiration to be reflected in our own creation. This will help us to understand and detect the inspired artistic work of the past.

A work of art is the image of some object. It is only through close acquaintance and familiarity with the object that we can truly appreciate the value of the image. It is possible to enter into lengthy and infinite discussions about the image and the various factors in its development, but all these will be merely interesting informative data, unless we derive inspiration from the object which is always with us provided we have eyes to see. The same air, light, sky, trees, flowers and animals that inspired artists of the past will do the same for present
and future times. No period stands in greater need of such inspiration than the present if we are to create lasting works of fine art and absorb the wealth of the historic past into our aesthetic tradition.

It is obvious that natural environment differs in various localities and that climate is a determining factor in the topography and physical character of environment. It is a part of the natural order that human responsibility must be firmly attached to a specific environment. The making of a general is dependent on various particulars and therefore the whole wealth of a more widespread and cultured humanity depends on the response of human beings to their various localities. Local beauty adds to the wealth of art, both natural and acquired. Thus the particular and the general will be happily interwoven in the patterns created by response to varied natural surroundings. The true and logical outcome of such response that will be varied expression which is often referred to as the cultural attainment and contribution of a locality or nation. This is the substance of a 'national' culture. The expression of these various national culture patterns is fused by the underlying ethical purpose common to all humanity which has been discussed already as an objective universality. The harmony of various cultural expressions in architecture is not expressed in any fixed similarity but through a genuine response to natural environment. Thus the artist finds an essential harmony in those
striking differences between northern and southern architectural expression which are chiefly based on the right response to a different climatic environment.

If we are to achieve a cultural expression in art, then we must first look for its primary substance. This lies in accepting the local geographic pattern and in attempting to understand it both physically and contemplatively. The result will be fine expression invigorated and blessed with the quality of permanence. Buildings are a symbol of man, and man's life in a certain place; art must concern itself fundamentally with representing the truth of such a relationship. National culture should never be separate from regional expression. The truth of man's expression of his environment must always remain the criterion of a well developed architecture. The 'intrinsic' or 'vernacular' quality is the term which will be used throughout to designate this symbolic relationship in any region under discussion. Such a definite relationship does not mean the stagnation of a fixed expression throughout the ages. It means rather the possibility of infinite variety centred on a substantial theme which provides a tangible starting point and purposeful meaning for regional architectural character.

The penetrating influence of other climatic provinces and nations is one aspect of the inter-relationship of human activity and commerce on this earth. The best way to derive the greatest
benefit and make right use of such an alien character lies in due awareness of one's own physical and climatic conditions. This would fortify one against the introduction of an undesirable contemporary expression. It would also qualify and help the acclimatisation of such elements so that they are fused into an organic and indigenous entity.

If the architect is not in sympathy with his surroundings, he is in no position, either instinctively or consciously, to create the right expression. Resorting to copies and importation of forms is then likely to find a fertile home in the new land. Although such forms might be highly developed and beautifully contrived in their own environment yet they are bound to lack that spirit of nativity and inherent 'rightness' which all buildings are entitled to possess. In the understanding of his own environment the artist will have little need of alien forms, but once attuned to a specific locality he is in a happier position to control and transform extraneous influences to his own purpose. Souvenirs of distant places will then take their due place in relation to new surroundings. This attitude should be one of the most significant considerations in the historic study of the art of architecture. It is also the major problem of architectural development at present.

At any period like the present when the arts and creation are at such a low ebb the artist should look more closely at his natural environment, the origin and source of inspiration
that can revive and direct flagging sense and imagination to the right and natural order. It stimulates artistic creation at a time of stagnation and keeps alive that sense of continuous nourishment which has inspired the good work of the past and will still inspire future generations. The present Mediterranean outlook stands in vital need of such an orientation. The study of material geographical facts should be developed to an art of landscape appreciation in the same way that historical facts can be translated into an artistic enquiry.

The material value of landscape, surface, colour and texture will have more meaning if it is related to a particular aesthetic pattern. In this way a material contribution has been made to detailed and thorough understanding of the facts and properties of the surrounding conditions and environment. Such knowledge directed for instance to local building material would thus equip the architect with a more confident mastery of its usage in response to their inherent composite qualities. The artistry of local craftsmen has instinctively absorbed a sensitive feeling towards the use of material through years of loving intimacy.

Observation of nature cultivates a sense of structural composition in design since the organic and the beautiful are combined in natural forms. It furnishes an instinctive intuitive sense of organic relationships and sensitive proportions not only in forms but in the colour and texture composition of various localities. The interaction of the various climatic factors of
sun, light, rain, sky and their effect on the landscape can all be seen at once in their natural order. Stability in architecture demands such climatic observation since buildings have to be designed to suit the environment, never the environment to suit a proposed building.

"Everything that is at its best, either in nature or in art, or both, suffers least change from without", states Plato. The close observation of natural forms and environment reveals a balanced distribution of weight helping the artistic vision of proportion in design. It is a requirement in architectural practice which must be absorbed and cultivated by the artist. It would help to achieve character in a stable manner, a quality that ensures that test of good architecture - permanent appreciation. Sensational mechanical novelties must be subdued to this restful composition and it is easily noticed that those who are inspired by physical environment express these virtues of restful well-proportioned composition. The intrinsic quality of many local villages has been inspired by natural observation and will always receive artistic appreciation.

Advance in the technicalities will not ensure the creation of a work of art unless there is a reflection of the human values of purpose, time and space which have been the subject of this introductory discussion. Belief in these values should form the essential criterion for the art of architecture. Though they might appear simple and not new or startling discoveries, yet

(1) Republic, Book II, p. 381.
they are often ignored in a complex civilisation. A new contribution lies in their rediscovery and the stimulation that could be given to any particular field of activity. Architecture stands as a great medium for the expression and transmission of high human values.
PART II

THE MEDITERRANEAN

CHAPTER II - Climate and the Mediterranean Culture.
CHAPTER III - Climate and History.
CHAPTER II

THE MEDITERRANEAN
PART II

Chapter Two

CLIMATIC AND MEDITERRANEAN CULTURE

The significant relation of culture to climatic conditions; climate gives a significant unity to the study of the history of architecture in the Mediterranean. Scholarly work in history of art loses a great deal of constructive meaning if not related to the climatic background. Mediterranean climate and religious expression in architecture; climate and social institutions.

Climatic unity of the Mediterranean region. Summer drought and marked winter rainfall is more clearly marked in its Southern and Eastern zones constituting the Mediterranean climate proper. Definition of the Mediterranean region as distinct from the Mediterranean basin.


Climate and the agricultural mode of life. Importance of water in type of settlement; hill and alluvial sites. Significance of water planning in the life of villages and cities. Symbolic importance of water in religion; fountain and water temples.

Mediterranean culture and the primary community; bazaar and sanctuary correspond to the material and spiritual need. Civilisation and rural culture. Relation of "Classical" and "Romantic". Relating the significance of architectural achievement and civilisation in the "golden ages" to its regional substance.
The 'small scale' character of "village-town"; its organic maintenance and cultivated expression is the microcosm of Mediterranean culture. Classical culture and Mediterranean climate.

Relating biblical literature to climate and Eastern Mediterranean culture.
The Mediterranean is a cradle of human culture and civilisation. It has enriched the world in ideas and in practice, and the store of academic learning has been accumulated by constant reference to the Mediterranean world. The endless search for ideas which will contribute to good human living constantly turns for inspiration to the lands which border the "Great Sea,"¹ A full understanding of ideas and practice has to be related to climatic background. This is the relationship of Mediterranean culture to climate. The study of any region or period of development in the Mediterranean cannot easily be separated from the greater whole. The character of architecture as an expression of Mediterranean climate constitutes the scope of this dissertation. Historical facts become more significant and imaginative when this quality of artistic understanding is involved. The grasp of a Mediterranean quality in architecture would lessen the intensity of the struggle between the modern and the living past; Future architectural development could advance unhampered by the conflict of past and present schools of thought.

(1) The Mediterranean referred to as the Great Sea in Ancient Scripture; other writers named it MARE INTERNUM, the inner sea. In Arabic it is called BAHR/AL/ALBIATH/AL-MUTAWASIT - The White Midland Sea. Similarly the Greeks today call it the White Sea to distinguish it from the Euxine or Black Sea.
A sympathetic understanding towards the place and the common people is the quality required for any culture. There can be no fruitful results when there is a background of preconceived ideas and a resort to historic study merely for further reference and justification. In reconstructing a Mediterranean past the grouping of facts into a lifeless pattern with rigid conclusion does not give full measure of satisfaction. If the soul is missing, the material failure will also lack vision, colour, and woof texture necessary to a divine inspiration. History can sometimes be used as a mental literary exercise in reconstructing the past - a romantic approach which is not always careful to make sure of its facts. There is a tendency and danger that the historian will intrude his own personality and produce his own historical tapestry instead of weaving accurately with the threads at his disposal. Climate is one of the deciding threads of history. In an artistic enquiry guided by the sympathetic observation of mind, heart and soul, we are not likely to commit an historical error by determining facts which might not be true; our ancestors would be struck by the illusion we have built around them. They are not with us in person, and we are not likely to tell their story with the right degree of intimacy. But our enquiry into their building achievements - the buildings which are the outward expression of their thoughts and aspirations - is a pleasure to us and a tribute to them. We should not approach the subject with any preconceived
prejudices or racial doubts; such an attitude contributes nothing to the sum of human dignity and exhausts its energy in unconstructive enquiry.

The climate of the Mediterranean region has a far reaching influence on the lives and activities of its people. Strict dependence on a hard climate in the lives of Mediterranean peoples has a deep significance in the evolution of ideas and religion from this source. Religion reflects a noble purpose of living which can be given architectural expression. Although these eternal ideas have been constantly interrupted by periodic warfare they are still Mediterranean legacies which invite present and future expression.

Because of their dependence upon similar weather conditions the response of the Mediterranean peoples will have a common purpose which is reflected most clearly in social and economic activities. The varied solutions which are brought forward in answer to Mediterranean problems will all have something in common with abiding climatic factors. We shelter for different reasons from cold, from rain, from sun; yet within a uniform climatic region the expression tends to bear a similarity in the evolution of forms. It is in this connection that comparisons such as those between California, South Africa and parts of Australia become of distinct value and use. At the same time it is evident that climatic problems are never exactly alike in two places. No two sites have exactly the same set of conditions.
What is truly remarkable is the high degree of similarity in institutions, customs and manners within one climatic region. For instance, when open air spaces become places for living they express a social pattern and cultural activity which is affected by climatic conditions. Man and environment come closer together and the 'useful' and the 'beautiful' need not be separated.

The Mediterranean region is in the main a climatic unit. In her chapter on Mediterranean climate, E.C. Semple writes:

"The Mediterranean sea and its bordering lands constitute a climatic region characterised by winter rains and summer droughts. Despite the sharp contrasts in rainfall and temperature to be found on the north and south coasts in highlands and lowlands, the region is in the main a climatic unit. It has an outstanding type of climate, in which the essential feature is the seasonal distribution of the rainfall. This type is not confined to the Mediterranean region of Europe. It recurs, attended by a distinctive type of vegetation armed with drought-resisting qualities, on the west side of the Continents in about the same latitudes both in the Northern and Southern hemispheres, - in California, Middle Chile, the west side of Cape Colony and Southwest Australia. All these districts have their Mediterranean climate restricted to a narrow coastal strip too limited in area to attain historical significance. . . . Compared with other Mediterranean climatic regions it combines the advantage of large area with a whole complex of other geographic advantages, - with varied relief, location on an enclosed sea, command of a long indented coastline, access to three contrasted continents, proximity to land routes, all contributing to the stimulating environment which left its mark upon ancient Mediterranean civilisation; for advancing civilisation was chiefly progressive adjustment to this environment, made by the peoples living within reach of the Mediterranean coasts."

(1) pp. 83-85, The Geography of the Mediterranean Region, its relation to ancient history is an admirable research work full of interesting facts. Most information here is derived from this book. Further definition of Mediterranean Climate.

Footnote continued:
As early as the twelfth century, the Arab geographer Idrisi referred to Mediterranean climate as the climate of the olive. W.G. Kendrew also writes:

"The best indication of the actual extension of the Mediterranean climate is given by the distribution of olive trees, one of the most characteristic elements of Mediterranean vegetation."

Footnote continued:

Encyclopaedia Britannica writes "The subtropical belt embracing countries bordering on the Mediterranean in Southern Europe and Northern Africa, and then extending eastwards across the Dalmatian coast and the southern part of the Balkan peninsula into Syria, Mesopotamia, Arabia, north of the tropic, Persia and adjacent lands. This distribution has led to the use of the name "Mediterranean Climate". Owing to great irregularities of topography and outline the Mediterranean province embraces many varieties of climate, but the dominant characteristics are the mild temperature except on the heights of the winter rains. W.G. Kendrew, Climate of the Continents, Oxford 1937, in a similar sense states "The Mediterranean climate in spite of great local differences, possesses an essential unity and individuality among the climates of Europe and it has produced a very characteristic vegetation. The Mediterranean climate has three main characteristics. (1) Rainfalls in the winter half-year and there is drought more or less complete in summer. (2) Winters are not only rainy but very mild; the coldest month has a mean temperature of above 40°F. and in much of the region 50°F. (3) Summer is very hot as well as dry. The mean July temperature exceeding 70°F. and in Africa 85°F."


(2) Climate of the Continents, Oxford 1937.
The importance of the olive in the life of Mediterranean peoples was recognised in the literature of Ancient Scripture. The long rainless summer which determines Mediterranean vegetation has resulted in plants such as the vine and olive with roots that penetrate deep into the soil in order to preserve their fertility until autumn. The palm tree, however, characterises a more typically southern type of vegetation which has penetrated to the Mediterranean coastline of North Africa. The evergreen Maquis shrub which can endure the penetrating rays of the sun and the ravages of the goats is the standard vegetation common to the Mediterranean shores. They have an annual coat of varnish which they exude to close their pores and check evaporation in the great heats.¹

The Mediterranean not only forms a general climatic unit, but also a distinctive physical region with mountain barriers defining it and separating it from the cold penetrating winds of Central Europe on the northern limits; only the fringes of Southern Europe become truly Mediterranean. In the south west, the Atlas mountains set the limits of the desert and make it easy to define a Mediterranean regional zone; the Sahara separates North Africa from the rest of the tropical continent.

In the west the Atlantic ocean sets the western barrier, while eastwards the zone penetrates deep into that area which is sometimes called the Near East. This area within the greater Mediterranean Region has made an important contribution to the culture of the whole. The Tigris-Euphrates basin turns westwards to the Mediterranean forming the 'Fertile Crescent' or outer limits of the settlements of desert peoples. Thus the Mediterranean region forms a link between three continents, and this fact has an important bearing on the growth and extension of Mediterranean Culture.

The Mediterranean Basin proper is an inner part of a more extensive Mediterranean region and it is this wider interpretation of the term Mediterranean which will be considered throughout the thesis. This two-fold division distinguishes the immediate hinterland of Mediterranean coastlines and its important islands which together form the geographic Mediterranean proper. The influence of the sea tempers climatic conditions and marks a more distinct type of climate from that of the Mediterranean

(1) Name became very common during World War and now is convenient name for the lands grouped about the east end of the Mediterranean. The orient designate of the same region.

(2) A translation of what is termed in Arabic ALHILAL AL KHASEEB.

(3) J.L.Myres on the distribution of Mediterranean weather states: "The great sea-basin clearly serves as a gigantic hot water apparatus for the whole of its northern coasts, and at the same time as a markedly moderating influence over a large area to the south .... The July isotherms of the same typical localities show even more instructively what a moderating and cooling influence the Mediterranean Sea
region. In the Eastern Region the characteristic of the Mediterranean climate in the way of rainfall distribution is more clearly marked, representing the "Mediterranean climate of the Geographers"¹ with the whole of its rain in the winter and none between May and October.

The distribution of highland zones throughout the Mediterranean form climatic islands which are relieved from drought because of their altitude. In turn these islands in the Mediterranean proper have a different tree vegetation which supply woods for ship-building and domestic use.² The fringes of the Mediterranean region attained a greater significance because of their seafaring activities, whilst the larger area was the potential granary and reservoir of man power. Ports and caravan terminals were thus formed in the Mediterranean basin. If the camel is called the ship of the desert, then the ship might be called the camel of the sea. The Mediterranean midland sea has always acted as a thoroughfare for man's activities and has helped to unite the basin and its accessible hinterland. People moved from region to region and still came under the influence of the same Mediterranean climate.

Footnote continued:

exercises in the hot seasons on the neighbouring lands, and at the same time how sensitively the heat lines respond to the presence of land masses with this watery region." Geographical study of Greek and Roman Culture. An address delivered on February 3, 1910 and published in Scottish Geog. Magazine.

(1) J.L. Myres ditto.
(2) Ezekiel, chapter 27. 5,6 Fir trees of Senir, cedar from Lebanon, oaks from Bashan. Also use of cedar pillars and beams and fir timber in the House which King Solomon built for the Lord. I Kings ch.6.
The diverse regional developments within the Mediterranean and the contact and penetration from bordering lands have all helped to enrich Mediterranean culture. These bordering lands are in themselves gateways to a more distant culture, as for instance the Middle East is the natural highway to the Further Orient, and the fertile crescent leads to the Indian Ocean.

The Mediterranean extends and penetrates northwards to the Black Sea, the Caucasian mountains and the Russian steppe lands [between 46°N. latitude to about 30°N. latitude]. This fact coupled with the massive size of the adjoining peninsulas of Spain and Asia Minor will inevitably produce minor climatic districts. For instance, the Anatolian plateau is steppe country with scant rainfall and internal drainage. Rain occurs chiefly in spring and autumn and occasional irrigation schemes are carried out, using water drained from the interior mountain slopes for settlements. Wool of fine and exquisite quality which would supply the material for a highly developed textile industry is the result of the vast salt pastures of this climatic province. It penetrated to the Aegean coast of Asia Minor and provided the industry of Miletos and other Greek cities of Ionia and Aetolia.  

The Meseta Plateau of Spain provides an interesting parallel to the Anatolian plateau. Winter is cold with frequent

\[1\] Syme 97-98.
frost and snow, summers are hot and dry, and the scant rainfall which falls mainly in spring and autumn results in maquis vegetation and in many instances treeless steppes. It is an isolated region difficult of access from the coast and has provided a race of war-like people. The Caucasian and Armenian highlands bordering the eastern end of the Black Sea are a lofty rain soaked area with abundant rainfall of 30" - 60" throughout the year. The woodlands present a striking contrast to the sparsely wooded Mediterranean region. The Scythian plain of South East Europe is the hinterland of the Black Sea. It forms a district of low relief, scant rainfall of 12" - 20", most of which falls between May and July. There is insufficient rain for tree growth, but instead there are wide spread pasture lands until late summer. In contrast, the mountainous coastal belt of the Crimean peninsula has a Riviera climate which gave the Greek colonists a congenial environment. The Po valley is a transitional province between the Mediterranean climatic region and the rainy lands of Central Europe.

Egypt is the gift of the Nile - the river brought cultivated land out of a climatic desert. This area has the scantiest rainfall of any Mediterranean climate, since such a climate in average years implies a rainfall sufficient for winter tillage. At Alexandria there is a rainfall of 8", at Port Said 3.2", at

Halwan 1.3", up the Nile almost none. This imposes a strict dependence upon mechanical irrigation which has had its effect on culture. These climatic conditions have imposed a monarchical form of government upon the Egyptians. In comparison with the Nile Valley, it is worth noticing that the basin of the Tigris-Euphrates lies more within the latitude of the Mediterranean belt. The Nile pulls Egypt southwards as it forms a natural highway into the continent of Africa. The Mesopotamian plain south of the thirty-fifth parallel has an annual rainfall of about 10" only, falling mainly in winter. A long summer drought lasts from May to November. Northwards the rainfall increases because of the higher elevation and northern location. By defining the extremes of Mediterranean climate we can approach more easily to a definition of the Mediterranean climate both in rainfall and temperature. It is characterised by mild winters and winter rainfall, so that the cooler half of the year is the season of plant growth and germination in contrast to the northern world.

In a Mediterranean type of climate, people maintain themselves by agricultural pursuits in small groups leading a sedentary life. Corn, oil and the vine are the typical Mediterranean products and their importance is testified to
time and again in the Bible and the Koran.

"And it is He who sendeth down rain from Heaven: and we bring forth by it the buds of all the plants, and from them bring we forth the green foliage, and the close growing grain, and palm trees with sheaths of clustering dates, and gardens of grapes, and the olive and the pomegranate, like and unlike. Look ye on their fruits when they fruit and ripen. Truly here-in are signs unto people who believe." ¹

"For the Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains and depths that spring out of valleys and hills; a land of wheat, and barley, and vines, and fig trees and pomegranates; a land of oil, olive, and honey; a land wherein thou shalt eat bread without scarceness." ²

Stone fruit, the fig and mulberry came later from Anatolia, while citrus fruit which was first introduced by the Arabs now forms the basis of present Mediterranean specialisation. Gardening more than farming became the theme of Mediterranean agriculture and it has naturally resulted in a settled mode of life. More land was brought into cultivation by terracing and so extending the area upwards, or correspondingly reclaiming

(1) Surat Alanam (98)

(2) Deut 8 (7&9).
the fen downhill. Tending the soil has always been more important than rearing live stock, and water has always been the limiting factor in the distribution of rural settlements. The significance of rain and river water on the landscape of Mediterranean countries is clearly reflected in great wealth of literary evidence such as the Bible.

"They drop upon the pastures of the wilderness: and the little hills rejoice on every side. The pastures are clothed with flocks; the valleys also are covered over with corn; they shout for joy, they also sing."  

As a result, the isolated farm is a rare phenomenon, except perhaps on the northern mountain rim of the Mediterranean. Irrigation has always been a deciding factor in the growth of local agricultural communities. Where perennial rivers are scarce, springs and wells naturally provide the continuous water supply. Settlements with the name 'ain' in the beginning signify a spring site, and villages cluster round these springs in small groups. Sometimes the home village and outlying fields are quite a distance apart.

In the semi-arid south and east of the Aegean where the summer drought is long and the land is parched, villages are consequently few in number. As E.C. Semple clearly illustrates, on the alluvial plain where plenty of ground water accumulates

(1) Psalms 65, 12 and 13.
through wells, or piedmont slopes blessed with rare perennial streams, the abundance of fertile moist soil and the life giving water set the stage for numerous small villages. Such villages were scattered over the Nile flood plain, the Boetian lake plain, in the Po valley, Etruria and Campania. The distribution of village communities in relation to water sources and geological ground formation is an obvious geographical consideration.

The slope or hillside settlement had many advantages; it offered protection from flood, a well drained healthy location. In his choice of a healthy site for a city, Vitruvius states that such a site should be high with no mist. He goes on to describe "the poisonous breath of the creatures of the marshes" that come from swamps. Such vapours denote the presence of what medical science now describes as malaria. Although alluvial plains offer the tempting prospect of rich moist soil and easy irrigation, they are under the constant threat of flood. Mediterranean climatic conditions mean sudden rain storms with violent flooding in the mountain valleys which turns the dry wadi or thin summer trickle into a raging torrent, sometimes with devastating results. The low lying valley

(1) Semple 540.
(2) Vitruvius, Book I, Chapter 4.
floors were the highways of man's movements in peace and war. Yet they were particularly vulnerable to attack and safety had to be sought on the lower terraces of the mountain side. This factor characterises the distribution of settlement in many of the high, impregnable sites of the Greeks, and indeed throughout the Mediterranean lands.

Planning for water had a deep significance for the Ancients. Aristotle\(^1\) emphasising the great importance of water in a city state, writes:—

"And it must possess if possible a plentiful natural supply of pools and springs, but failing this, a mode has been invented of supplying water by means of constructing an abundance of large reservoirs for rain water, so that a supply may never fail the citizens when they are debarred from the territory by war."

In Palestine underground drainage and springs which are reached by shafts through the geological strata are bound to have settlements clustered around them. Cisterns hewn out of limestone rocks\(^2\) acted as reservoirs for the underground water and an inspiration for the fountain. These illustrations help to emphasise the significance of water in the life of any people. The fountain might be regarded as the symbol of man's

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(1) Aristotle, Politics, Chapter VII.
(2) Jeremiah, Chapter II, verse 13: "For my people have committed two evils; they have forsaken me the fountain of living waters, and hewed them out cisterns, broken cisterns that hold no water."
appreciation of water. In some cases the symbol takes the form of a built up structure, as may be seen in public fountains associated with the Islamic mosque. [In the Sahn of Mosques and holy shrines today, people vow a sabeel, i.e. free gift, for water to be distributed to the public. A person with a large jar fixed to his shoulders calls loudly for people to come and have a free drink. Fountains are created as an act of public piety, and men dedicate money for this purpose. The significance of water supply in desert warfare was fully realised in the present war strategy of North Africa.]

The custom of erecting a Nymphaeum or temple above a spring like that built by Carthage at the intake of the Aqueduct\(^1\) emphasises the sanctity of springs, and it becomes an impious act to profane the source.

Under Mediterranean climatic conditions throughout the ages there has existed a primary community of sedentary folk—a pattern which can be traced at various places and various times. This primary community is the prototype of Mediterranean culture. Its material needs were satisfied in the activities of suk or bazaar, while the sanctuary ministers to spiritual welfare. The fusing of these two spheres was

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(1) Semple, ditto. "Gods of Rainfall and Tillage", Chapter XVIII.
essential to a normal, active and permanent way of life. In this respect a great responsibility is thrown upon the rulers and leaders of Mediterranean society. This sense of completion and satisfaction gave such communities a moral force and strength which typifies Mediterranean life at its best. In attempting to grasp the true Mediterranean quality of culture it is vitally important to appreciate this core and substance of that real society which is attached so firmly to the earth. A casual observer whose mind is too "sophisticated" to appreciate the true significance of a 'primitive' society might deem such a search worthless. Yet these people managed to lead a full, happy and good life in close abiding contact with their natural environment. It is a changeless quality, one which defies historic definition; it might even be called 'non-historical' since its roots stretch back to immemorial time, and its piety is older than Christianity. Thus it is essential not to cut across the woof of this ageless pattern at the present or any future time.

New ways cannot be ignored, but they must be inspired if they are to be introduced with success and permanence. The primary society of Mediterranean peoples offers such inspiration. They evolved a mode of life without conscious theorising - their life was an active co-operative effort in response to the demands of a natural order. Emotion and intellect were fused into a satisfying human culture. Mediterranean conditions demand a wholehearted effort on the part of man. The
drift towards war and barbarism is only too easy when material power is divorced from the spiritual. The Mediterranean lesson can be learned at any time.

Peasants everywhere look up to the sky in their search for the higher being. "I will lift up mine eyes unto the hills from whence cometh my help." They regard rain as Heaven's gift to the people on earth. Mountains - sources of water and God's gifts to His people, were the lofty seats for the Gods.

"What was the cogent reasoning", writes E.C. Semple, "that made men of all the Mediterranean World see in these lofty seats the dwelling places of the Most High - that made Jew, Trojan, Greek, Lydian, Roman and Carthaginian erect thereon the first rude shrines or altars of the rain-gods, and mount these long slopes with prayers and offerings in times of drought?"

"Below in the treeless plains a glare of light from cloudless skies, a merciless sun beating down on shrivelled crops and vineyards, meadows parched and sere, the soil baked and cracked with the heat, water courses dried up make a whole world athirst. Above on the heights clouds rested, and gathered at times for local storms, creating islands of moisture in a vast sea of aridity. There under a grey canopy, refreshed by showery afternoons and dewy nights, grew forests of oak and tamarisk, of chestnut and ash and cedar - sacred groves of all "high places", handiwork of the rain-giver, evidence of his presence in this place of his abode. From these tree-grown slopes perennial springs sent their gift of water down to the irrigation ditches in the plains below. Even in summer those misty summits held out promise of rain, elusive though it might be; towards the end of the dry season their gathering clouds and the increasing play of lightning were harbingers of the autumn showers. Therefore when the Mediterranean peasant saw his meadow parched by the pitiless sun, his crops dying for lack of water, his irrigation stream shrinking to a trickle and his well or cistern

(1) Psalm, 121, 1.
(2) Semple, Chapter XVIII, pp. 517 and 18.
giving out, in despair he looked towards the mountains for signs of rain: I will lift up mine eyes unto the hills whence cometh my help."

"There the rain-god manifested himself by clouds, thunder, lightning, and storms. The groves which crowned the dewy summits became his sanctuary, and hence they were marked by rude altars, rarely by temples because the sites were too remote from the haunts of men. The sanctuaries were often associated with nearby springs and wells, reminiscent of the older worship of the gods of the underground waters; and these waters figured in the cult of the rain-god as another sign of his presence. Such was the spring at the high place of Tarnaaach on the north slope of Carmel near Megiddo, and the bell-shaped cistern beneath the high place of Gezer on a western spur of the Judean plateau; and such were the springs and cavern streams that figured in many mountain sanctuaries of Zeus and Baal and Jove."

Present research into Mediterranean folk-lore abounds in interesting literature which seems to bring the ancient past very near and reveals the Bible and sacred books in the light of a record of daily events in the life of a people. The Bible is an extremely rich source for the understanding of Middle Eastern Society. Such a culture would be representative of other Mediterranean regions since the uniformity of climate and man's response were in harmony. In his Frazer lectures at Cambridge, J.L. Myres states

"All elements of the Mediterranean as of biblical food-quest came from the Near East. Yet many are but improved strains of what was found wild in Mediterranean lands; so acclimatization was easy."

Rural life and city life in the Mediterranean might tend to become separate. When city life divorces itself from a

real dependence upon the permanent conditions of Mediterranean life, then its ultimate downfall is assured. The Ages which are termed "Golden" merely because of grandiose material prosperity and pageantry were only the climax of a movement which ultimately caused them to crumble in ruins. This is of particular importance under Mediterranean conditions where Nature imposes a strict dependence upon the soil, mutual goodwill, and co-operative effort. Despite the finished product which is often evolved during such golden periods, we should not be misled into minimising the importance of the inherent forms which have made possible the climax. Indeed the climax sometimes presents a cultural achievement that so arrests our attention that we are in danger of forgetting its background and gradual growth, a temptation which can easily result in an unbalanced view divorced from the real substance of life. The study of culture as opposed to mere civilisation lies deep in the soil. The primary society of Mediterranean rural culture is the substance that deserves a greater attention than has hitherto been given. In this way the grand achievements of the historic period would be co-ordinated to a scale and purpose indigenous to the whole. Moreover, classical and architectural scholarship should relate achievement and culture to the climatic setting which produced them. For instance, the achievement of classical culture owes its inspiration and is closely related to Southern Mediterranean climatic conditions.
If a real benefit and understanding are to be derived from a study of such culture in other regions, it is essential to relate it to the soil and air of its native home.

The small scale character, fusing both civility and culture seems to embody a Mediterranean life. A civilisation without a culture is a terrifying and could be as an unhappy spiritual state of affairs. Though it might abound in magnificent and startling expression, there will be little if any lasting meaning or message for mankind in the monuments which it leaves behind.

Because of the strict control imposed by climate, the Mediterranean way of life demands social co-operation. It needs emotion and intellect fused into a civilising culture. The idea of man as a social animal is in true harmony with Mediterranean open air conditions. Human beings gathered together in a festive scene symbolise the idea and the deed combined in harmony with a very simple background—perhaps only a wall enclosing an open space. Thus an open air theatre would exist under the Mediterranean way of life long before the Greeks or the Romans.

The integration of small communities arose naturally because of agricultural economy, dependence on local water supply, as in the case of the oasis, and the local government of tribal structure. They were self-contained and retained individuality. The harmony of these various societies was attained by a spiritual response to one God. This ensured the enjoyment of
CHAPTER III

CLIMATE AND HISTORY
PART II

Chapter Three

CLIMATE AND HISTORY

Climate and the Mediterranean in the pre-historic period. No change of climate in historic times. Climate and the rise and fall of civilisations. The need for individual and collective public response to environment; lessons to be learned from the downfall of past civilizations.

Fluctuations in rainfall characteristic of Mediterranean climate. Therefore great demands on man's wisdom and foresight. High degree of dependence in Mediterranean countries on co-ordinated effort of authorities in power.

Historic phases of the Mediterranean;
(1) River Cultures: Tigris, Euphrates and the Nile Valley. Effect of large river sources on civilisation in the Mediterranean.
(3) Atlantic phase - further expansion. Present development through air navigation.

Greek cities of the Mediterranean. Reflection of commercial activities in the city markets of Mediterranean lands. Greek and Eastern Mediterranean culture. Effect of commerce with the Mediterranean Orbis Terrarum on art in the past compared to the present international penetration of contrasting climatic regions of Northern latitude.
The Mediterranean is placed in the great Northern quadrant with the Atlantic Ocean on its west, the Mongolian world to the east, while a northern highland zone separates it from the flat lands of Central Europe and a southern flat land forms a barrier between the black races of the rest of Africa.

In the early stone age, we are told that men south of the Mediterranean had to protect themselves from the ice, while on the northern limits of the Mediterranean area men's lives were made increasingly difficult by the steady encroachment of ice. There was heavy rainfall on the southern side of the Mediterranean making the Saharan plateau a green, well watered area, covered with meadows, forests and jungle growth. Later, for various complex reasons not yet fully understood, this Saharan rainfall and that of the whole of Europe began to decrease. The glacial cap which had covered Europe for so many years began to shrink and retreat towards its present northern boundaries. As a result, the Saharan plateau became gradually drier, and the hunters of these southern flatlands were attracted to the Nile Valley. ¹ It was in this eastern area of the Mediterranean that civilisation first developed, and

(1) Breasted, Ancient History, para. 17.
thus we have to consider the relation between the Mediterranean and the study of early history in this region. North Africa and Southern Europe are commonly supposed to have been connected through the land bridges of Gibraltar and Sicily.

The evidence of many geographical scholars seems to indicate that there have been no marked changes in the climate of the Mediterranean during historical times. Facts derived from ancient and modern sources point to a marked stability in the rhythm of Mediterranean life. With the exception of those crops introduced by the Arabs in the seventh and eighth centuries, there is a clear similarity between the dates of ploughing, sowing and harvesting, methods of tillage and the crops themselves of Biblical times and the present.

"The question has been repeatedly raised as to whether there have been changes of climate in historical times, especially rainfall fluctuations, sufficient to explain the decline and fall of the Roman Empire and the decadence of civilisation, by reason of which large sections of the Mediterranean lands, once thriving and populous, have become depopulated or impoverished. Arguments supporting this position have been advanced chiefly by historians, archaeologists, and other incompetent authorities not concerned with climatology. The large majority of competent authorities have reached a contrary conclusion."

The importance of that evidence which points to no climatic

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(2) After a detailed study of ancient Mediterranean tillage - Semple has been struck by this amazing agreement. P. 98.
(3) See Semple, p.99, for detailed account and summary of the views of various scholars on this point.
change lies in the new direction of our argument. We are driven to look further into the causes for the failure of man's activities—to search into man's great contribution to human culture and welfare or his fall to a lower level. The Mediterranean area is a striking example of lands which depend on the energies of its people.

But it can be shown that with the development of man's agricultural effort and the spread of afforestation temperature tends to be locally modified. The moisture which results from such effort in semi-arid lands is a cooling factor which will affect local conditions. If such conditions are widespread owing to man's influence, corresponding changes in climate will be felt. In his work on climate and civilisation Professor Huntington\(^1\) observes that these considerations are likely to be the nature of change from dry to moist and moist to dry in Palestine and the Eastern Mediterranean. Effect of vegetation in the landscape on temperature and coolness is a noted factor. "And that the whole land thereof is brimstone, and salt, and burning, that it is not sown, nor beareth, nor any grass growth therein, like the overthrow of Sodom and Gomorrah, Admah and Zeboim."\(^2\)

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(1) Civilisation and Climate, New Haven Yale University Press, 1924, p.10. Pulsatory climatic changes have taken place during historic time and have differed in type from region to region. In Palestine of the Eastern Mediterranean the conditions of vegetation especially the palm and vine, make it almost certain that variation in storminess and rainfall, rather than in temperature have been the primary factor.

(2) Deut. 29:23.
The degree of dependence on climate demands a close response between people and environment. Knowing themselves will mean knowing their native land. In the words of J.L. Myres "nature, the Gods, the order of the world, were against the man who did not know his place, which as Delphi taught meant also knowing himself."

The fluctuation of rainfall which is more marked in the Eastern basin of the Mediterranean called for wisdom and far sighted thinking; it stimulated the rise of prophets in these semi arid lands. These changes of rainfall are amply illustrated by Semple. 2

"Modern records show that the rainfall at Jerusalem fluctuates between 12.5" and 42"; that during the sixty years from 1850 to 1910 it dropped twelve times below the critical 20" and twelve times exceeded 32 inches. Thus every five years, on an average, the rainfall on the Judean Plateau drops below the annual mean of 26" and causes alarming reduction of the harvests. Moreover, a succession of these dry years tends to occur, diminishing the reserves of moisture in the soil and lowering the ground water-table. During the half decade from 1869 to 1873 inclusive the rainfall averaged little over 17". In Cyprus precipitation varies from 10 to 27 inches on the coasts, in Cyrenaica from 8.27 to 24.25 inches, in Athens from 4.5" to 33.3", in Palermo from 22.8 to 39 inches, and Rome from 25 to 45 inches."

The causes for the decline from green flourishing lands to desert can be traced throughout history in the lack of cohesion between organised effort and agricultural settlement. The torrential rains of the wet season, the resulting soil erosion

(1) Frazer lecture 1943.
(2) Semple, 506-7.
in the mountains, damage to irrigation works, the devastations of war and disease—all these factors result in the collapse of associated effort. They reflect what the ancients might call the wrath of God. Professor Musil, a scholar of distinction on discoveries in North Arabia, believes that the greater part of the province of Palmyra was cultivated in antiquity.\textsuperscript{1} Writing about rivers in the limestone hills east of the Orontes, the late H.C. Butler of Princeton University\textsuperscript{2} gives a representative picture of present conditions in the Syrian desert.

"On ascending into the hills the traveller is astonished to find at every turn remnants of the work of men's hands, paved roads, walls which divided fields, terrace walls of massive structure. Presently he comes upon a small deserted and partly ruined town composed of buildings large and small constructed of beautifully wrought blocks of limestone, all rising out of the barren rock which forms the ribs of the hills. If he mounts an eminence in the vicinity he will be still further astonished to behold similar ruins lying in all directions. From a distance it is often difficult to believe that these are not inhabited places. Yet every ruin is surrounded with the remnants of presses for the making of oil and wine."

While such work suggests the great scope for future archaeological studies in these early sites of Hellenic and Islamic culture, it also demands serious attention with regard to their revival in the present since they already possess name, identity and a rich historic legacy.

\textsuperscript{1} Northern Arabia, The exploration of Alois Musil.
\textsuperscript{2} H.C. Butler, Desert Syria — the land of lost civilisations. Geographical Review. February 1910. See also his other works on Archaeological Discoveries in Syria.
In tracing the successive stages in the rise of a Mediterranean civilisation M. J. Newbiggin stresses the forces of concentration, expansion and subsequent collapse. At first, members of a community adapt themselves to local conditions of climate, soil, and relief with the result that they are able to accumulate some material wealth, knowledge and increase in population which in turn brings about the second phase of expansion. At this stage of development it is possible to trace the seeds of the final collapse into central decay and neglect. For instance, the spread of malaria lowers human energy and vitality to such a pitch that men become incapable of thinking and acting to their best capacity. Diseases are themselves the result of a decaying civilisation and a cause for further disruption and neglect.

Poverty has always been and is at the present, the prevailing note among Mediterranean peasantry. Governments that had nothing to offer except the achievement of a grandiose measure of power and dignity by force and taxation had no positive contribution to offer. They merely widened the gulf between the governing and the governed. Such urban politics without art does not satisfy the inherent aspirations of Mediterranean peoples and will never assure continuous and

(1) Newbiggin, Mediterranean Lands.
successful achievement; it is only the empty husk without a soul. However impressive the temporary, unblessed prosperity of such an alien or home political rule it will contribute little to the sum of human welfare. If wise politics are to help men live the "good life" a great burden of responsibility inevitably falls on the leaders who must have something of the quality of Plato's "philosopher kings". It is a real tragedy in Mediterranean life when the link between the mass of peoples and governing power is destroyed. This virtue of full participation of people and government makes Mediterranean civilisation fruitful and cultural. The rural communities provide a sympathetic environment for the cultural and civilising life of the Mediterranean. It is only on such firm foundations that any lasting civilisation can be built. Otherwise there is no human power and energy of mind and body to help plant the seeds of a happy future on its own soil, and watch it grow in the Mediterranean air.

If it is the same climate today as in the past, then there is all the more justification for a search into the past to reveal the similar needs of the present. The sum of Mediterranean achievement in ideas has been put into practice by the rest of the world, and this is amply illustrated throughout European culture which owes a great debt in the arts to the Mediterranean world. Here we can see the attempt — though
not always successful - /acclimatize what was of a southern Mediterranean origin. The classical Renaissance in this aspect was practised more in Western Europe than in the Mediterranean.

At a very early stage in the history of the Mediterranean, man's activities have revolved round the sea. The first important epoch in Mediterranean history is assigned to the river cultures. This illustrates the magnetic power of water in tempting settlements of people. When such water sources are abundant on the surface and extend along lengthy territories, it is natural to expect the development of life on a large scale and an attempt towards an established form of civilisation. The Tigris-Euphrates and the Nile valleys are the two centres of early established civilisation in the Eastern Mediterranean. Inscriptions and archaeological observation have provided evidence of the outward expansion of the kings of Ancient Chaldea, Babylonia and Assyria in response to the lure of the Mediterranean. The Tigris-Euphrates valley extends diagonally across South West Asia from the Persian gulf almost to the Mediterranean sea that lies on its west. In latitude it lies within the Mediterranean belt of 31° - 37°, and the desert reservoir of its peoples also supplies Great Syria and the Mediterranean coast. The great
western land of the Euphrates river marks the beginning of Mesopotamia. It acts as a link between East and West, between the temperate Mediterranean climate of southern Europe and the tropical Asiatic lands of India and the Pacific Ocean - a link between the products of two different civilizations.

In this area and the Nile Valley the highest cultural development is dependent on irrigation. Because of this dependence on artificial water channels, their culture tends to differ from that of smaller communities with a local source of water supply. The very magnitude of the problem of natural resources in these large river valleys demands a powerful government.

The second phase of Mediterranean history is marked by more activities on the shores of the Mediterranean and the development of navigation; the lure of the sea triumphs over the river. A large sea could not be controlled, its highways were not physically defined. The islands of the Aegean Archipelago formed the nursery of Mediterranean seafarers. By virtue of their close spacing they formed an active zone at an early period of history. Mount Athos

(1) Mesopotamia, the name known to the Greeks and Romans to mean "the between Rivers Country". To the Arabs AL JAZIRA meaning the land surrounded with water. It is also known as WADI AL RAQIDAIN meaning the valley of the "two gifted rivers" constituting the country of Iraq.
(6,347 feet) was a guide to seamen in the North Aegean for a radius of a hundred miles", states E.C. Semple,¹ "at the summer solstice its shadows fell on the market place of Nyrna in the island of Lemnos forty miles away." J.L. Myres roughly dates this early sea traffic to the third or second century B.C. The interchange of ideas, commodities and settlements during the Greek Phoenician era culminated in the idea of the Mediterranean as the orbis terrarum - the same girdle which later formed the Roman Empire. A third extension brought the Mediterranean into contact with the Atlantic Ocean and opened world horizons to northern and western hemispheres. From this discovery an epoch arose during which the Mediterranean was almost a cul de sac, or in the words of Emil Ludwig "The forsaken sea". It is not until the opening of the Suez Canal and the nineteenth century commercial revival with its active foreign enterprise that a period of Western European domination emerges. The future holds possibilities of a fourth phase - the further annihilation of space through air routes.

Thus we can discern an ever widening relationship between the various regions of the earth. The orbis terrarum round a midland sea has been extended east and west, north and south.

¹ Geog. of the Mediterranean region, p.537.
² Frazer Lecture, 1943. Mediterranean Culture, pp.21,22.
In the first place, Mediterranean culture spread to other countries. It is significant and interesting to notice how Mediterranean culture is suited to similar climatic regions in the rest of the world. It found a congenial home and similar expression in similar latitudes North and South of the tropics.\(^1\) But with the completion of the cycle, Mediterranean lands themselves received the impact of the new culture which they had inspired. It is a phase in which the arts have suffered. A sense of locality tends to become merged into a confused whole and there is less response to climate and environment. Advancement of intellect takes the place of human and spiritual values and the ultimate expression of culture is the rapid growth of large urban cities. Even the small communities which escaped this drift are now threatened with extinction.

Physically the Aegean, Marmora and Black Seas separate Europe from Asia, but in history they have acted as a link between the two. Early maritime activity extended Mediterranean culture towards these shores and at the same time received and was influenced by the impact of such a vast hinterland. These activities, fused within a single climatic region,

\(^{1}\) In this respect it is interesting to compare the development of architecture in Mexico, California, Florida, Brazil, South Africa and Australia.
self-sufficient, yet gaining by intercourse, seem to represent a near approach to the perfect order of Mediterranean coastal and island culture. The settlements of the early Greek colonies never penetrated deep into the interior since these early settlers were primarily sea rovers with an eye to commercial traffic. Awareness to the sea was a major aspect of these settlements. Aristotle gives his opinion when he talks about the siting of a city. "As to the site of the city, if it is to be ideally placed, it is proper for it to be well situated with regard both to the sea and the country."

The Greek city states were distributed along the Eastern coast of the Mediterranean though in their life they remained aloof from the native communities and failed to incorporate them in the Greek way of life. A settlement which never penetrated beyond the coastal areas of a region, which was primarily concerned with commerce could never create a permanent and lasting order. Contribution towards civil life and a finely developed system of government - an achievement such as Plato's Republic, which impresses by its high degree of civil administration, marks the bright dawn of Mediterranean historic life.

In its effect on trade, the Greek settlements brought neighbouring regions of similar and alien climates into contact with the Mediterranean world. Such an impact had obvious

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(1) Politics, Book VII, Chapter V, 3
results in the economic sphere by stimulating commercial activity. This early trade system promoted Greek intercourse with the rest of the Mediterranean and in its later Eastern expansion it led to the establishment of what we term the "Hellenic phase of culture" - a late development in Greek Arts which mingled the Greek pattern with that of the Near East. This intermingling tended to further a state of cultural unity in the Eastern Mediterranean. Thus the study of Greek culture is transferred to a Middle Eastern environment reflected in later Arab thought and achievement. This relationship should be emphasised in the scholarship of the future.

Alexandria, Antioch and Seleucia were among the number of important Hellenic cities and cultural centres. They flourished because of their commanding position on the trade routes. Alexandria took the place of Meletos in fusing Oriental and Greek cultures - it brought the Nile Valley and Red Sea into the sphere of Mediterranean Sea influence. Antioch was situated on the left bank of the Orontes in North Syria - at the junction of a northern highland route to the Euphrates. Seleucia lay on the Tigris not very far from Babylon, the first world city of history.

Modern scholarship has furnished us with an abundance of material for the study of this city life. It is of importance to us in this instance in so far as it helps us to decide the degree of civic penetration into Mediterranean agricultural
life. The market was always an active centre. Examples of such activity and the types of merchandise may be pictured from the Old Testament. In Ezekiel the description of the Mediterranean town of Tyre and its commercial activity is worth mentioning.

"O thou that art situate at the entry of the sea, which art a merchant of the people for many isles. Thy borders are in the midst of the seas, thy builders have perfected thy beauty. They have made all thy ship boards of fir trees of Senir: they have taken cedars from Lebanon to make masts for thee. Of the oak of Bashan have they made thine oars; the company of the Ashurites have made thy benches of ivory, brought out of the isles of Chittim. Fine linen with brodered work from Egypt was that which thou spreadest forth to be thy sail; blue and purple from the isles of Elishah was that which covered thee. All the ships of the sea with their mariners were in thee to occupy thy merchandise... Syria was thy merchant by reason of the multitude of the wares of thy making..." etc.

In considering the cultural life of cities with a view to the future it becomes important to relate such activities with a firm attachment to the land. Once people neglect and divorce themselves from the land, city life loses its real foundation. It lacks both physical and spiritual response to regional identity. A problem arises that people engaged in mobile activity of a commercial economy will not live in spiritual harmony with the established community. The significance of this fact must be considered in the present and

(1) Ezekiel, Chapter 27.
future range of commercial activity. Throughout history, the Levant has been famous for the rise of an alien population engaged in commercial activities. In consequence the fringes of the Mediterranean region were peopled by strangers, a cosmopolitan tendency which is reflected in the arts. Within the range of similar climatic conditions, architecture in the past did not suffer but rather benefited. At present there is a chaotic intermingling of styles from alien Northern lands. In practice, wisdom and goodwill should adjust the economic aspect and help to bring about a healthy attitude wherein skill and energy find their reward without violating home culture.

The Roman Empire attempted to incorporate the small agricultural communities of the Mediterranean region into an organic whole with legal and political unity. Eventually it came to rely on sturdy countrymen as conscripts for its army. But the Eastern Mediterranean had been the sphere of an earlier Hellenic culture and the loyalties of the separate urban centres tended to remain aloof from the capital of the Empire at Rome. Rome was thus more dominant in the Western Mediterranean. She attempted to achieve political unity by incorporating the small villages or towns of a particular neighbourhood into a market province. This political superstructure was never wholly successful. There was no common ethical or spiritual purpose to bind together the extent of Mediterranean territory.
Military rule however well organised in a civil order, inevitably deteriorates into self-indulgence and material pleasure in daily life. Worldly pleasure was substituted for religion and the baths became gambling centres for exotic pleasures. The vomitorium is another expression of such indulgence. For this reason we find the Early Fathers of the Church condemning attendance at the Baths. The Mediterranean needed sea highways as well as highly skilled feats of road engineering.

J.L.Myres comments: "If they touched cities, it was for refreshment not for intercourse." Because of prosperous commercial activity, piracy was a constant threat in the Mediterranean. Another way of using a ship on the great sea highways is thus to make it the crew's "home and castle".

The Southern and Eastern areas of the Mediterranean were the home of desert bred peoples well acclimatized through the process of time. It needed more than a political regime imposed by an organized army to subdue the proud spirit of the free Bedouin, whose proud nature and environmental breeding would not submit to alien superimposed structure. The strength of both the Greek and the Roman lay in urban development. The word pagani denoting villagers of the old cult illustrates the lack of spiritual cohesion between urban and rural. Roman civilisation had a firm grasp of techniques and organisation. Magnificence, power and civility are reflected in the roads,
aqueducts and baths. We wonder at the energy with which the Romans were able to conquer problems of water supply and create new towns and settlements. In their colonising activities the Romans introduced southern culture to Central and North Europe. The hypocaust system of heating in which the floors and walls of buildings were warmed by the passage of hot air through flues, was introduced on a large scale to conquer the Northern climate, just as the attempt to alleviate summer heat is now the major problem of another colonising movement in an opposite direction. They have left a rich legacy of technical achievements, and it is for us to humanise them to a gentler way of life.

Compared with Roman culture, the Greek is definitely more truly Mediterranean in character. In its native homelands it represents man's highest achievement of Mediterranean island culture with virtue derived from its own reservoirs of peoples. In the coastal lands Greek culture found a "home away from home", yet these coastal lands were only part of a different hinterland with peasantry who already had a tribal structure or primary association of their own.

Roman Christianity was essentially urban in character, and did little to reconcile pagani and townsmen. Its gatherings and ceremony centred round the church which became the outward expression of Christian belief in Europe and the Western World.
Whilst Rome brought culture and civilisation to the Western world, Byzantium brought the same gifts to the Slavs. Hellenic and Eastern Church heritage were merged and taken over in the rise and spread of Islam.

"The spiritual culture of Islam is Islamised Hellenism. Christians, Syrians, Zoroastrians, priests and gnostics in Aramaic and Iranian soil passed on to the Muslims the Grecian inheritance."

Greek and Arab culture have met in the Eastern Mediterranean, the central home of Islamic culture. It is geographic unity and not merely historic circumstances that makes the Southern and Eastern Mediterranean Arabic. This inter-relationship of geography and history is essential for true understanding and historical criticism in Arab and Islamic studies. One almost wonders if time does have a stop when such stern desert environment rules man's activity.

While Latin penetrated and replaced the native Gallic and Iberian in the west, the Greek language never penetrated into the Eastern Basin of the Mediterranean. The literary expression of these peoples found its medium in Arabic. As long as geographical conditions remain constant, Arabic speaking peoples will always form the bulk of the population. The fringes of this Eastern Basin might be exploited from time to time, but physical conditions and natural ethnical distribution will ultimately prove the stronger.

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A spiritual call/unite in this region man's activities

(1) Hans Heinrich Schädler from quotation by Hans Kohn p.35 in Western Civilisation in the Near East, London 1936.
to one purpose and one God was the message of Islam. It denounced pagan religion as the worshipping of little gods belonging to varied tribes and clans. The Arabs were united by Islam and transformed from that level of tribal strife which dominated "Al Jahilia" into a spirit of fraternal equality. The new religion emphasised a spirit of equality among all people. The Arabs brought Islam to the Mediterranean lands, thereby uniting lands which already had common links physically and spiritually. Pre-Islamic culture in Arabia and the fertile lands are represented in the poetry of the period. If the Mediterranean inspired Homer to sing of the sea, the desert environment is revealed in an art of song and the spoken word which expresses valour, generosity, pride and love.

These virtues are all expressed in the Mualliquat - the chosen poem which used to be recited in the open market of Suk Ukath, parts of which were later inscribed on the Kaaba walls. It is interesting to notice that oratory and poetry in Arab lands take the place of writing in the North. It may perhaps be related to the different idea of social intercourse which prevails in the two regions. Caravan journeys and trading activities kept the Arabs of the Badia (living spaces of

(1) State before Islam characterised by tribal rivalry in pride and vanity.
(2) See Nicholson, Literary History of the Arabs for references to translations of Arab poetry of this period.
the desert) in touch with settlements in more fertile places. The two famous seasonal trade gatherings of "Rihlat al Saif wa Alshitae" are mentioned in the Koran.

Western scholars who are unaware of this early Arab poetry sometimes refer to the desert as a wilderness which bred unlawful nomads; and compare the Arab invasions to the Northern tribal eruptions. It would be more apt to think of the desert as a great sea - the hinterland to a great neighbouring kingdom in Iraq and Alsham. The riverine cultures penetrate the desert which also provides a refuge for the oppressed who are fleeing from a dictatorship. Bevan writing on Arabia before Mohamed maintains that emigration from the river valley centres took place throughout history. Besides it must not be forgotten that there was another very early source of established civilisation in Southern Arabia. This is revealed in the Koran and the Bible and the great water cistern of "Sad Marab" is evidence of constructive water engineering at such an early date in history. Commercial and cultural contact was maintained between the wide spaces of the Arabian peninsulas and its hinterlands. This physical unity contributed to the indigenous quality of Islam.

The art and architecture of the Arab-Islamic phase of

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(1) Alsham = Syria and Palestine.
(2) Bevan, Arabia before Mohammed, p. 5. See also Hilti, History of the Arabs.
history in the South can be compared to Medieval Gothic in the North - a common spiritual inspiration in two different climatic regions. The mosque and the cathedral in architecture symbolise the rich artistic treasury in both regions. The beauty and glory of nature turned men's minds towards goodness and belief in God which distinguishes man's capacity for contemplative thought. When civilisation loses control in a wild lust for material power there is an even greater need for such contemplation. The region between the Euphrates of Mesopotamia and the Nile of Egypt was the home of the prophets. Here it was possible for men to view the panorama of evil from a distance. Far from the centres of civilisation, men could afford to gaze into the vast infinite horizon and the stars of a desert night where the landscape whispers the magnitude and glory of eternal power. This was the birthplace of prophets who spoke of wisdom and piety. It is the background of the Old Testament. Names of desert origin and the folklore of the Old Testament help us to understand the Bible in its true setting in this climatic region where desert tradition has so profoundly affected the development of character.

The relation of Arab culture and Islamic studies to the Mediterranean world has been vague and obscure to Western artistic scholarship in the past. But modern and future scholarship could help to combat the mistakes of the past and the accumulated prejudice by a more intimate contact.
"In the East there was an organic connection between the ethnic forces and the intellectual’s ideals and conceptions, since here the thread of development had not been broken... Hence the enormous cultural influence of the Islamic world on Christendom, which finds expression to this day in the numberless words of Arabic origin in our languages and of which it is impossible to have an exaggerated conception. Not only material products of the East but the broad lines of economic life, the ideal expression of our medieval chivalry - including even the poetry of the Minnesingers, for all its European appearance - the bases of our whole education in the natural sciences, even ideas in philosophy and theology which have had a wide influence, came to us during that period from Islam. The consequences of the Crusades are the plainest evidence of the enormous superiority of the Islamic World, which we are recognising more and more every day" (C.H. Backer). 1

The consolidation of Islam2 in southern Mediterranean lands brought the southern and western shores of the Mediterranean into political and cultural union with North Arabia. In the course of its later cultural activity and development Islam changed. The deep eastward penetration to Persia, Western India and China brought the Far East to the Mediterranean. On the borders of the desert, lying on a great caravan route, Damascus became the seat of the Ummayad Caliphate and thus the capital city of the Arab Islamic Mediterranean world. But the extension of Islamic culture and its activities in various regions, though varied in expression were fused to one purpose. Throughout these various areas, the mosque stood as the expression of culture and religion. The climatic unity of the Arab Islamic world (though local variations) meant that no energy was squandered on becoming acclimatized in Persia or the Mediterranean.

(1) H. Kohn, Western Civilisation in the Near East, p. 48.
(2) It is incorrect to use the frequent term Muhammadism to designate Islamic religion.
In the course of its development, Islam absorbed previous cultures and inspired them with a new driving purpose, but in turn was itself influenced by the statecraft of earlier kingdoms. This second aspect was expressed in the abundant riches of the urban centres. The transfer of the capital from Damascus to Baghdad was the first hint of the disruption of the political unity of this Arab Islamic world of the Mediterranean whereas Damascus was a window to the Mediterranean world, the outlook was orientalised and brought under the influence of Persia. Then followed a period of unstable regional government with rival dynasties ruling by force. Baghdad was raised to a lofty position as proud centre of the caliphate, and a 'Golden' Age of courtly prosperity was influenced by the infiltration of Persian aristocracy. Although this expression was dazzling in its splendour it did not reflect the idea and purpose of Islam. The spirit of the Koran was preserved in the moral and legislative code that did ensure a continuity of belief although it was later clouded by political upheaval.

Cairo, Cairawan in Tunis, and the many flourishing cities in Andalusia were other Islamic centres in the Mediterranean. During the Abassayad period, cities were built on an exceedingly lavish scale — for instance the round city of Baghdad,\(^1\)

\(^1\) For details of the building of this city and reconstruction of the old plan of the city see G. Le Strange, Baghdad during the Abbasid Caliphate, Oxford 1900.
and Samarra are examples of excessive urban proportions, built at times when the need to maintain power meant the services of large armies.

The arts of canalisation and embankment were a very important feature of civic planning. In a lecture on "Eastern Factors in the Growth of Modern Cities" Professor Unwin comments:

"Facts seem to suggest that the new methods of engineering which were undoubtedly being used in the construction and expansion of nearly all Western cities in the twelfth and thirteenth centuries had been derived through the Levant from Mesopotamia where they had been known and employed for thousands of years... Venice which was the earliest European instance of this type of city, grew up under predominantly Levantine influences in a specially close connection with Alexandria which was also built on reclaimed soil; that the foundation of Damascus and other cities of Syria, of Persia, and of Central Asia had evolved great engineering skill in canalisation and finally that the plan of Baghdad as founded by the Caliph Al Mansur in 776 showed the deliberate adoption of the concentric principle which was afterwards so widely applied in Northern Europe in close connection with Levantine dedication."

It is not relevant to attempt the verification of such statements in this connection. Their importance lies in the extent of the relationship between the Arab Mediterranean world and Medieval Europe. Bertram Thomas ("The Arabs", London, 1937, p.207) writing about the Arab and the Renaissance in Europe states:

"They (Arabs) had held aloft the torch of Greek civilisation and after 400 years, passed it still more brightly burning to the Christian West. That heritage contained the seed of the Renaissance and out of the Renaissance grew European civilisation and European supremacy."

Vanice was the mistress of a flourishing Mediterranean trade which preserved the connection with the Arabs, while in Europe Arab culture found a home in Andalusia where a period of great prosperity ensued. The new towns of Andalusia, Kordova (Kurtuba), Granada (Ghirnalta) correspond to the Damascus of the Eastern Mediterranean. Here an Ummayad Arab prince Abd-Al-Rahman ruled independently.

A flourishing Islamic culture in the Western Mediterranean followed forming a phase of the spread of Arab culture and its penetration to Europe.

The three centuries of Crusades form the first large scale penetration of North to South; the misguided energy was forced into a mould of fanatical knighthood and ended in failure. But the Crusades paved the way to the later power politics of Western Europe. Venice, Genoa and Pisa were among the leading Italian towns which benefited from the protection of the Crusades to the extent of a flourishing trade with the Levant. During this period the West was brought into contact with Eastern Mediterranean culture. Wider horizons were opened to men. The journey was made overland from Acre to Peking and by sea from Basra to Canton. European isolation came to an end, and the way lay open to the Great Voyages of Discovery of Vasco Da Gama, and Bartholomew Diaz. Thus in a sense the Crusades may be regarded as the paving stones to the discovery of America.
In 1258 Baghdad fell to the might of Holaco and his hordes from Central Asia, - the successor of the great Ghengis Khan. In 1453 Constantinople fell to the Turks. At a time when the civilising forces of Islam were weak, the dominance of the Ottoman Empire took root in the Eastern Mediterranean. This transfer of the centre of gravity in the Ancient world of the Eastern Mediterranean opens the new chapter of modern Europe. The rule of the Ottoman Empire was doomed to failure. It superimposed political unity on nations and regions with an unsympathetic environment and culture. Walis were appointed from Constantinople with powers to act for the Sultan in the collection of burdensome taxes. There was no impulse for the growth of local initiative and self-developed units that might adhere to the regime but still take their place in the larger sphere of Islam. Yet people still continued their traditional craft work for local markets and even used their crafts to glorify the Sultan. Damascus and Aleppo were market centres of activity on the pilgrimage routes which fostered local craft activity. This gulf between political structure and true Mediterranean harmony and dependence on environment is the essence of the failure of the Ottoman Empire in economic and cultural spheres. Another contributory factor to its decline was the rivalry of East and West, Moslem and Christian which characterises the period.
Keeping the "Sick Man" alive was the power motif of western politics. It is the tragedy of political history that simple and honest human emotions are often roused for the sake of political drama. This is a further incitement to a militant nationalism. The impact of the 'modern age' came with such a sudden force that it was difficult for the Eastern Mediterranean to know where to turn for guidance and what principles to maintain. (The dazzling achievements and expression of colonisation cannot help but reflect the purpose of its origin. A statue of Mussolini in a central square of Arab North Africa, even were it conceived and executed with the best available technique, could never make Mussolini a protector of Islam.) It needs a genuine sympathetic enquiry into the human values of Mediterranean life if a better and continuous future is to be assured.

During the nineteenth century, Napoleon, the Mediterranean Corsican, attempted to restore the old unity of the Mediterranean by power and conquest. In Egypt, Mohamed Ali typified the ambition of Eastern Mediterranean unity, and this new spirit may be linked with the Greek War of Independence, the Assembly of the Cortes in Cadiz 1812, and the Arab Awakening. While the material power of the Western world was reaching a climax, the Mediterranean world and its hinterland remained unchanged in the structure of its society - in Spain, Southern Italy, Greece and the Near East. The opening of the Suez
Canal meant the return of commercial interest to the Mediterranean and this was bound to influence certain strata of Mediterranean society, as for instance the Levantine peoples. This in turn led to the penetration of French imperialism into North Africa where it now controls an extensive area of a region alien in climate, culture and peoples to that of France. The value of this zone of 'influence' was reckoned in terms of increased political and commercial supremacy in the Western world. Such an attitude which is typical of others could never bring true peace or true culture to the world; it would add to the accumulation of national bitterness and result in ultimate explosion. A typical instance of such reaction has been the wholehearted indignation of the Arabs over events in the Lebanon during the present war.

After the first World War, the penetration of a more effective change began to take effect. We are witnessing a transition period in the history of these Mediterranean states. It is a transition to a modern machine age – one which might be for the good provided that there is no colonisation merely for selfish motives of power politics. The Mediterranean life

(1) In January 1939 M. Deladier declared: "I am going to resume my voyage to North Africa which is part of France because there perhaps more than anywhere else is the greatness of the French Empire." G. East, The Mediterranean Problems.
has low standards of health; it is a state of extreme poverty. Yet the price of help should never mean the domination of the soul. Throughout the ages, this Mediterranean region which gave the world a great message of goodness and contemplative thought has had to suffer conflict and exhausting wars in a continuous struggle. For the first time the East and the West are forced into close contact. The true spirit of religion needs awakening and there is a crying need for a faith which sincerely and spiritually guides our inner conscience towards a realisation of the wider concept of humanity.
PART III

CHAPTER IV - ANCIENT.

CHAPTER V - CHRISTIAN ARCHITECTURE.

CHAPTER VI - RENAISSANCE AND THE MEDITERRANEAN CLIMATE.

CHAPTER VII - ISLAMIC ARCHITECTURE.
CHAPTER IV

HISTORICAL DEVELOPMENT

ANCIENT
PART III

Chapter four

ARCHITECTURE AND HISTORIC DEVELOPMENT - ANCIENT

Art scholarship in the understanding of essential principles in historic development and styles of architecture. Architecture and archaeology. Architecture essentially an art of creation.

Climate and the architecture of the Mediterranean throughout the ages. Climate effects an essential unity in architectural development. The effect of climate in the inter-relation between Christian and Islamic architecture, and the link between these two and the Ancient epoch.

The Tigris-Euphrates
Brick tradition as the national style in relation to topography. Thick brick wall to shelter from heat. Effect of heat on lateral expansion; 'corrugated surface' treatment of wall.


Climatic influence in comparing Chaldean and Assyrian forms to Egyptian. Vaulted structure and cool shade shelters. Influence of brick material on the evolution of structural forms; the genesis of dome evolution is more relevant to brick region.

The monumental expression of the Ziggurat in relation to flat and dominant starry landscape.
Hypothesis of flat landscape and the two-dimensional representation in art. Inscribed bricks and sculptural tablets remain to be a significant and noteworthy contribution to the art of architecture.

Palace layout - horizontal and vertical mass composition; effect of height as a guide in the flat plain.

Climate and court planning in Mesopotamian palace architecture compared with similar Aegean and later practice. The niche or semi-dome recess are primary characteristic forms of the brick regions. The two needs of open air living and indoor shelter from the heat brought open court and massive character of wall; daily and seasonal changes of temperature and their effect on the house plan. Assyrian and Babylonian houses are early evidences of the court constructed type.

Nile Valley

Stone formation in the beam and post element of structural design: Der El-Bahari and the geologic formation of the landscape. Pyramidal form a distinctive feature of Ancient Egyptian architecture.

Brick in Egyptian architecture. Sir Flinders Petrie's account of its use by the ancients and the technical problems involved. Water and clay in the sub-soil. Statements by J. E. Richmond and Sir Flinders Petrie on the structural problems in relation to underground water.

Climate and colour in Egyptian architecture. Hypothesis on sculptural representation and climate, statement by W. Harvey.

Early type of Egyptian peasant dwellings; clay models at the Ashmolean museum.
The windowless interior and the problem of ventilation; tracing early evidence of the "badgeer" as a cooling and ventilating device in the interiors of Egyptian houses. Slit windows. Reflected light.

The Aegean and the development of classical architecture

The nursery of later stone developed classical architecture in the Mediterranean islands of the Aegean.

Architectural studies from the Palace of Knossos. Street architecture of an early Minoan seaport. The 'romantic' character in the sense of an ardent response to natural and climatic conditions. Developing an indigenous 'romantic' character into Mediterranean "classical" forms. Climate and local material in Aegean and classical architecture. Stone and hill site levels and its effect on planning; outdoor and indoor steps; Aegean columns.

The climatic explanation of certain aspects of planning - borrowed lighting, air circulation, window openings above doorways. Heating by means of braziers.

The low pitched roof in the Mediterranean zone. Rural and classical character of the roof. The single plane of low pitched roof also characterises rural landscape architecture in the less arid northern Mediterranean zone and high altitudes.

Stone and the Mediterranean. Stone in the making of landscape; limestone is treaded upon in the natural terrace. Stone composition in the architectural landscape design of hilly elevated sites.

The Greek House; marked continuity and uniformity of type of house is to be attributed to climate; the research evidence of B.C. Rider on the history and development of the Ancient Greek house. The place of the court in the living order of the house; inclusion of an open air room in planning composition.
Open air living would mean the "contemplative" attitude towards nature. Climate and Greek Gods worship in the open air.

Climate and classical composition in architecture. The regional and local character of classical architecture relative to the stone geology and climate of the Mediterranean. The Acropolis as a monumental example of landscape regional architecture in the geographical and climatic conditions of Greece. Symbolic expression of climate and environment in the Temple religious edifice.

The structural and architectural unit of the column. Southern climate and the columnar style of classic architecture. The Portico as a sheltered open air resort; a covering from the sun and rain showers. Column design: flutings and their aesthetic purpose. Articulation within the classic composition - mouldings.

Mediterranean light and classical details. The quality of stone and its effect on the exactness and precision and endurance of constructed line and silhouette. Intensity of sun-light and its effect on the colour surface of buildings. Glare of surface material. Principle of reflected light one of the most important considerations in southern architecture. Practical and aesthetic considerations of the effect of this reflected light from paved terrace to building projections, mouldings, column and sculptural decoration.

The clarity of the atmosphere and its effect on distant views. Optical illusion as evidence of contemplative design in clear light conditions. Colour and climate in Greek architecture.

The Pompeian House
An accomplished classical arrangement of southern type of house. Space and volume composition of atrium, peristyle and garden. Southern light and the small court.
Civic Buildings
Open air theatre and the hilly stone landscape. Gymnasium court layout. Agora - the civic centre type and market agoras. The stoae in urban classical composition. Colonnaded streets - arcade constructed walks. Climate and public social life - the portico in Roman Civil and recreational architecture.

Because Architecture can never be separated from the life and thoughts of its people, and because of the many regions involved, the scope of historical architectural study in the Mediterranean is immense. Within the fascinating by-ways of such a study there might be a tendency to interpret the present in relation to time and social changes as something entirely different and separate from the steady flow of the past. Although the study of Architecture as the development of styles in different periods is valuable in so far as it builds up and clarifies stylistic expression, there is a danger that the underlying principles might be overlooked. There might be no connecting link to show how the different styles of a region came into being. The present period of upheaval with its impact of change stands in great need of a firm grasp of essentials. They form the starting point from which architectural development can advance, and this is the task for artistic scholarship to expound.

The need is urgent not merely for the assimilation of historic facts, but rather the promotion of a sound, critical, constructive and creative attitude set in a humanistic content and implication. The facts are sometimes more strictly the concern of the archaeologist than the architect. T.J. Jackson, rightly

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(1) T.J. Jackson, Introduction Byzantine and Roman Architecture, Vol. I.
states "But while an architect must take archaeology to some extent into his service he must beware lest it becomes his master. He must study the art of the present neither as a subject of historical research nor as a matter for imitation, but in order to learn its principles taking it as his tutor rather than his model". An artistic understanding should stimulate the present study of buildings and monuments. The buildings of the past may have been erected in response to different prevailing needs, however they were built under similar if not the same geographic and climatic environment in that we live today, and so the significance and understanding of regional styles should become a primary source for architectural accomplishment at the present. If this is always borne in mind, the study of the past can never be dismissed as possessing merely 'antiquarian' interest. Instead it will always be of immense practical value to artistic continuity. The structural aspect of architecture will benefit by direct technical knowledge as for instance the domes and vaults of the past which combine such highly developed technical efficiency with architectural beauty.

The most striking feature of Mediterranean architecture is a marked similarity over an extensive area. Influences from central established sources were always active, but this is not necessarily the explanation of the character which is general. Climate set a similar problem throughout the whole
region, but the solution was reached in different ways in different localities. This marked uniformity within the whole architecture of the Mediterranean region, however, has given rise to the expression 'southern light' in distinction to the characteristic styles of the bordering Northern continent and Southern tropical Africa. A comparison and a study of the quality of Mediterranean architecture forms the scope of this chapter - how for example within diverse regions, the varied building materials resulted in various expressions within one more or less abiding climatic type.

It is this fact that brings the two formative elements of Mediterranean culture - Christian and Islamic architecture - into close unity. Earlier the ancient epoch provides a rich source for architectural investigation into these later developments.

The Tigris-Euphrates Valley, (WADI AL-RAFIDAYN, meaning the valley of the two gift-giving, i.e. the two rivers) the early source of great established river civilisations has contributed to architecture in the art of brick and clay building. Brick, the natural material source in the topographic conditions of the country thus becomes the source for an indigenous and national style. Its various usages in the art of structural composition are well worth detailed study today.
The vast alluvial plain is unrelieved by any outcrop of stone, and the transportation of such material from the North would prove a costly task.

Massive brick walls act as a barrier to the sun's intensity and produce a sheltered indoors from the outside heat. The depth of the wall, and its importance in terms of three dimensions as opposed to mere surface is a significant factor. The effect of heat on lateral expansion is a structural problem which has to be realised. In this connection it is significant to notice the treatment of brick wall surfaces. Recesses in the composition of the wall could be regarded as a method of overcoming this problem. Sir Flinders Petrie refers to "corrugated" wall surfaces which allow for elasticity in his observations on Egypt. This treatment had an obvious significance in the architectural composition and design of the wall and the alternate light and shade.

Apart from considerations of stress resulting from changes of temperature in the various parts of a very thick wall, the structural stability of the wall has also to be related to the soil. In the climatic condition of arid countries exposed to sudden and periodic rise of water level owing to the marked seasonal distribution of rainfall the continual changes of the water level tend to result in underground movement. This has serious effects on the condition of buildings, situated in such circumstances. Basements and sub-basements are often
flooded in the winter season when the level of the river is raised. Leaving aside considerations of health and inconvenience to living arrangements, this affects the structure of buildings and helps to speed up the process of dilapidation. However well designed in itself, a building must therefore stand in close relation to the soil formation and local conditions. Sir Flinders Petrie in discussing buildings in a desert site mentions a case of practical interest: "a number of houses were put on a desert site near Cairo, a charming open desert, healthy and with nothing to fear, as dry as a bone. They were built in an extremely wide water-course, which drained down from the Mountains twenty miles away. This lasted very well for two or three years, but one day there was a black cloud over the mountains, and shortly afterwards there were two feet of water in that site and in a short time the whole of the houses were reduced to piano, pots, and pans and wreckage."

The prevailing practice in palace building was to erect them on a platform high above reach of the floods. This necessitated building retaining walls and vast sub-structures. The outer wall of burnt brick set in bitumen mortar retained

the inner core made of unburnt brick in mud mortar. 'Weep holes' or small openings were left for the purpose of draining the clay core.\(^1\)

Large square bricks for use in a wall were evident in early practice.\(^2\) The method of bonding was not well suited to this shape. Atkinson and Bagenal\(^3\) quote a letter from C.L. Woolley in which he writes "but as most bricks were approximately square, internal bonding is bad; the total thickness of the wall is made up of series of skins with little or no structural cohesion between them. To meet this weakness the builders put layers of reed matting in the bitumen mortar between the courses - the mats running right through the wall served the same purpose as the wire netting occasionally employed in modern reinforced brickwork".

Great arched drains were erected to carry off the downpour during the rainy season. The bricks were laid in asphalt mortar, and each course was laid at a slightly inclined angle instead of standing on edge. In this way they support one another and finally lean against the wall from which they started. The tendency of each course to fall out of place is reduced by the

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(2) Evidence of such practice is still to be seen in building methods in Iraq, where the preparation of bricks to the size of about 15" sq. is practised, denoting the prevalence of an early tradition of the thick wall.
faces of all important buildings were protected with very hard
and considerable size are employed. As a rule the external
brick was used the inconveniences of such a slope would soon
render could not without causing great damage, but where
then during upon sloping walls or dressed stone these for
are unheard in by storms or rain, the amount to little less

an almost unknown phenomenon. The change of the seasons
even in Italy or Greece, but rain is not, as in Upper Egypt,
materially used. Doubtless it rains less in Mesopotamia than
universal in Egypt, by the difference of climate, and of the
existence from Chaldea or a system of construction that was so
than. They write, "we may, perhaps, explain the complete
peristyle and columns. Even there is a climatic explanation
structure of columns at Chaldea and Assyria with those of Egypt,
comparing the effect of rain on the arches etc.

carried out without wooden centering or temporary support.
reception of the span at the vault, such vaults could be
method of laying each brick with the widest face in the di-

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and well burnt bricks. But the rain, driven by the wind, might easily penetrate through the joints and spread at will through the core of mere sun dried bricks within. The verticality of Assyrian and Chaldean walls was necessary, therefore, for their preservation. Without it the thin covering of burnt brick would have been unable to do its proper work of protecting the softer material within from the sudden storms by which the plains were now and again half drowned."

Vaulted structures and domes were evolved as a solution to the problem of shelter with the available material. Early examples of the Sumerian builders' familiarity with architectural forms such as the vault apex, dome and the use of the column have been preserved. Leaving aside the evidence of archaeology it seems a logical development for the native peoples to build small domes (Kubba) over their living space, and the palm tree itself, a natural pillared form, suggests the use of the column. The prevalence of such shapes is reflected in Assyrian and Babylonian bas reliefs. The genesis of the dome and vaults and their evolution throughout historic time has occupied the attention of many scholars with various claims and hypotheses, depending mainly on the evidence of certain recorded buildings. The influence of material and

(1) C.L. Woolley, Ur. Excavations, Vol. II, p. 236 and plate
climatic requirements is intrinsic in the meaning of such evolution and should not be overlooked in favour of certain historic data. While it is significant to follow the later development of the dome or vault and the monumental attainment in the art of covered space during Christian, Islamic and Renaissance periods, yet the evidence of their natural evolution as shelter requirements for early societies in many places was a logical outcome.

The 'vertical' aspect of architectural composition during the early period of Babylon and Assyria was provided by the Ziggurat. From this Herodotus and others attribute to the Chaldeans the scholarly study and observation of the vast expanse of sky. In a flat country, sky is the dominating feature of the landscape. It is inescapable, not only overhead, but on all sides as far as the eye can see. At night the Ziggurat may be imagined set in a backdrop of deep blue studded with the gentle silvery points of the stars. The dominating influence of sky in the landscape somehow tends to minimise the significance of the third dimension and helps to explain the prevailing two dimensional representation so characteristic of the art of the Eastern countries. In contrast to the Greek classical conception springing naturally from the mountainous setting the conception of art developed on a flat surface, and the artist is more interested in a technique of

(1) By means of the two dimensional representations it was possible to achieve a "fourth dimension". This term is used in the sense of spiritual purposes.
carving as distinct from the moulded process. This factor was felt later in the intermingling with classical art in the Eastern Mediterranean basin.

The use of inscribed bricks and large engraved tablets is a significant contribution to the architectural character of this ancient period. They spring directly from a masterly use of clay for monumental architectural purposes in a natural setting devoid of stones.

The palace layout of Chaldea and Assyria represents an early example of composition based on the rectangular court system of grouping. Dominance of horizontal forms is in sympathetic harmony with the nature of the country while the height of the contrasting Ziggurat gives a unity to the predominant horizontal composition. It also serves as guidance to a place of destiny in the even plain landscape.

Later during the Abassiyid period the minaret in Samaria, an associated composite form in the layout of the mosque, is an interesting comparison to the Ziggurat. The open court system is also the theme of later planning and is reflected in a similar development in other parts of the Mediterranean. The palaces of the Aegean or Crete serve to illustrate the similarity of Mediterranean architectural planning which is to be explained as the outcome of climatic conditions. The dominance of a large central court in the composition of such a palace layout helps to emphasise the unity of groupings. This may
be compared to the more formal axial arrangement of diminishing sized courts characteristic of Ancient Egyptian temples which is of climatic as well as conventional ceremonial significance.

Surrounding niches rather than colonnades served similar shelter requirements in Iraq. They became a distinctive feature of the regional style of architecture denoting the influence of brick material. Thus different styles to meet a similar climatic problem afford a note of regional variation to an essential climatic theme. Brick covering suggested the niche and the large stone laid on pillars, the beam and column. Rows of repeated niches or semi-dome coverings were to be developed later in the Islamic period.

The need for a barrier against heat meant a logical development of thick massive walls, while an open air life would suggest a lighter expression. As early as Babylonian and Assyrian times there was a prevailing use of light timber structure in conjunction with the massive architectural character of the buildings. Assyrian and Babylonian tablets reflect such use, and Chipiez’s reconstruction of the type of open air architecture or roof court is not so very far removed from Bible references and present needs. This relation

(1) History of Art in Chaldea and Assyria, Vol. I, fig. 70.
of light open air structure and massive wall constitutes the theory of architectural design in semi-arid Mediterranean countries.

The house design of Ancient Assyria and Chaldean follows the rectangular court plan, and a reconstruction based on archaeological discoveries shows the similarity in grouping with later periods and the present.

In Ancient Egyptian architecture, closely spaced massive pillars supporting stone beams are the element of architectural space covering. In covered halls with rows of such columns or in colonnades surrounding the open peristyle court, the Ancient Egyptian style of monumental architecture reaches a high level. Granite, sandstone and limestone could be quarried in the hilly environment of this stone geological stratum thereby achieving a landscape formation in harmony with the natural setting. As an architectural composition, the rectangular arrangement of column repetition was in relation to the stern even level of the desert plateau background. The Temple of Der-El-Bahari is described by Sir Flinders Petrie with the eye of an interested landscape artist as well as an archaeologist. He writes:

"The strongly marked horizontal and vertical lines of the scenery condition the style of buildings that can be set before such a background. ... Behind the building the skyline was the

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(2) Arts and Crafts of Ancient Egypt, London 1900
level of the desert plateau only but open by an occasional valley, but with never a peak rising above it. And the face of the cliffs that from the stone setting is ruled across with level lines of strata, which rise in a step-like background on a wall lined across as with courses of masonry. The weathering of the cliffs breaks up the walls of rock into vertical pillars with deep shadows between them. In the face of such overwhelmingly rectangular framing any architecture less massive and square than that of Egypt would be hopelessly defeated. The pediments of Greece, the circular arches of Rome, the pointed arches of England, would all seem crushed by so stern a setting. The harmony is shown most clearly in the Temple of Dier el Bahri."

Whether this sense of harmony was an instinctive response to environment or a conscious attempt it is difficult to decide. But the resulting permanent quality was undoubtedly achieved by the sympathetic relation of local material resources to natural local conditions.

The attainment of a style and the creation of an inherent unity is achieved by general adherence to the simple structural method of the beam and post principle of construction. The way of achieving beauty through simplicity, therefore, stands as an abiding principle. In this trabeated style pressure on walls and columns was vertical and no outward thrust was imposed on the walls. These principles of
construction are quite distinct from those involved in the type arch and vault of structure.

The pyramidal form of the exterior walls was one of the distinctive features of Ancient Egyptian architecture. If wall surfaces are extended we find they unite at last in a point in the case of a square plan, a ridge in the case of a rectangular. Such structures suggest the lasting stability of settled forms. The stone material and the dry climate helped still further to ensure their survival against the force of wind and rain.

Brick, burnt and unburnt, is another important source of building material in constant use in present day Egypt and Iraq as in the past. It is closely associated with the mud strata of the river banks and the plains of Egypt. In connection with village and domestic architecture brick is more important. Its technical use in the climatic conditions of Egypt provides a field of detailed study which Sir Flinders Petrie has discussed.1 He writes:

"Bricks were made of the Nile mud, when dried it is very hard and tough; cutting through it is as laborious as working

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(1) Egyptian Architecture. British School of Archaeology in Egypt. London 1938, pp. 3-14. Figs. 32 and 3 show scenes of brick-making in the time of Thutmose III indicating the long history of present methods.
soft rock. The mud, if unmixed, contracts much on drying, losing about an eighth of its former size when damp, as may be seen in dried-up ponds. It is therefore needful to mix it with sand, using enough to form a continuous frame of sand all through the mass, so as to prevent contraction. Otherwise chopped straw is mixed in it, enabling the mud to shrink locally around the hollows, and so dry without contracting the dimensions. The surface of the brick is also strengthened by rolling the clay in straw dust before moulding, thus forming a thatch to resist the rain. Heavy rain will wash out the mud, leaving a matting of straw on the face, which resists any further denudation.

The mortar used in binding brick is identical with that of the brick. In plastering/different quality of mortar was used. What the wall requires for its protection of strength is a firm face of plaster. With a coat of mud plaster on each face it becomes a girder with two faces and solid ties between. The facing plaster requires to have as much sand in it as it will carry; the grains should be all in contact, and the mud only enough to fill the interstices and make a cup for each grain. Such a face will bear heavy rain and dry again in a hot sun without damage."

In relating the structures of buildings to climatic conditions in Egypt, the wet season should be an important consideration. Winter rain and the rising level of subsoil water
[during the flood period of the Nile] threaten the stability of the superstructure. Such earth movements result in an upward pressure which E.T. Richmond discusses in his address on Building Methods in Egypt.\(^1\) He illustrates the way in which Nile mud contracts about 1/8 inch in drying and gives as an example that large cracks open in dry fields enough to entrap one's foot in walking and anything dropped is lost. In connection with the problem of underground water and its effect he states that "no particular attention has in the past been paid by Egyptians to the varying levels of the subsoil water," while Sir Flinders Petrie maintains that the ancients were conscious of these problems and evolved two solutions. One way was to bed on sand which left walls free from shifting below it.\(^2\) The other way for long enclosure walls was to build them wavy or corrugated.\(^3\)

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\(^2\) Writing on foundations Petrie states. Sometimes bricks were laid on sand, and with sand between them. Such layers of sand enabled the levelling to be adjusted and allowed for shifting of the soil without cracking the walls. Chapt.I. 10. loc. cit.

\(^3\) For a plan of a wavy brickwall see Pl.V. Fig.II of a wall around Pyramid MAZGUNEH XII Dynasty the length of such walls exposed them especially to contortion of the soil; the wavy plan allowed of rise and fall in different parts, without doing more than slightly increasing or diminishing the amount of wave in the upper part of the wall. This form also ensured the greatest steadiness with a given amount of bricks. The wavy walls are always thinner than the straight walls of enclosures. Bidg. Methods in Egypt. J.R.I.B.A. xxv 7th June 1911, p.536.
The effect of the type of make of brick on architectural forms is a worthy consideration. In the use of soft brick, for instance, it was necessary to work such material in a high parabolic arch with a very small curve in the lower parts, rounded over by a small arch at the top, thus avoiding the great strain imposed by the flat arch. The low crushing point of such brick makes it unsuitable for use in flat shaped vaulted forms.

In the dry climate of Egypt, colour applied to the exterior of buildings played an important part in architectural detail and scale. Egyptian columns which might be described as massive rolled up walls were treated with hieroglyphic decoration in the same manner as the wall surfaces. They provided abundant scope for the use of strong hues which were comparatively little affected by the dry Egyptian climate and in no danger of being washed away by frequent rain. W. Harvey comments on the relation of colour to the climate of Egypt when he states: "The definite simple shapes of the architect are such as might convey an impression of undue severity when seen in photographs. Under their own blue sky, however, the biggest Egyptian building tends to become dwarfed and to appear trivial unless enough colour remains to give them scale and distinction. Without applied colour the buildings seen in the light of a glaring sun merge into their background of sandy hills, which

also reflect a glare of light and heat capable of rendering inconspicuous the largest mass of masonry."

The use of sculpture in Ancient Egypt is also to be related to climate and Harvey's\(^1\) sensitive observation is quoted in this connection. He states:

"The conventional attitudes in which human beings are portrayed in Ancient Egyptian Sculptures and paintings, and which seem so quaint and unreal to an Englishman, have been explained by reference to some religious conventions which kept the Art to certain beaten tracks. There may be a great deal of truth in this religious explanation, but, in fact, the attitudes drawn in the Sculptures hardly need much comment when seen in their own land. The nature of the country explains them automatically and the Sculptures which have appeared so stiff, forced and unnatural when seen in a European Museum become recognisable as intensely naturalistic when viewed in the light of their own surroundings. Egypt is a mud flat intersected with artificial raised lines of embankment for paths and irrigation channels. Consequently everyone walking along a path is seen in outlines silhouetted against a sky of solid blue, and with the exception of some details of costume, the present inhabitants look singularly

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(1) Harvey, Colour and Architecture.
like the Sculptures. The resemblance is closest in the case of naked slaves working the shadoof and tilling the fields."

The influence of climate is clearly shown in the form of houses, and as early as the IX to XI dynasties in Ancient Egypt we have preserved clay models which illustrate the peasant type of dwelling. These are not very different from the present fellaheen home with a walled open space to form a court or centre for everyday activities, a flat roof and some rude form of loggia on top.

It is interesting to notice in these models the idea of the 'wind scrap' known in Egypt as mulqaf, in Iraq and Persia as badgeer. It denotes an early device of letting air into the windowless rooms. It is also a method by which cool air and water, both essential to indoor comfort, are obtained.

It is a device still employed in traditional houses at the present time and deserves real consideration in planning for coolness. The serdab (basement) retreats which are common to semi-arid climates still bring air by means of the badgeer. A further reference to the badgeer system will be discussed in its relation to Islamic architecture.

(1) Seen in Ashmolean Museum Oxford. N.B., photographs in Petrie "Egyptian Architecture", Plate XXIV.
(2) Serd Aab. A word of Persian origin composed of two separate words and meaning a place where cool water can be obtained.
When windows are used to admit light to the interior they were in the form of slits. Reference to such type of narrow windows is also found in the Old Testament. In the temple of Kharnak or Medinet Habou or the type of Ancient Egyptian urban house there is ample evidence of such window slit formation. In clear-storey lighting they would acquire more importance in regard to lighting and air circulation of the public edifice. Sir Flinders Petrie in describing the type of Ancient Egyptian windows gives these details: "In the Granite temple of Khafra", he writes, "they (windows) were more of the nature of ventilators: a slit a few inches high and 41 ins. wide led from the top edge of the wall into a vertical shaft which opened in the wall face above. The light only dimly entered by two internal reflections from the sides of the shaft. In the Ptolemaic temples which remained roofed the lighting is by holes in the roof only 8 or 10 ins. square, widening downwards so as to spread the light over the chamber. The great pylon chambers are lighted by a slit, 20 ins. wide of about 5 high; at the roof level, with the wall thickness splayed away in a slope down to the floor."

(1) Ezekiel 40.16. "And there were narrow windows to the little chambers and likewise to the arches." [Ezekiel 40. 16.]


(3) "And for the house he made windows of narrow lights," [1 Kings 6,4].

(4) Sir F. Petrie, Egyptian Arch. p. 76.
In the design of windows it is important to observe the principle of reflected light since direct light would mean the penetration of the fierce damaging rays of the intense sun.

The Aegean islands form another active centre of early Mediterranean culture. It was the nursery of later classical development which consolidated Mediterranean island culture and contributed to the rest of the Mediterranean through the penetration of seafaring contact.

In Crete the early architecture of this period is revealed in the noted archaeological discoveries of Sir Arthur Evans in the Palace of Knossos, which present an abundant wealth of material. Remains of faience mosaic afford a glimpse of an actual Minoan town in close proximity to the sea. House elevations with two or three stories and roof attic, windows with six panes of a date probably not later than the last half of the 18th century B.C. indicate an achievement of orderly civic life. Elevations suggest town houses standing in rows and the chief interest in this connection is to trace the domestic quality of the architecture of these representative islands of the Mediterranean basin.

(2) Ibid., vol. I, pp. 301-314. The town Mosaic. See fig. 223, vol. I for a photographic view of some of the plaques placed together showing house fixtures and towers. See also restored drawings fig. 226 by the late Mr. Theodore Fyfe.
This early architecture becomes of primary interest since it achieves an essentially Mediterranean character. It reflects an economy in constructional effort which is typical of many rural dwellings of other regions of the Mediterranean. Reference to such early Mediterranean architecture should provide a constant source of inspiration for the region. The pre-classical architecture of the Aegean bears a "romantic" character evident of a spontaneous response to climate and a Mediterranean way of life. This forms the genesis of the more conscious intellectual attainment of a fully classical architecture. But it is most important that the relationship of the classical and the romantic rural background should not be separated. The full and true understanding of the Classical is embodied in this relationship where climatic environment provides the guiding theme. Because of this climatic relationship, classical architecture achieves a character and value not only local to the Greek islands and peninsula, but representative of the Mediterranean lands as a whole.

Local stone and timber formed the materials for the use of post and beam constructional methods. The horizontal wood beam construction contributed to the domestic scale in design. Columns tapering towards the base forming a "determined entasis" in an opposite direction to the classical column are a distinctive feature. At the junction of staircases leading from
court-yards they were used characteristically. The contoured levels of hill sites were utilised by means of intermediate steps between indoor and outdoor terraces.

The painted stucco relief blended with a massive rural type of structure is a Mediterranean feature of pre-classical Greek architecture. Paintings in colour show masterly perception by introducing a gentle decorative quality into the massive architectural settings of the Mediterranean. The strong bright hues of red, blue and ochre in common use helped to define the interior. ¹ Ancient traditional methods whereby colour penetrated the mortar and was preserved are a specimen of early scientific attainment.

An aspect of internal planning which could be related to climate is found in a study of the palace of Knossos. The fact that room areas could be wholly or partially closed or entirely open suggests a planning arrangement adjusted to suit the needs of marked summer and winter seasons. Traces of rows of door apertures capable of such sub-division are revealed in these excavations. Sir Arthur Evans in noting this arrangement writes: "A characteristic feature of these is the Minoan doorways/lintels enclosed on the two sides by the upward culmination of the door posts and above by the beam that

(1) For illustrations actual and restored see supplementary plates in Vols. II and III.
formed the main support of the floor above. This feature which resembled a window both in form and function was itself the logical outcome of the form of timbered construction prevalent in the third middle Minoan period. There is reason to believe these squares of timbering could be left open for the passage of air and light. They were indeed the sole means of giving light to the interior of a chamber when the doors were shut." This prevalent use of indirect means of lighting and ventilation recurc in later Mediterranean developments particularly in Islamic architecture where the semi-circular top of an arched opening was usually treated as a window aperture above the doorway. Braziers were used, then as now, for heating during the short cold season. They were movable fixtures usually brought to the centre of the room so as to distribute heat in all directions. But the dominant problem in Southern latitudes (in contrast to the Northern) is always that of providing shelter from heat.

The low pitched, inclined surface roof is characteristic of Mediterranean architecture in the northern basin where no doubt it was evolved to dispose of rain water. Such a pitch was emphasised and given an architectonic character in the classical roof as seen in the pediments with a slope of about 15°. Archaeologists often attempt to determine roof structure when only the plan remains, and doubts and arguments arise as
to the type of roof then in use, whether it was flat or pitched. In this connection it is important to note a third type of roof (with evidence of a long history) in common use at present. This is the single pitch tiled form of roof.

In the European zone of the Mediterranean and in high altitudes where rainfall is more abundant, this type of inclined surface plan gives a finished protective form to buildings of the southern landscape. When analysing the picturesque romantic quality we attach to these places we find it a characteristic of buildings where the useful is interpreted in terms of the vernacular to form the "romantic" aspect of Mediterranean life.

This type of less formal roof design overcomes structural and planning difficulties and retains a common character in its use of tile. It could be adjusted to complex plans. The house of the Vetti at Pompeii is an instance of such a roof design.

The history of the Greek house is marked by a deep sense of continuity from earliest to present times according to B.C. Rider. In tracing the connection between similar types

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(1) The Greek House, its History and Development from the Neolithic period to the Hellenistic Age shows a certain uniformity and continuity of type based broadly speaking on the court-yard with principal room.
in mainland and islands, historical research tends to over-
look the probability that similar styles would develop
naturally in response to similar climatic conditions. The
court-yard was a well designed open space of living concern
to people's daily activity. Whether surrounded by a wall in
its rural form, or a more complex developed layout, the court-
yard retains an essential living purpose that lends itself to
Mediterranean architecture. Its horizontal plane is not to be
separated in general planning as in detail from the rising
structure of walls and pillars that surround it.

The open air life of the Mediterranean plays a great part
in architecture.

The terrace or court idea on the ground floor of the site
invites architectural composition and so the relationship of
buildings to environment becomes an organic, closely inter-
woven living need. Local building materials suggest them-
selves instinctively. They already form the material substance
of the natural terrace, the foundation of rocky hill site ele-
vations. Rocky stone material is symbolic of the existence
of these island promontories in the Mediterranean. Once stone
is accepted as the material and artistic symbol it only awaits
a further development and refinement. The lasting quality and
pleasure of such a simple rustic composition owes a great deal
to the organic substance of local stone material.
A contemplative sense in tune with environment would be more developed and cultivated when man's daily activity is spent in the open. Architecture reflects the difference between races who worship their gods in the open air and those who are driven indoors to worship. Shrines will be erected in the open air and the Homeric conception of the dwelling place of the Gods derives a conscious pleasure from light and air.

"Rose to Olympus, the reputed seat eternal of the Gods, which never storms disturb, rains drench or snow invades, but calm the expanse and cloudless shines with purest day."¹

The Aegean architecture which combines much of the Mediterranean character was the genesis for the classical development of Greek Architecture. Stone, the medium for expression in an art of conscious space composition was later dramatised in its grouping to an accomplished attainment.

The classical achievement of the Greeks is of deep significance in the history and theory of architectural design.

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¹ Homer's Odyssey, William Cowper's translation, Everyman's library, and "Not only by winds is it (Olympus) shaken, nor even wet with rain, nor doth the snow come nigh there-to, but most clear air is spread about it cloudless and the white light floats over it." Odyssey VI. Butcher and Lang, p.93. Quoted by Atkinson and Bagenal in Theory and Elements of Architecture.
In this connection it is important to remember that it grew and developed as the result of Greek requirements in the Mediterranean climate, an aspect very little discussed and often ignored completely in historic study. In this classical phase, the grouping of various elements and fusion of the general and the particular conception reached a pitch of perfection. Such perfection lies not only in harmony of composition, but is also the result of a definite idea in response to local environmental conditions. While there is much to learn and derive from classical architecture in ideas and elements of composition it can only be fully understood in relationship to the conditions and material of a Southern Mediterranean latitude. Where climate and geological formations are similar, the classical column architecture becomes the accomplished style of the Mediterranean. Poets and artists have left us an abundant wealth of appreciations. But apart from literary and historic association, classical architecture represents an achievement in sympathy with local space environment, with the beautiful contrived with truth to purpose and use.

Stone and marble were the local materials and a unity of architecture creation and composition was achieved by grouping this organic material into an organic structure. This satisfied the first essential for a permanent and potentially rich artistic achievement. The second step was to organise this
material for structural purposes so as to satisfy the necessary requirements for shelter under Mediterranean conditions of climate. The response to climatic needs was met by the Greeks in their religious expression; climatic influence is not confined merely to the useful in domestic need but it should be closely related to the monumental expression. Temple architecture stands as the pinnacle of Greek achievement. By fine appreciation of scale, proportion and space composition it achieves a symbolic interpretation of Mediterranean climate in the Greek locality.

The Greeks mastered the use of the column for structural purpose. They repeated it and arranged their scheme of architecture composition so that it provided a protective element and also served as the medium to define space. This was developed into the well known 'orders' of architecture. The colonnade provided shelter from the heat of summer and protection from winter showers. The underlying/quality of the classic is the result of contemplative design in harmony with the local stone environment. The classical grouping of the Acropolis has an underlying romantic harmony with the physical landscape surroundings.

Once the two aspects diverge, the classical expression loses much of its true meaning. It tends to fall into the category of reference thereby becoming the means of attaining a certain 'academic' quality.
The controversies between so-called 'Romantic' and 'Classical' schools of thought are often a misguided mental effort; the rival theorists usually base their arguments upon a distortion of each conception. Greek classical architecture is native in origin and inspiration - its growth is in harmony with the landscape. Copies in northern climates though inspired by genuine intellectual appreciation must inevitably arouse controversy. They tend to become merely formal in their expression and seem to have been superimposed in alien conditions for a monumental purpose.

The portico type of architecture with the column as the unit of composition was necessary in the open air life of the people it catered for. The proportions of the columns - their height, the volume of space they occupy - reflect the mode of outdoor living for the greater part of the year. In winter as well as summer they were places for walking, sitting and living in a Mediterranean open air life. Vitruvius mentions such a function in more than one instance. "For the idea of the pteroma and the arrangement of the Columns round a temple were devised in order that the intercolumniation might give the imposing effect of high relief; and also, in case a multitude of people should be caught in a heavy shower and detained, that they might have in the temple and round the cella a wide free space in which to wait."¹

(¹) Also Book III, Chapt. III, Para (9).
In connection with theatres he mentions a similar use. "Colonnades must be constructed behind the scene so that when sudden showers interrupt plays, the people may have somewhere to return from the theatre." Gibbon writes: "From the portico the Roman civilian learned to live, to reason and to die."

Monumental architecture expression was achieved by a mastery of the elements of composition in a direct simple planning and on the 'column and post' method of construction. In itself the column was complete in design. The shadows of the flutings emphasise the function of the column by their repetition of the vertical, and so its heavy round bulk is softened and intellectualised without sacrificing its primary function. The rhythmical subdivision in turn detaches the shaft from the wall behind. The articulation of the various forms expressed in the design of the moulding distinguishes classical architecture as the grammatical source of composite design. Mouldings were logical in their need and beautiful in the mastery of their profile. Their use should be more fully appreciated under the natural surroundings for which they were designed. Mediterranean conditions of light demanded clarity and precision. Bold yet sensitive to the quality of light, these mouldings help to clarify the edifice. The stone material capable of being polished to such a definite moulded shape plays an important part in the attainment of

(1) Short expression for 'peripteral colonnade'.
(2) Book V, Chapt. IX.
(3) Atkinson and Bagenal quoting Gibbon, Chapt. 44.
a high degree of exactness and endurance throughout the ages. This is a factor of considerable importance in the lifetime of symbolic buildings. The clarity of Mediterranean conditions of light meant reduction of the brightness of walls. The high reflective capacity of bright surfaces in Mediterranean light results in an irritating glare which was often reduced by a coat of ochre. Vitruvius\(^1\) mentions this use in many instances and states that it was practised by the ancients in their finishings. "A white matt surface will reflect as much as \(84\%\) of the light falling on it --- In scientific terms the Greeks reduced their surface from "ivory white" having a co-efficient of reflection of 77" to 'ivory tan' having a co-efficient of 56\%."\(^2\)

Light reflected from the horizontal surfaces of courts and pavements plays a considerable part in classical architecture. When it is projected to the buildings, mouldings and shadow surfaces are affected. The intensity of the shadow is reduced and the soffits are lit. The art of decorative fenestration is particularly suitable in these circumstances since the work will never be in dark shadow. Sometimes shadows can be seen above string courses and projections

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(1) Vitruvius, Book VII. Chapt.VII.
(2) Atkinson and Bagenal, p.23.
instead of below them.\(^1\) Sculptural decoration on the pediment is often treated so that it receives reflected light from the ground surface. Thus an important aspect to be noticed in Southern Mediterranean conditions is the way in which the intensity of the light can be reduced to suit man's physical and artistic requirements. The portico invites subdued indirect lighting. Decorative art within the shade of walls and ceilings must receive enough light to be seen in comfort. This factor leads to a consideration of building material, its degree of reflection, and the extent of paving in relation to height of buildings.

Clarity of light also has an influence on architectural composition and mass grouping. In a clear atmosphere buildings can be seen more definitely from a distance, and form and mass grouping have a landscape as well as architectural significance. They must look restful in the distant panorama. The clear light of the Mediterranean helped men to appreciate clearly the 'mass' of the temple from a distance. Such visibility meant the achievement of perfect grouping which is marked in this by correction of optical illusion. The angles of buildings were made slightly thicker since they were seen

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(1) Atkinson and Bagenal in Theory and Elements of Architecture observe this and suggest that if Classical Architecture is to be rightly rendered in this country, this factor of terrace paving round the building must be considered.
against the light and seemed to diminish in size when compared with similar surfaces which were not so clearly defined.

As well as the inherent observation of form in architectural composition colour also played its part under the bright clear skies of the south. Colour abounds in nature and it arrests our emotional and intellectual attention. A northern trained eye tends to be prejudiced against the use of bright colour since its lavish introduction would be unsuited to northern conditions which need more of the self-contained colour suited to the dull skies. No paper reproduction can adequately convey colour composition and in judging this question national taste has to pay due regard to local climatic conditions. The use of colour was a common practice in Greek architecture. W. Harvey - a sympathetic observer of colour in the architecture of Southern climates whose work at Athens involved the observation of applied colour - states: ¹ "My work involved the examination of Coloured Ancient objects and impressed on me the fact that the Ancient peoples of Greece had considered colour an essential of architectural expression. The displacement of the sombre of permanently coloured terracotta eaves tiles by marble tiles decorated with gayer though fugitive colours seem to have been an instance of the interplay of structure of colour in which the beautiful triumphed over the logical."

The pitch of the temple roof is accentuated and treated with architectonic decorative forms so as to emphasize the structural elements in a 'classical sense'. The decorative moulding is also architectonic in composition — thus the purpose of the building aids the poetic expression of its structure. It is not merely the art of covering a space, but has gone one step further into space composition. The fusion of the craftsman and the artist gives a sense of complete satisfaction and the quality of composition in Greek classical architecture is universally recognised.

However, while we admire and appreciate the proportions of classical architecture it is idle to reproduce its elements in a slavish convention. The inspiration of supreme architectural logic should guide us to a different expression in accordance with the demands of different climatic requirements.

Examples of classical architecture are abundant and the temple stands as the representative symbol of classical achievement. In the Parthenon we seem to see the essence of all temples. Their variations enrich the studies of a scholar, but the intrinsic quality of this shrine is sufficiently inclusive in itself.

The other accomplished achievement of inspired management
is the Pompeian house. Although this belongs to the Roman period, it represents a highly finished building achievement of classical domestic architecture. In no instance did the Mediterranean southern type of climate find a more suitable or congenial expression than the Pompeian house. It combines the Greek peristyle court with the Etruscan atrium into a unified design. It reflects the consolidation of the prevailing southern type of court-yard house throughout the historic period, a masterly simple composition of open air and sheltered room arrangement. The central space or atrium in the Etruscan plan was proportionately more covered, there was only a central sky opening. The amount of light and sun to enter this sky aperture makes its surroundings lively. The balance between light and shade is suited to the climatic environment of the small patio houses of Mediterranean southern latitudes. Such an arrangement would be most unsuitable in the rain and cloud of a northern climate. When attempted in planning it has no practical open air living purpose and tends to become

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(1) Prof. D.S. Robertson states that the Atrium is not a room tending to become a court but a court so constructed that it might be mistaken for a room. In Pompeian house he writes, "It seems more likely that the old Pompeian type is in origin a Country or Village house, with minor rooms grouped round a Central Hall, adjusted to the cramped conditions of town life, and beginning, when we first meet it to feel the influence of the entirely distinct Greek Peristyle type. Greek and Roman Architecture, second edition, Cambridge, 1943, p.305."
a mere area to introduce light into the surrounding rooms. In the Pompeian house the atrium space results in a lofty hall compact and vertical forming a pleasant composition with the low and more airy peristyle volume. It also acts as a transition between narrow street and the spacious nucleus of the domestic apartments beyond. The combination of two plans has resulted in a classical prototype of a Mediterranean house with contrasted light and shade and imaginative planning. At the same time, it retains the charm and intimacy of the domestic scale. The wider peristyle with its surrounding area of shade forms a space treated in terms of horizontal composition. The garden is appropriately defined and yet completely open to the sky. The whole composition should be an inspiration to present practice capable of variation in size to a similar theme.

The similarity of Pompeian house in planning arrangement is of a reverse order to that of the Egyptian temple. The space relationship between the varied volumes of forecourt, hypostyle hall and sanctuary in the Egyptian order suggests the solemnity of ritual symbolism. There is a tendency to replace the clear light of open air by darkness but this primarily for reasons of shelter and protection against the severe rays of an extreme type of Mediterranean climate. By way of contrast, the architecture of a Pompeian house reflects the conscious enjoyment of open air life.
Outdoor living and enjoyment meant the establishment of cultural and recreational facilities. The open air theatre is representative of a set of social conditions fostered by climate. The architectural expression was sympathetic to landscape conditions. Site was chosen on a sloping bank and the necessary requirements were met by appropriate terracing. This sensitive response to environment in an orderly arrangement ensured that buildings were not imposed unnecessarily. But when a theatre was constructed on a plain as in many Greek and Roman examples, enclosing walls were specially constructed which afforded a scope for structural architecture decoration.

The planning of other establishments for social and cultural purposes followed the type of central rectangular court surrounded by colonnades with adjoining rooms as seen in the Palaestra. Olympia provides the best examples of this type. The place of the Gymnasium in the physical and cultural attainment of the Greeks is evident from the sculptural wealth of statues representing the ideal natural figure.

(1) Robertson, loc. cit., p.105. "The gymnasium was the meeting place for athletic practice. Its characteristic form was that of a number of porticoes and rooms round a rectangular open space, often surrounded by a cloister colonnade: it had some influence on the Roman Baths."

(2) See A. Marquand, Greek Architecture, Chapt. VI on buildings for social and cultural purposes. Detailed description of Palaestra, p.325.
in a lasting inspiration to the whole world. Moreover the
discourse of Plato on the place of gymnastics in education is
a literary and philosophic evidence of the conscious thought
with regard to nature and living in the city urban state. The
outdoor activities of the Greeks were fused in a harmonious
living with nature. Thus their life became an education of
soul and body in response to environment. This is the great
achievement and lesson of the Ancient Greeks.

The Agora was the focal unit of the town. Just as the
court was the unit of home activity, so the Agora was the
central congregating space of the many homes that made the
town socially. The Agora corresponds to the town civic centre.

Aristotle mentions such a function in the type of free Agora
where people assemble to hear proclamations and attend civil
and religious functions. The other type he mentions is the
commercial one for transaction of public or private business
enterprise. Temples, statues, public fountains, the
Bouleuterion [Council House] Prytaneum would be grouped within
the civic type, while shops and stalls and open air shelters
form the elements of the commercial agora. More simply, the
sanctuary and the market in a city were separate. In these

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(1) Aristotle, Politics VII, XI.2. "Agora of the kind cus-
tomary in Thessaly which they call free Agora, that is,
one which has to be kept clear of all merchandise and into
which no artisan or farmer or any such person may intrude
unless summoned by the magistrates. It would give amenity
to the site of the Gymnasia of the older men situated
there." The Agora for merchandise must be different from
the free Agora and in another place; it must have a site
convenient for the collection there of all the goods
sent from the sea port and from the country."
civic units the surrounding portico or stoai acted as a sheltered gallery, in another sense as a roofed covered way for protection from solar rays in summer and sudden showers in winter. The formal, regular, unified composition owes a great deal to the trabeated form of construction. It produced straight constructional lines which inspired classical town planning reflected in the Hippodamian rectangular plan. However in contrast to the classical, vaulted buildings with structural difficulties evolved a different type of unity in a less formal presentation. The position and function of the stoa, "a most important plan unit of Hellenistic time"¹ is discussed by E. Norman Gardiner ² who sums up by saying: "These stoa were a distinctive feature of Greek life. We find them in all places of public resort, in or around the Agorai, or the Gymnasia, in Sanctuaries like Olympia and Delphi. .... They served many purposes. They were lounges or promenades where people could walk sheltered from the heat or the rain and watch the busy scenes outside."

The construction of the stoa at various levels of a sloping site called for a type of more than one storey to form upper walks and seating shelters. The stoa gives a

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² E. Norman Gardiner, Olympia its history and remains, Oxford, 1925, p. 275.
unity to informal grouping of buildings by repetition of the classical order. This must be imagined in the sacred enclosure at Eupidauros for instance where the temples of Asklepios and Tholos (a circular building) are situated. Colour and sculpture give the necessary individual articulation in a basically unified composition. The new curvilinear arrangement of the same classical column introduced variation with a different rendering of light.

Colonnaded streets which are found in many of the Greek city settlements are an attempt to express in architecture the climatic need for protection from summer sun and winter rain. They are an extension of the same idea of the portico surrounding the open spaces. The colonnaded avenues of Antioch, Baalbek and Palmyra in the Eastern Mediterranean are monumental examples of this practice. In order to understand their true significance such streets must be thought of as public open spaces which in this case happen to be lineal in form because of their use in processions. The functional climatic need for protection is carried out in an architectural monumental expression. Anyone familiar with the dangerous effect of the summer sun in these Mediterranean countries would realise the significance of such sheltered colonnaded avenues. In winter they happen to serve another function against rain showers. In this connection

(1) In the City of Baghdad at present the main street has consciously became a colonnaded one. In places where buildings do not have such protective columns on their ground floor great inconvenience is caused.
Bosanquet adds "The increasingly gorgeous and perishable clothing of the Hellenistic and Roman East was little fitted for exposure to the rain."

Tacitus comments on the long wide streets which Nero designed for Rome after the great conflagration. He writes: "That there were many advocates for the old system, as more conducive to health of the inhabitants, because the narrowness of the street, and the elevation of the buildings excluded the rays of the sun; whereas the more open space, having neither shade nor shelter, left the inhabitants exposed to the intense heat of the day."

As such details in Palmyra reveal, the treatment of the junction of colonnaded street was designed in a masterly way. The construction of walks for pedestrians corresponded in importance to modern road building. It is evident from the Greek practice that such walks were not limited only to ground space. Vitruvius mentions the Greek practice of constructing upper walks in their forums.

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(1) Bosanquet, Arcaded Street, T.P.R. Vol. 5 No. 4, 1915, p. 287.
(2) The Vicissitudes of the Eternal City or "Ancient Rome". G.I.W. Whiteside, translated from the work of Canina the distinguished Italian architect, London, 1849.
(3) See plan of Palmyra (Tadmur) Colonnaded street and details of junction in Vogue Pittoresque de la Syrie.
(4) Vitruvius, Book V, Chapt. I.
In Roman architecture the use of the colonnade is widespread in garden porticoes. Sir R. Lanciani maintains that porticoes are a characteristic Roman institution.

"At the time of Rome's greatest prosperity, the surface of the Campus Martius and of the Circus Flaminius, in fact, the whole area between the left bank of the Tiber and the Pincian, Quirinal and Viminal hills, was covered with porticoes, "Greens" and "Campi" twenty of which are especially mentioned by ancient authors. ... I do not know whether due consideration has been given to the special nature of these edifices," Lanciani adds, "stretching along the river from the foot of the Aventine to the region of the Vatican. They have been studied rather individually, one by one, and from this point

(1) Ancient and Modern Rome cites further details and particulars; should the reader lay before his eyes a plan of the Ancient City, he would see at once how easy and delightful it must have been made for the citizen to walk under shelter from the Forum Boarium to Hadrian's Mausoleum at the opposite end of the town. And the sight was enough to captivate even the most torpid minds. I have been tempted to some statistical data concerning this incomparable group. The extent of the twelve larger porticoes of the Campus Martius amounted to 4,600 yards; the surface protected from the sun and rain, to 28,000 square yards; the total area of the porticoes, central gardens included, was 100,000 square yards; the number of columns 2,000 or thereabouts. The columns were sent, cut from the rarest kinds of marble; their capitals were of Corinthian gilt brass; the pavements were inlaid with jasper and porphyry; the walls were adorned with statues, as reliefs and pictures, while the inner space was decorated with lovely gardens and clusters of box, myrtle, laurel and plane trees, intersected with lakes, fountains and water falls.
of view they appear to us sometimes as enclosures of temples, sometimes as Art Galleries of painting and sculpture or as meeting places for the fashionable idle youth. Their importance increases tenfold if we consider them all together as successive manifestation of the same idea as a part of a single scheme for the benefit of the public."

It is important to remember that they formed an integral part of the layout of particular civic and temple buildings. The idea of such covered places was so inherent in design that it is sometimes possible to move from one portico to another without any conscious planning to such a purpose. The purpose of these porticoes has once more to be related to the climate of the Mediterranean and the civic extension of the Metropolitan City of Rome. In the public park colonnade seemed as sheltering places to people of the metropolis to wander at the various seasons and various hours of the day, sheltered from rain, sun and cold.

Climate has its effect on the psychology and social outlook of people. Open air gatherings influence certain aspects of literature since oratory tends to replace the written word. The long winter evenings of the north favour the development of domestic arts whereas public places and institutions have a higher significance in the life of southern peoples. Here discussion often starts with an invitation for a walk and students often study or spend their leisure strolling under an esplanade.
Roman contribution to the civic aspect of architecture reached an outstanding level in its mastery of the problem of conducting water so vital to the Mediterranean city life. Besides domestic use, the Romans also erected Thermae and displays of water in public and private fountains. In this connection it is interesting to notice how far the structural work of Roman civil engineers attained a significant architectural quality. Bridges, roads, aqueducts, are a work of architectural design in the choice of building material and the relationship to the surrounding landscape.

In its civic development Roman architecture was expressive of grandeur and imperial magnificence. It signifies a march in civilisation and a divorce from Mediterranean culture since the small scale character of Mediterranean society is lacking. By comparison, the Greeks have captured more of the essential Mediterranean spirit in the scale and expression of their architecture and so it seems their culture is more truly Mediterranean.

This forms early evidence of the loss of the essential life vitality of a true natural culture which follows when the urban structure of society becomes independent of its natural environment. Planning for convenience and comfort is one spur to our intelligence yet work and comfort can never be separated. It is often more comfortable for body and spirit to work. This is especially the case when such
work is directed to a human purpose and given its due reward and appreciation.

Catering for large multitudes is always the dominant theme of that aspect of civilisation revealed in the forums, clubs and leisure establishments of Roman architecture. Therefore large areas for gatherings were needed in planning with wider spaced columns giving more room than the trabeated close spaced pillar and beam construction. The mixture of the two is a feature of a semi structural decorative style of Roman architecture in arch and beam construction that is often a factor of artistic enquiry and elaborate scholarly probing into derivative origins. This semistructural decorative style was copied in later revivals especially in non-Mediterranean countries with an effect of pronounced academism. 1

Axial arrangement was developed by the inclusion of the 'round shape' in planning. Restorations of great halls, the\(\text{\textdegree}\)s of Caracalla or Diocletian etc. show lofty interiors which are a feature of Mediterranean 'grand' architecture. The use of high quality adhesive cement produced a monolithic constructional effect which can be seen in the Pantheon.

\(1\) Where the colonnade was unnecessary as a protective surface in front of a wall such a columnar order was sometimes used close to the wall in a pilaster fashion. The column bay thus became a window bay, and windows are the important element in architectural design in Northern latitudes where there is little danger from the sun.
The planning arrangements of palace enclosures and town planning and composition is carried out on the extensive rectangular system of court spaces and cellular room distribution not very different from later practice in similar establishments of the Renaissance and Islamic periods. In the palace of Diocletian at Spalato, the Escorial near Madrid, or the Caliphate residence in Samaria there is a basic underlying similarity which comes from an essential uniformity in climate in space and time. This geographic factor rather than dependence on historic events should serve as the primary explanation. A geographic approach to history should serve us as guidance to any scholarly historical work.

Familiar theory of design and planning is discussed by Vitruvius. Proportion in relationship to average number of people likely to use the building would determine the size of Forums and meeting places. Convenience as regards planning and orientation is also stated. Catering for winter cold in the busy life of the market is a factor which Vitruvius mentions when he writes about the design of meeting places.

"Basilicas should be constructed on a site adjoining the forum and in the warmest possible quarter so that in winter business men may gather in them without being troubled by the weather."\(^1\)

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(1) Book VI, Chapt. IV, 1 and 2. Winter dining rooms and bathrooms should have a South-Western exposure, for the 

Footnote continued
A further comment by Vitruvius on house design in Northern and Southern latitude is mentioned in this connection. "In the North houses should be entirely roofed over and sheltered as much as possible, not in the open, though having a warm exposure. But on the other hand, where the force of the sun is great in the Southern Countries that suffer from heat, houses must be built more in the open and with a Northern or North-Eastern exposure."

In winter, the sunny side becomes the shelter in light daylight, while in the summer season, the reverse is the case.

Thus Vitruvius is reasoning in favour of the open type of house as it is represented in court architecture, while

Footnote continued:

reason that they need the evening light, and also because the setting sun, facing them in all its splendour but with abated heat, lends a gentle warmth to that quarter in the evening. Bedrooms and libraries ought to have an eastern exposure because their purpose requires the morning light, and also because books in such libraries will not decay. In libraries with Southern exposures the books are ruined by worms and dampness, because damp winds come up, which breed and nourish the worms, and destroy the books with mould, by spreading their damp breath over them.

Dining rooms for Spring and Autumn to the East; for when the windows face that quarter, the sun as he goes on his career from over against them to the West, leaves such rooms at the proper temperature at the time when it is customary to use them. Summer dining rooms to the North, because that quarter is not, like the others, burning with heat during the solstice, for the reason that it is unexposed to the Sun's course, and hence it always keeps cool, and makes the use of the rooms both healthy and agreeable. Similarly with picture galleries, embroiderer's work rooms and painting studios, in order that the fixed light may permit the colours used in their work to last with qualities unchanged.
he is also aware of the significance of a northern aspect as a shady retreat from the direct and indirect heat of the sun's rays. It should be evident also that the more northerly the latitude, the more important becomes the aspect of solar orientation.

Pliny's description of his villas of Laurentinum and Tuscanum furnishes the necessary background of social rules and customs which determined the design of these country residences with their facilities for pleasure and agriculture. 1 R. Castell points out that these villas were contrived according to the rules of Vitruvius for beauty and proportion - rules which apply equally in city and country. In respect of internal arrangement, the architect had to plan how best to enjoy the benefits and avoid the inconvenience of the seasons.

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(1) The Villas of the Ancients by Robert Castell, London, 1808.
CHAPTER V

CHRISTIAN ARCHITECTURE
PART III

Chapter five

CHRISTIAN ARCHITECTURE

Court architecture and the basilican church. The narthex. Cloister court an integral part of space composition in southern latitude churches. Basilican churches and regional character in the North-Western region of the Mediterranean.

Climate and church design in north and south. Effect of steep roof on design in the north. The buttress and window screen. Relation of roof to plan. Theory of the column order in relation to the structural character of North and South. Symbolic character of the roof in northern climatic regions.


Climate and the southern Byzantine character. The protective expression of thick wall is unimpaired by its decorative treatment compared with Northern skeleton framework wall design. Solid character of the dome shell in relation to southern climate. Extension of the idea of thick wall to the dome roof as protection against solar heat and light.

Effect of Mediterranean climate on available building materials. Tree growth limited by moisture and thus it is more to be found in Southern Western Europe and the Mountain regions. This
N.W. zone of the Mediterranean corresponds to the Romanesque style of timber roofed churches, known also as "Med. type" to distinguish it from the Near Eastern barrel and domed designs.

In general Byzantine architecture and its vaulted covering represents the 'vernacular' of the more arid Mediterranean region East and South of the Mediterranean, corresponding to "Mediterranean climate" proper of the geographers.

Terra cotta tiled domed roof covering Balkan churches and Turkish mosques. Byzantine rural and landscape character.

Byzantine domestic architecture. Stone character compared with mud-brick character.
CHRISTIAN

The transition from Roman to Christian brought about a new phase of architectural development. The church became the symbol of the new religious feeling, and art was its handmaiden; thus the Christian epoch marks a new trend after the Classical. The Romanesque style of basilican churches ensured the continuity of Roman architecture, since the need for a sheltered place of assembly had been met already in the basilican halls. These halls could serve their new purpose with but little constructional modification. Columns carrying arches or lintels, a wall pierced with clear storey windows above and a wooden roof that had no serious thrust remained the elements of construction. Different examples of the basilican type are distinguished by the size of column and varied decorative treatment. The columnar court which formed the peristyle in front of the basilican church remained unchanged. It is not necessary to explain this by referring to the inner meaning of certain pagan practices since climatic problems still created the same need for shelter against sun and rain. Plans of churches such as St. Clement's, Rome, and Old St. Peter's testify to this old solution of an old problem. Because of climatic reasons, a court in front was a convenience but when this was not possible, a narthex indicates a trace of the same idea.
In a less formal pattern of arrangement, the cloister is a similar development, and forms an integral part of Southern Medieval architectural layout.

In tracing a comparison between these basilican churches and the small farm buildings of the north western region of the Mediterranean there is an essential harmony and unity, since the architecture of the place of worship is an indigenous expression of the locality. The low pitched timber roof might almost be termed the 'vernacular' of Southern European architecture and it finds a further expression in the religious edifice thereby symbolising both regional character and a spiritual purpose. In contrast, the churches and cathedrals of Northern climates were designed with steeply pitched roofs involving a vaulted constructional design which influenced the plan in support and layout. Therefore the development of the wall to a buttress design and screen for large stained glass windows is a northern characteristic which is obviously unsuited to the Mediterranean climate. Though the Latin plan served as a model in the North it is important to remember the significance of roof design on the type plan of both regions. Simultaneous thought to both roof and plan is more in the practical and aesthetic nature of design in northern than in southern climates. The Medieval cathedral plans of the north become a projection of roof support,
whereas Southern practice effected a more generous vertical free standing poise in column design, bearing less weight from eccentric roof thrust. The column orders of the southern interior acquire a free standing character in harmony with an open air architecture. The structural beauty of the characteristic Northern Mediaeval cathedrals lies in the symbolic expression of roof design. Mediaeval cathedrals might thus be termed the 'vernacular' of the Northern climatic region and as such take their place as a homely symbolic creation in the same way as cottage architecture expresses the convenience and the spirit of the North. And here again cottage and cathedral have an intrinsic quality that bring them into a climatic regional unity. Although the constructional principles involved might be inspired by the South East, and although they were enriched in details and mouldings adopted from Mediterranean origin, the Northern Mediaeval cathedral attained a local artistic quality representative of northern climatic conditions.

In the Eastern Mediterranean churches developed on different lines from that of the basilican type, forming a new architectural church expression known as the Byzantine style. The structural principles of this style were practised in the Eastern Mediterranean long before the rise of Christianity. In church design the development of the Byzantine style played
an important formative role in the religious art of the Mediterranean. It is native to the Eastern Mediterranean region, i.e., the fertile Crescent, Northern Arabia and an extension further east in Persia. The subject of early Christian art, its development East and West, and theories about its origin have occupied the attention of many scholars. Conflicting views on the subject are represented by Rivoira and Strzygowski, Rivoira stresses Italian and Roman origins, while Strzygowski opens a new horizon and penetrates eastward to Mesopotamia and Persia, the cradle home of dome and barrel vault development. Half way compromising views have also been adopted but all these theories tend to involve a mere historic rather than an artistic comprehension of architecture. In this connection it is worth while stressing that architectural discoveries after the First World War tended to explore new historic evidence of cultural inter-relations in the Eastern Mediterranean area, a study which is yet unfinished and awaits future scholarship.

The latest classical epoch known as Hellenism was the

(2) "Hellenism" - "to speak the language of the Greeks." The German historian J.G.Droysen introduced the fashion of using it to describe particularly the latter phases of Greek culture from the conquest of Alexander to the end of the Ancient World when those over whom this culture extended were largely not Greek in blood. [Encyc.Britannica.]
period immediately preceding the rise of Christianity. In
turn it influenced and was itself influenced by new sur-
roundings. This late classical development found a congenial
home in Syria. The use of the architectural decorative carv-
ing reflected a new enrichment on the classical period. De-
corative carving and its emphasis was a new element for the
classical plastic composition. The transformation of the
Greek architectural spirit of the classical trabeated style to
an arcuated structure is a notable aspect of Hellenistic
architectural development east of the Mediterranean. It is a
too departure from Roman style and the Vitruvian proportions ob-
viously affected by the deeply rooted traditional method of
arch and vault construction which did not lend itself to the
same degree of formal expression. This is a noteworthy in-
stance of the infiltration of a classical spirit in archi-
tecture and its adaptation to a new structural inspiration.
In Syrian church design we see a new Greek classical inter-
pretation distinct in quality from the accepted Roman clas-
sical architecture.

The major contribution of Byzantine church development is
the advance in constructional method afforded by covering a
square space with a dome: the curvilinear forms and contoured
skyline were therefore the central feature of Eastern archi-
tecture. In the course of constructing domes over a square
space various treatments would develop. Individuality was attained and emphasised as a result of the technical skill necessary in each particular roofing. It is through this structural design that Byzantine architecture acquires a degree of picturesque informality and lends itself to irregularity imbued with an underlying harmony. Certain methods of stylish construction were evolved in the process of methodical transition from the square plan to the circular. An octagon is nearer to the circle than the square, the angles of wall corners could be treated by corbelling, a series of arches were built across from wall to wall in what is known as the squinch method – all these methods suggested various decorative design. The well known pendentive method was consistently used in the domical construction of churches. A representative monumental example is the great Byzantine monument of Hagia Sophia.

The focal interest of a central dome marked a notable development in interior design since there was a new opportunity for covered space composition. It also invited consideration of the relationship and treatment of the varying sizes of domes and semi domes in the general composition. Moreover, new and interesting perspectives and variations in level which were somehow lacking in classical architecture added to the interest of the natural and urban landscape formation.
Since the raised Byzantine edifice exposed a large area to the sun's rays, the thickness of the wall was accordingly maintained throughout. The size of window opening in relation to wall thickness to allow reflected light to the interior and avoid the direct rays of the sun is to be noted. Furthermore, the slanting towards the interior on both sides of the aperture, helped to distribute the range of light received indoors. When windows appear large it is important to note their subdivision treatment. Compared with northern practice they were more in the nature of stone slabs pierced with holes for light. This distinguishes and greatly affects the character of southern architecture. It has already been observed in Ancient Egypt and a further discussion of this type of development in Islamic architecture will be dealt with more fully in a later chapter. Climate has affected the architecture of the wall. It is noticeable that when decorative art was applied to the wall its structural function was left unimpaired. The character of a skeleton framework is completely absent, and the dominant aspect of the wall - as well as the roof covering which in this domical expression is an extension of the wall into a curvilinear shape overhead - is to defy the heat and glare of the sun. This is a significant fact which distinguishes southern architectural character.

The Byzantine style of architecture acquires an intrinsic
regional character in the markedly arid climate of the Mediterranean, while Romanesque style is expressive of a more moist region of the Mediterranean. The explanation of such regional character could be looked for in the influence of climate on the possible building material. In the relatively moister region of the north west and higher altitudes, it was possible to find timber for building purposes. Its logical use for roofing affected the architectural character, whereas in the more arid region the lack of timber and the cost of its transport in bulk for common building use resulted in the dependence on stone to cover roof spaces. This suggests that the Byzantine style of architecture acquires a general intrinsic quality in the Mediterranean because of the climate.

The curved barrel type of roof is to be seen in many Mediterranean localities, distant rural places, where there is no evidence of possible inter-connection. It was, rather, the intuitive solution suggested by similar local climatic conditions.

An interesting fusion of the Mediterranean tiled roof and Byzantine dome is to be seen in the tiled-domed roofs of many Greek churches and even domed mosques in Asia Minor, as well as elsewhere in the lesser known rural dwellings. In such compositions as Kaisariana, S. John, Attica, Evangelistra, Mistra and many other Greek churches, the spirit of Mediterranean architecture in church design is inherently reflected.
In the sphere of domestic architecture communities continued to build in the same unchanging manner. The use of local material and the demands of climate were still the primary factors to be considered although doubtless economic reasons of personal wealth played their part. The domestic character of Byzantine architecture\(^1\) is dependent on stone and the simple structural methods employed. It is interesting here to notice the influence of stone on the architectural style compared with mud clay bricks. In both the dominant character of the wall surface was rarely interrupted by voids. In the former, a method of stone projection and recessing was the more or less naturally suggested way of wall design. Thus a bold corbelling method of construction, bays, cornices and decorative art are features of Byzantine domestic architecture. The use of sun dried brick or mud building material suggests a development of stucco ornament. These remain potential building materials and must be interpreted in architectural expression so as to reveal more or less their true and inner potentialities. When using stone material the corbels projecting on the outside retain shape and form, and cast a clear shadow. The effect of such projections with regard to the weathering process is a factor which has to be noticed in the relations of building materials and their resistance to weather forces.

\(^1\) For Byzantine houses see Beylie "L'habitation Byzantine" well illustrated with sketches, restorations and photographs.
Domestic, cultural and religious life were often fused in the activities of monasteries. An architectural record of the design and layout of such establishments, would be a valuable asset to the student of architecture. It is another task that remains to future study. The column is the typical classical contribution to Mediterranean architecture, whereas the architecture of the wall and dome represents the Byzantine and Arabian contribution where craftsmanship plays a significant part in design. A combination of both classical and Byzantine, the column and the wall, is a synthesis of composite architectural arrangement in adjusting open and sheltered spaces.
CHAPTER VI

THE RENAISSANCE AND THE MEDITERRANEAN CLIMATE
Chapter six

THE RENAISSANCE AND MEDITERRANEAN CLIMATE

Renaissance architecture in Italy and the Gothic style in the North. Comparative climatic observation in Northern and Southern development of Renaissance architecture.

Because the elements of ancient classical architecture were evolved in response to Mediterranean conditions of climate, their revival, continuity and development were natural and logical. Elements of Gothic design and their response to Northern winter conditions. The high pitched roof construction of the North and its architectural expression during the Renaissance in non-Mediterranean countries. The dormer window and mansard roof in the European Renaissance compared with the classical roof and balustrade of the south. Classical details in northern climates and the need for their climatisation. Critical approach and analysis of architectural details in response to regional environment should be within the scope of active stimulated fine art studies in architectural scholarship.

Southern Renaissance in Spain and Italy. The court in northern and southern architecture. The Renaissance court with its fountain is a constructed open air lounge. Fountain the symbol of a southern climate and in a similar sense to the fireplace, a symbol of the cold north. Lofty interiors and columnar porticoes in south and north.

The Renaissance both a revival and a development. Arab influences reflected in Venetian art. Influence of stone craftsmanship and decorative art on Renaissance development. "Quattro Cento" architecture.

Baroque tendency and the Mediterranean; decorative and structural composition of baroque design moulded forms and their architectonic integrity. Arabesque excessive flat surface treatment in "Eastern Baroque" or rococo manner.
Alberti's discourse on urban and country planning. The avenue and court in Renaissance country palaces. Development in external civic composition; court in Renaissance architecture compared to that of Islamic planning. Social function of street and open spaces. Gateway entrances to streets and squares. Medieval concept of enclosed units in town planning compared with baroque excessive dramatization.

Street shelter and the colonnaded bridge. Upper floor porticoes and their social function. Regional planning devised by Alberti. Climate and the choice of a town site; effect of wind on site and topographic observation: hill sites and higher altitudes. Reflected heat on a town from rocks. Evaporation and ventilation in enclosed river or lake sites. Possible to adjust relative humidity by planning. Convenience in buildings with regard to climate. Ancient devices.


Alberti on the properties of building material. Effect of weather on stone quarrying. Various uses for timber according to type of wood and resistance to climate.

Water in civic planning. Importance of aqueducts in the life and 'climate' of a city. Mediterranean country residences and gardens of the Renaissance period reflect a notable aspect in secular grandeur in Mediterranean conditions: stone terraces, balustrades, loggias, water treatment in fountains, cascades, etc. Little change in the architecture of Mediterranean peasant communities throughout history.
THE RENAISSANCE AND THE MEDITERRANEAN CLIMATE

The relationship of climatic environment and architectural development during the Renaissance should be a significant aspect in the historical study of architecture. Italy was the home of the Renaissance, and the response to Mediterranean conditions of climate was expressed in the requirements of planning and the massing of buildings. Architectural writers emphasise the fact that Gothic architecture never found a home in Italy. This truism follows naturally from differences in climate and the consequent effect on architectural forms and building construction. The example of roof design and its influence on plan and pier design in the North has already been cited in this connection. The steep roof of English timbered halls for instance is a dominant form in the relation of architectural composition to the landscape. In France, the roof design of cathedrals, palaces and chateaux achieved a characteristic form expressive of the national architecture. This in turn influenced the early expression of the French Renaissance. Thus the high pitched gable received classical dressings and characteristic Renaissance detail.

The dormer window was the logical outcome of deep pitched roof space. The resulting skylines are quite different from the low-pitched classical roof and the Italian balustrade.
The well known Mansard roof for example represents a logical architectural adaptation; it is however a form evolved in response to the climatic conditions of the North.

In this sense the Renaissance in northern and central European countries, or even the northern latitudes of America may be regarded as an attempt to use classical elevations and details in the solution of a different structural roof problem. It took time before these motifs and details were absorbed and nationalised. They were not primary forms in the sense that they had not evolved in response to a direct structural and resulting aesthetic need. They were more dependent upon classical monumental architecture and therefore one must look to the less well known examples in the various countries for the question of climatic influence on architectural forms.

The degree of climatisation of derived architectural detail is of real concern in this connection, and it is perhaps unfortunate that this point has not been given due attention in art scholarship. The details or architectonic phrases of classical architecture must have an underlying harmony with nature and the surrounding air and light. Then what might have been a stale and lifeless pattern will be imbued with colour, form, texture and woof. This should not mean creating a renewed state of intense reaction or classicism versus romanticism. But the artist does need a stimulating
study of environment, and climate is primarily responsible for the making of physical environment. Artistic objectivity would be helped by a renewed sensitivity towards form and detail in the proper setting of its climate and landscape.

The Renaissance gave Western Europe a rich architectural legacy; yet later on misapplied scholarship resulted in a "Battle of Styles". In the heat of the struggle, the architect stood in danger of forgetting that continued architectural development must have its roots in a response to the permanent conditions of physical environment. A similar position exists for the arts today.

The Renaissance revived and adapted the elements of classical design of a former era rooted in the physical conditions and artistic inspiration of the Mediterranean climate. It led to an amazing stimulus and development of artistic appreciation in Italian society; and in Florence particularly it became a representative of Western Mediterranean European culture.

Spain was influenced by Italy and easily absorbed the Italian lesson since climatic conditions had already created similar problems of plan layout and living needs. Though the expression varied in these two regions, the difference was largely the result of decorative art and local craftsmanship. Whereas the Florentine school represents the pure intellectual form of the Renaissance, Spain was influenced considerably by
the Arabesque from Islamic architecture.

The principle of mass distribution round central courts and the relationship between open court spaces reflects the layout pattern of Mediterranean practice. Renaissance civic art is similar to its predecessors and consists largely of an attempted court composition. When such layouts are transferred to Northern climates they acquired a different meaning because of their different use. For instance, the colleges of Oxford and Cambridge represent a high order of court composition in cultural and domestic plan units. Here the treatment of open spaces is often characterised by an informal stretch of lawn. Courts are to be spacious enough to allow sun and light to penetrate to the interior. The relation of glass window design to light affects the character of these courts and makes them a homely inspired design. The self contained idea and civic architectural interest are important acquired aesthetic considerations in favour of such court composition in the North. Adaptation of southern arrangement to Northern practice must be related to the significance of climate.

The proportions of the domestic court in Spain and Italy and the rest of the Mediterranean region is obviously unsuited

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(1) In this instance it is probably significant to mention the law concerning "Ancient Light" legislation designating the significance of light in northern architectural practice.
to Northern conditions where the particular quality of Mediterranean light is missing. Besides the more southerly in latitude the larger the angle of the sun, and so more light is able to penetrate to the small court. In the Northern latitudinal regions during the winter season, when the hours of daylight are few, planning for light becomes an architect's chief concern. Because of climate, Renaissance architecture was suited to Mediterranean Europe, where it expresses the required coolness. The court with its central fountain could never become a living salon in the North. Instead it acquires a different function and usage and with this a different name of "courtyard". Whereas in the North building for warmth brought the fireplace as a focal point in interior design, there is an almost instinctive preference for an open fire in the architectural interior. Besides its substantial warmth, the quality of light seems to compensate for the long winter evenings. As the fireplace is a poetical expression of the domestic interior, so the chimney in architectural design contributes a great deal to character of Northern towns and villages. In the rural communities and isolated manor houses of the North, rising smoke is the welcome evidence of life and human occupation; in a parallel sense the gush of water from fountains is a symbol of the same.

Because of this underlying need to cater for warmth, the design of the interior would be affected. Lofty interiors
are difficult and costly to warm and as such unsuited to Northern character in architecture. The lofty columnar portico designed to allow the free flow of air and to exclude the direct rays of the sun is unsuited for a primary element of design in the North.

Renaissance architecture, reflecting the social change, bears a dominant secular character. The monumental scale now serves the individual in the erection of palaces and self-contained establishments, embodying the development of a consciously urban society in the Mediterranean.

Although such architectural forms as the 'orders' had been created to meet the especial needs of Mediterranean climatic conditions, they tend to suffer because of a feeling that they are merely standardised elements of architecture. But the Renaissance was by no means a mere revival of the preceding forms of the classical age. Contact with the Mediterranean during the middle ages ensured intercourse with the Arab world and the Islamic art. This is reflected very clearly in the Venetian school, another primary source of the Renaissance in Italy and Western Europe.

Venetian architecture fuses a great deal of derived Islamic art in its composition. This particular quality distinguishes it from the purer European development in Florence, where it was more of a conscious intellectual revival.
The transmission of Arabesque into the stone architecture of the Northern Mediterranean resulted at its best in a different architectonic character inviting craftsmanship that helped to express the inherent quality of the stone building material. Plasticity of composition acquired a more stable decorative form with textured interest. Stone was not just the means to express content, but it becomes a potential source for expressing feeling. It results in what Robert Byron would call a "static composition" in comparison to the mobile composition where decorative art, however free, never impairs the movement of the primary structural forms. It is important in this connection to relate such a composition to Mediterranean climatic conditions, particularly in the further South and Eastern regions where expression of thick walls necessitated such an attitude. Even in baroque which is supposed to bring movement into the composition, the climatic character of the south seems to obliterate such movement.

A love for stone and its carving resulted in an architectural sculptural façade that enriched the architecture of the early Renaissance. It is this 'blossoming of stone' that Adrian Stokes describes as the Quattro Cento. Their

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(1) "Appreciation of Architecture".
(2) Adrian Stokes "Quattro Cento" is a stimulating study of 15th century Italy by an artist carried away by the inherent quality of stone.
aesthetic value is distinct from what might be regarded as a plastic tendency in Baroque conception. The outward expression of Quattro Cento reveals an inward potentiality whereas the Baroque tends to become first an outward exposition.

The Baroque reacted against a repetition of the 'orders' in a prescribed sense. It brought movement and a new expression into composition by a generous use of space. It was bound to be mainly urban and was sometimes carried to a pitch of excessive nervous exhaustion. When "intellectual romanticism" begins to be conscious of itself in an imposing manner, there is a lack of harmony with Mediterranean rural environment. The limitation of the Baroque resulted largely from its insistence on grand schemes in the grand manner to suit a sophisticated urban life.

In regard to the understanding of the general term Baroque it is important to distinguish the elements of its composition. It is usually associated with a profuse indiscriminate decorative art in architecture which lend itself to overburdened architectural façades. In artistic composition however, there is no limitation as to the place, method or style of decorative design. A master architect, like a good

(1) Geoffrey Scott "Architecture of Humanism"
composer who is able to create a composition provided he has acquired an inherent mastery of the primary elements, can reveal the beauty of details providing they enrich without destroying the essential theme and its structural simplicity. In a profuse composition this simplicity can be attained largely through the proper understanding and use of building material. Architectural decoration while possessing the poetic expression should also have a relevant meaning. It requires a sense of fenestration in design on the part of the architect. In southern architecture where the mass of the wall is unimpaired by frequent window openings, decorative art and surface variation becomes a distinguishing feature. Doorway openings, in particular, invite decorative fenestration, and curvilinear movements in scrolls of various motives could express a note of emphasis and variation giving the building an integrated individual expression, provided they are well proportioned and well designed in relation to the integrity of material in use.

The Baroque style in the Mediterranean may be classified broadly into two types. One which may be termed 'Classical' is three dimensional in decorative form and mouldings. The other 'Islamic' or 'Eastern' type is primarily concerned with the profuse arts of recessing, carving and inlaying. An indiscriminate combination of the two styles to enrich buildings is often excessive and tiresome and in itself could
form the subject matter for lengthy historical and artistic investigations. The moulded, or plastic, three dimensional form is largely confined to the moister European region of the Mediterranean while the flat treatment is usually associated with the more arid lands. This Eastern Baroque treatment will be discussed more fully in a later chapter.

In both types of Baroque treatment there is a tendency to glorify space. When the composition shows that insufficient regard has been paid to building materials, the joint structural integrity, there is an artistic failure. However, broad generalisation is misleading and criticism is more valid when based on discussion and analysis of actual examples. If one is to derive a creative impulse it is particularly important that artistic analysis of the elements of this style should achieve more effective and less personal criteria for judgment. The subjective approach must give way to a more active art scholarship of the future.

Leon Battista Alberti's De Re Aedificatoria\(^1\) is a primary source for understanding the principles of Renaissance architecture and the development of the concept of the "ideal" city. Alberti's treatise is not only a work of architecture but also of philosophy, as he emphasizes the importance of beauty and proportion in the design of buildings.

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\(^1\) The Architecture of L.B. Alberti in ten books translated into English by J. Leoni. See also an article in T.P.R. Autumn 1943, Vol. XIX, p.10-28 by Mr Eden. Although this does not attempt to relate the significance of Alberti's work to Mediterranean climate, it reveals a high understanding of the importance of both theory and practice of architecture in regard to society.
Renaissance source for urban architectural theory and practice. It follows in the footsteps of the ancients yet marks the beginnings of the modern age of architectural scholarship. Some aspects of this work are worth discussing since they are connected with Mediterranean practice, and urban theory and trace the start of regional planning in Southern European Mediterranean conditions. He discusses the relation and grouping of buildings to a civic purpose, the connection between architecture and politics. This conscious attempt marks the start of modern urban theory. It refers extensively to the work of the ancients thereby serving as a source of architectural theory and practice, while at the same time it is concerned specifically with Mediterranean conditions.

Alberti writes of the wisdom of the ancients with a sense of moderation and appreciation, and his idea of a city may well be compared with the ideas and attitude of Plato's Republic. "So our design is to describe and illustrate by examples", writes Alberti, "such a city as the wisest men judge to be in all respects the most convenient, and in other respects accommodating ourselves to time and necessity, we shall follow the opinion of Socrates, that whatever cannot be altered but for the worse, is really best."

(1) IV, ii.
Buildings of public or symbolic importance must receive the attention due to their character, and Alberti writes "In the whole compass of the art of buildings, there is nothing in which we ought to employ more thought, care and diligence than in the laying out and adorning of a temple." Other instances are cited for buildings for citizens acting in a position of public responsibility. The relationship of politics to urban theory is bound to influence town composition. Religious grandeur of Medieval architecture began to give way to the familiar secular expression (typifying the new political life) of Renaissance civilisation. In architecture, this development is reflected in the avenues and court compositions of palace layouts. It is an elaboration of the same Mediterranean theme against a new social background.

Urban street elevation is an important Renaissance development. It reflects an extension of the idea of the interior requirements of court architecture to the architectonic idea of a city and in this respect it is not confined to urban architecture of the Mediterranean only. On the contrary Renaissance inspiration was less Mediterranean in extent and became more widespread in later North-Western Europe. Such civic development in Nancy, Bath and London squares, or Colonial Arch of New England in the American Northern Hemisphere, all illustrates a high development of civil and ethical order in (1) VII, iii.
architecture. There is an even greater need for such a developed civil order in Mediterranean towns. The street and square are living spaces in the main life of the Mediterranean. Not only do they satisfy man's material comfort but should give him a spiritual and aesthetic satisfaction derived from living amongst them. "For this reason", Alberti writes, "I would have the meadow, the portico and everything else so laid out, that nothing whatsoever could be better contrived for recreation." On the lighting of the public spaces Alberti goes on to say, "In winter let them receive the kindly beams of the sun, and in summer be shady and open to gentle refreshing breezes."

The social function of the open space in the square is to be thought of in somewhat different terms from the present one-sided concept of technical and transport efficiency. In a Mediterranean climate it has a special significance as a living space. "One of the greatest ornaments of a square or of a cross way, is a handsome portico, under which the old men may spend the heat of the day, or be mutually serviceable to each other, besides that the presence of the fathers may deter and restrain the youth, who are sporting and diverting themselves in another part of the place from the mischievousness

(1) V. (viii)
and folly natural to their age."¹

The treatment of streets leading through gates recalls a similar function in the arrangement of the enclosed open spaces of the mosque where gateways are the sign of street openings. In later Renaissance practice and Baroque development the pictorial concept of a whole resulted in a diminution of the importance of the square as an enclosed independent civic unit. The series of effects of independent spaces were a feature of Medieval practice, and Alberti was well acquainted in this stage of architectural development with the Medieval practice in town planning prior to the Baroque. Arches were built where the street opens into a square. "A very proper situation for an arch is where a street joins into a square and especially in the Royal street, by which name I understand the most eminent in the city."²

Alberti also refers to the ancient practice of providing terraces with porticoes at the top of Greek forums or markets.³ These serve as a pleasing promenade. At times of festivals and shows the colonnades are gathering and seating places for organised activities.

The need for street shelter is projected into the colonnade bridge which thus becomes a reflection of civic architecture.⁴ It is interesting to notice an extension of the idea

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(1) VIII (vi)
(2) VIII (vi)
(3) VIII (vi)
(4) See illustration of the roofed bridge after p.62. The colonnade arrangement over 3 pier voids forms a pleasant architectural composition.
of colonnaded street to bridge design. "The Adrian Mole" or covered bridge mentioned by Alberti is an example of the classical order carried into bridge design.

The account of a choice of site under Mediterranean conditions which Alberti discusses is particularly valuable in the light of modern practice. The enquiry shows the importance of establishing a right relationship between science and civic art. Alberti analyses the sum of past enquiries and the evolution of scientific knowledge. His account of the scope and equipment of the architect is inspired by Vitruvius. Mr Eden comments on this point when he states, "Thus we see that the work of an architect, for Alberti, included a very wide range of activities. It is important here to notice that these various activities are cited by way of amplifying the definition of architecture rather than of extending the province of a known art.\(^1\) Thus architectural practice requires the broad sense of observation into geographic and economic spheres.

The region of city settlement must be chosen with regard to the quality of air and condition of wind which can be gathered from practical observation. "When walls of the neighbouring buildings grow rusty and rugged it shows that

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some malignant influence has power there. The trees too bending all one way as if by general consent, show that they have suffered the force of high rough winds.

A region so exposed to the furious assaults of tempests is to be avoided as the very worst of all: for if the bodies of men are seized with too excessive cold or heat, the whole frame of contexture of all the parts is presently broken and dissolved and falls into dangerous distemper and immature old age.

A city standing at the foot of a hill and looking towards the setting sun is accounted unhealthy more for this reason than any other that it feels too suddenly the cold thrilling breezes of the night.¹

Healthy animals and good crops will indicate a suitable area for settlement and Alberti attaches such an importance to a suitable quality of air that he comments "It is even observed that they who draw a pure air have a better understanding than those who breathe a heavy moist one: which is supposed to be the reason that the Athenians had much sharper wits than the Thebans."²

When certain adverse wind conditions are unsuitable, Alberti emphasises the value of a suitable orientation of

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(1) I (v)
(2) I (iii)
the site. "I would have these winds come to me broken by
the opposition of hills and woods, or tired with long
journey, I would take heed that they did not bring any ill
qualities along with them, gathered from any places they
passed through."

After referring to the ravages of disease which the
ancient physicians Vairo and Hippocrates attribute to the
content of the air, Alberti declares that his choice of site
"should be healthy, wide, pleasant, various, secure and
abounding with plenty of fruits and great quantities of
water. ... Moreover, your city ought to stand in the middle
of its territory, in a place whence it can have a view all
round its country and watch its opportunities and be ready
whenever necessity calls, which may be convenient for the
farmer and ploughman to go out to his daily labour and re-
turn with ease laden with grain and fruits." The prevail-
ing note in this choice of site is one of avoidance of ex-
tremes, and yet it is important to remember that in contrast
to Northern climates he ends by saying that excess of cold
is better than excess of heat.

In regard to the relation of cities and sea, he refers
to Strabo, Plato and Aristotle and emphasises that "sites

(1) IV (ii)
(2) IV (ii)
(3) I (iv).
A wretched effort has been made.

A study of local topography has been made.

A certain number of the sea provided a study of local topography have some protection from wind and still enjoy the benefits. Such a statement can be allowed to stand, a sea site could be selected with a particular type of prestation when wind and that mentioned winds can not reach it. However, it is only in

Far off, let it be at least in some situation where the above

minutes distant from the sea, but if you cannot place it so

conclude with the analogous case for having a city standing at 10

and that which from the surface, that of heaven and that

By the sea, there are two sources of heat, that of heaven and that
upon a hill, we should take particular care that we are not exposed to one great inconvenience which generally happens in such a situation, especially if there are other hills near, which raise their heads above us; clouds to darken and eclipse the day and infect the air.\(^1\) He is thus aware of the application of natural physical science to choice of site. In this connection it is important to extend the relation of the science of natural physics to the problems of a town site. For instance, excessive reflected heat from certain types of rocks could be avoided provided proper attention is paid to calculations of orientation and other solar data which would help to alleviate such problems. Simple scientific observation could contribute a great deal towards cooling a city site.

If the city has to be built on a plain or river site, Alberti writes, "The best position for the city will be to have a river come in from the East and go out to the West, because then that breeze or gentle wind which rises with the sun, will carry the vapours out of the city."\(^2\) This relation of water to wind is an important factor in ventilating a city site. The degree of evaporation from water sources with regard to climate and relative humidity of the site is an important aspect of city planning. Alberti naturally emphasizes the importance of avoiding settlements near bogs, marshes

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(1) IV (ii)
(2) IV (ii)
or standing muddy water. At the same time he is aware of the possibilities of using natural forces to overcome these difficulties. Thus whenever the country is low, close and marshy, it will be of service to lay it quite open to the sun fair, because the damps and noxious animals which arise from such places will be presently destroyed by dryness and winds.

Discussing several inconvenient aspects of a closed site in a deep valley, Alberti states "If the sun shines in, you will be scorched insufferably by the frequent reflection of his rays which will beat upon you from every side and if it does not you will be dried and withered by the continual shade. Add to this, that if the wind gets in, being confined as it were in a channel, it will rage there with greater fury than in other places: and if it never enters, the air for want of motion will grow thick and muddy; such a valley may not improperly, be called a puddle, or bog of air. The form of the place therefore in which we intend to build, ought to be graceful and pleasant, not mean and low, as if it were buried below the rest of the earth, but lofty and as it were a hawk to look clear round about, and constantly refreshed on every side with delightful breezes."

(1) IV (ii)
(2) X (xiii)
(3) I (iv)
The influence of climate in its regional environment is a concern of the architect or town planner. It is not possible to lay down hard and fast rules about orientation or climate and town planning, and Alberti usually observes this consideration. A solution of any particular problem will lie in specific diagnosis related to those general principles which supply a co-ordinating theme.

Alberti's ideas on the influence of climate on buildings, the regulation of sun and shade and the need to plan primarily for summer conditions in the Mediterranean do not introduce new elements of planning. "Old men may chat together in the kindly warmth of the sun in winter, and where the family may divert themselves to enjoy the shade in summer", and "for indeed in my opinion a wise man should build rather for summer than for winter. We may easily arm ourselves against the cold by making all close and keeping good fires; but many more things are requisite against heat, and even all will sometimes be no great relief. Let winter rooms therefore be small with low and little windows and summer ones, on the contrary, large, spacious and open to cool breezes, but not to the sun or the hot air that comes from it. A great quantity of air enclosed in a large room is like a great quantity of water not easily heated."

(1) V (xiii)
In the eighth chapter of Book Ten he summarises the protective devices of the past with regard to overcoming the inconveniences of excessive heat. "The ancients made use of a great many defences against the violent heats, among which I am very well pleased with their crypts or subterranean porticoes, vaults, which received light nowhere but from the top. They were also fond of Halls with large windows turned away from the south, open to a cool air, and shaded by some neighbouring edifice."

The needs of summer and winter demanded a different treatment and different orientation in relation to sun and wind. Winter bed chambers should look towards sunrise, parlours in winter towards sunset and vice versa in summer. Alberti comments on the relation of windows to seasonal apartments. "In summer apartments, if the windows are to the north, they should be made large every way; but if they are to the south sun it will be proper to make them low and small. Such being best adapted for reception of the air and least liable and to be offended by the sun's rays — for that shade/not light is what is to be consulted there. On the contrary in apartments for winter, the windows will be best contrived for admitting the sun if they are made large and yet we may avoid being troubled by the winds at the same time, if we place

(1) V (xiv)
them high, so that the cold air may not blow directly upon
the people within.¹ This is of particular importance in
connection with the popular belief that all windows in
Southern countries must be small regardless of season and
aspect. It is important to think of the window opening in
the south primarily from the point of cooling air movements
rather than a source of light. In this sense the northern
meaning for window as a source of light is substituted in the
south by what is primarily an effective source of ventilation.

The need for protection against violent wind blasts has
to be considered. The small opening in an extensive wall
surface is an expression of the need for such protection.
Various convenient methods of planning are suggested by
Alberti with regard to the layout of an open site which
might be exposed to strong wind movements. Openings and gate-
ways are carefully situated in an opposite direction from the
prevailing wind. A garden wall in front of the house breaks
the first force. These elements form a contrast to the open
enclosures of the house itself. Moreover this type of
planning is by no means necessary in all sites. It is often
desirable to plan for coolness by allowing the highest possible
degree of cool air movement to penetrate within the house.
This suggests that the elevation faces the direction of the
prevailing wind. If the angle of a building faces the pre-
vailing wind, then a cooling effect is felt on both sides, and
whenever necessary the force of the wind is broken.

¹ I (xii).
Alberti gives an account of the constructional methods which will affect the design for cool interiors. "Moreover in order to make the shade the cooler, we may add roof to roof and wall to wall, and the greater space that is left between these, the cooler will be our shade and the more impermeable to the heat; for this interval between has almost the same effect for this purpose, as a wall of the same thickness would have, and in one respect it is better, because a wall would retain either the heat of the sun or the cold that had once penetrated it much longer, whereas these double walls will preserve an equal temperature of the air."\(^1\) This would lead to cavity construction which is discussed later.

Thick walls entailed special problems of ventilation and Alberti comments "In large buildings, where the wall is to be very thick, we ought to leave vents and tunnels in the lining of the wall, at moderate distances one from the other, from the foundation quite to the top, through which any vapour or damp that may happen to engender or gather under ground may have free passage without damaging the works. The Ancients in some of these vents were used to make winding stairs, as well for the sake of the beauty of the contrivance itself as for the convenience of going up to the top of the edifice, and perhaps too for the saving of some expense."\(^2\)

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1. X (xiii)
2. III (vi)
In his Second Book, Alberti discussed building materials and their properties. Again his knowledge is culled from the West of the practice of the ancients and the usage common to his day. "But the goodness of any sort of stone for this or that particular situation", writes Alberti, "is best learnt from use and experience; and you may much sooner come at their values and properties from old buildings, than from the writings and precepts of philosophers."¹ This point is well worth noting as regards the study of building materials in their own site and the effect of various climatic factors. Thus building materials and their properties have to be studied with a view to their weathering process as well as structural theories of balance. Alberti does not depend solely on practice without reference to scientific theory. In discussing the use of material, he always gives a scientific reason based on personal observation to justify his choice. "Cato advises to dig the stone in summer, to let it lie in the open air, and not to use it under two years. In summer, to the intent that it may grow accustomed by degrees to wind, rain and frost, and other inclemencies of the weather, which it had not felt before. For if stone, immediately upon its being dug out of the quarry, while it is full of its native juice and humidity, is exposed to severe winds and sudden frosts, it

¹ III (viii)
will split and break to pieces. It should be kept in the open air, in order to prove the goodness of each particular stone, and how well it is able to resist the accidents that injure it, making experiments by this small trial. 1

Writing on the use of building material in the solution of climatic difficulties, he advocates "In places where the sun is excessively scorching a wall built of pumice stone will admit the least heat and retain it the least time." 2 This is because of the amount of air admitted by such a porous stone.

Alberti gives abundant and useful information on the subject of the type of wood most suitable for use in building and what variety is best fitted for a particular piece of construction and in relation to a particular climate. 3 He notices the inroads made by ants and stresses a need for care in choosing a wood which will resist these ravages. In carpentry work as regards the use of two different types of wood, Alberti states "The Ancients were so far from joining together woods different in their natures, that they would not so much as place them near one another. And for this reason, Vitruvius advises us against joining planks of Beech and Oak together." 4 He notices the ways in which trees develop a

(1) III (viii)
(2) X (xiii)
(3) II (iv). See Alberti's account of details of Alder, Beech, Elm, Pitch, Cypress, Fir and Juniper and their structural use in architecture.
(4) II (iv).
certain resistance to wind and climatic factors. "They say likewise that such trees as grow in an open place, unsheltered either by woods or hills; but shaken by frequent storms and winds are stronger and thicker, but at the same time shorter and more knotty than such as grow down in a valley, or in any other place defended from the winds. They are likely to hold against the assaults of time. They should not be used under two years to the intent that you may have time to find out such among them as are weak in their nature and likely to damage the work, and to separate them from the good ones." 

This early enquiry ought to stimulate further study of the regional development of trees and their respective uses in regional planning.

Today regional planning schemes indicate the extension of civil engineering to farming methods. Alberti sees that these problems fall within the scope of the architect. He writes, "Some cases where the architect may be of service to the husbandman: as particularly when a piece of land being either too dry or too wet, is not in a good condition for tillage." 

Today we call these activities regional planning schemes and they reveal the similar nature of problems constantly recurring in the particular climatic region of the Mediterranean. Alberti describes his method for creating a meadow on a dry

(1) 11 (vii)
(2) X (ix).
deserted hill. "Dig a long square trench in the upper part of the hill, with its sides all equally high and exactly level. Into this trench bring water from the nearest spring above it, which running over on the lower side will equally and continually water the ground beneath."¹ In another instance he emphasises the great benefits man can reap from his own efforts in a deserted site. "In the country of Verona, a soil full of round stones very naked and barren, the inhabitants in some places by continually watering it, have raised very fine grass and so turned it into a beautiful meadow."² If opposite conditions prevail and man is faced with the problem of draining surplus water from low lying valleys, Alberti advises "A vineyard in marshy lands may be reclaimed by planting trees to absorb the necessary moisture."³

The place of water in civic planning is discussed at some length in the tenth book of Alberti's work. The discussion is well worth the attention of modern civil engineers not only from a technical aspect, but because of the awareness to problems of locality and climate. Alberti mentions specially the magnificence of water works near Rome. "These works were afterwards brought to such magnificence that in order to have high jets of water in their gardens and in their baths,

(1) Loc. cit.
(2) Loc. cit. (Present day spelling has been adopted.)
(3) Loc. cit.
they built vaulted aqueducts, in some places above a hundred and twenty feet high, and carried on for above threescore miles together. From these two they reaped conveniences. In several places and particularly beyond the Tyber the water of the aqueducts served to grind their corn, and upon their being destroyed by the enemy, they were forced to make mills for that purpose in ships. To this add that by means of this plenty of water the city was kept cleaner and the air made fresher and more wholesome.\footnote{1}

Thus these problems which Alberti discusses in detail from the viewpoint of an architect should serve as a starting point for similar problems of the present day in civil engineering, health, agriculture, irrigation etc.

Social changes and commercial prosperity influenced design thereby providing a wealth of information for the historical study of architecture. The villas of Italy,\footnote{2} recalling Pliny's, furnish numerous instances of a man-made environment designed for garden pleasure in Mediterranean conditions. Stone terraces, outdoor steps, balustrades, loggias, statues and ornamental water arrangements are all grouped in the rich country residences of the seventeenth century Renaissance environment.

\begin{footnotes}
(1) X (vii)
(2) For reference see bibliography.
\end{footnotes}
In regions less influenced by social change, the simple edifices of a Mediterranean rural community remain more or less unchanged. Such buildings, rustic, as they might appear, nevertheless provide a real inspiration for the quality of Mediterranean regional architecture.

Architectural scholarship frequently turns to the monumental in order to find a parallel with historic events. But this viewpoint, however interesting, is but one introduction to architecture. If architecture is to be regarded as an art, then it shall always remain that truth of expression will depend on a grasp of regional climatic conditions - the material substance which is reflected in building and monuments.
CHAPTER VII

ISLAMIC ARCHITECTURE
Chapter seven

ISLAMIC ARCHITECTURE

Underlying unity of artistic expression in Islamic architecture - climatic and geographical factors in the unity of the Arab-Islamic regions east and south of the Mediterranean.

Effect of penetration of brick-building tradition on Islamic and Mediterranean stone architecture. Eastern decorative carving values introduced to classical stone material.

Early Arab architectural monuments. Desert (more correct to call Badiya) palaces: Kasr Al-Mshatta. Early desert decorative art in stone carving. Quasayr Amr - prototype in stone of arid desert vernacular achievement. Lack of timber in such environment led to curvilinear roof - barrel and semi-barrel vaulting; prototype capable of being developed to a regional stylistic achievement.

Architecture of the Mosques - the court (sahn). Street gateways to the sahn enclosure. Architectural and social significance of the open space which is constructed as a central part and conourse of the mosque. Early "court temples" in the East: - discoveries of Rostovtzeff at Dura Europos; also biblical evidence. Relating the vernacular quality in Southern latitude of house (Bayt) to mosque (Bayt Ullah Alharam meaning the Sacred House of God]; compared to a similar inter-relation of cottage and cathedral in the north.

Treatment of surrounding court enclosure by small iwans (shelter rooms) formed often in brick regions by repetition of niche bays [a half dome in vertical section over a rectangular space]. Brick traditions and associated coloured tiled fabrics in Islamic architecture. Climate, material and colour in dry weather of southern Mediterranean.

The fountain in the Sahn.

The "sanctuary" or covered floor space for indoor gatherings and prayer during periods of extreme heat and cold. Sheltered street or gallery-walk approach to the sanctuary from the bazaar. The architectural attempt to bring into a unity the sahn with the sanctuary interior. Mihrab and Mirbar (pulpit).
Minaret tower - its function and architectural expression. The minaret in the composition of the town; its aesthetic character and physical service as a landmark. Dome and the development of mosque design. Domed Saints' Sanctuaries.

Islamic decorative arts and traditional craftsmanship. The "Minor Arts" and their significance to climatic conditions. The effect of a dry semi-arid climate on the use of colour in exterior decorative art compared with the relatively damp atmosphere of the North. An underlying climatic influence at work in the development of the use of colour in the south and moulded forms in the north. It should also be relevant to ceramic and clay work trend to colour and natural stone trend to mould.

Window design in the religious art of the south compared with the north - the pierced type of window grille and northern stained glass window. Lighting and interior colour composition. The striking transition from interior lighting to outdoor surroundings. Glare and the colour composite restful effect in the tiled surfaced exterior.

Screen partition in southern climate affects flexibility and simplicity in general planning; opposed to anti-draught planning and cozy interior in Northern planning. Latticed woodwork in Mashrabiya and partition.

Vaulted interior and dormer lighting. The protective barrier of wall and roof in Islamic architecture compared with the skeleton framework and window development of northern requirements. The structural character of the dome in relation to heat and climatic conditions in northern and southern latitude.

Islamic decorative art at its best when it bears a due relationship to the structural design. Effect of religious decorative art and representation on the general character: clear distinction of Christian and Islamic architecture.
The essential unity of Mediterranean houses throughout time and places and the Islamic variation to this theme. Early origin of the oriental type of house - discoveries at Dura Europos. Biblical and folk-lore evidence. Herzfeld's account of Abbasid houses. The central court and repetition of courts within the house to suit the seasons and social needs - haramluk [private household] and salamluk [reception quarter]. The court ensures orientation of rooms to four aspects to suit the time of day and season. The semi-open space - iwan or tarma. Effect of iwan or tarma in reflected lighting to interior rooms and generous air-circulation. Large protected window-openings in tarma. Air circulation and height of interior. Adjusting a draught breeze in southern planning is a planning aim.

Serdab - summer cool shelter - a subterranean vaulted structure during summer afternoons; need for barrier against fierce outside heat means less mass surface exposure. Problem of lighting and ventilation in the serdab. Indirect source through stairs of upper floor grille is sufficient. Healthy dry sun-heated air and the badger method of cooling and ventilation in the serdab.


Arab garden of the southern Mediterranean. Decorative art of irrigation by channel and water display in garden. Influence of rainfall on the scale and character of gardens. Parkland of the north and the small scale character of the enclosed gardens of the south.
Arab and Eastern tradition of gardening in Spain is a rich source of study. Spanish garden art and architecture - the influence of stone geological formation on the garden art of the Renaissance, compared with the brick and clay tradition in almost similar climatic conditions. Spanish art fuses the two, presenting a particular southern style known as "Mudejar". Transmission of Arab garden art and architecture to similar latitudes in America.

Climatic Aspects of Islamic Town Planning
Effect of gardens on the 'climate' of the town. Accounts of Arab travellers. Mustawfi's comprehensive description of the layout of a small town in relation to its surrounding region.
Masjid Al-Jami - the focal centre of the town - a religious and civic unit. Street gateways and their names. The market industrial town and the suk. Division of different industries and professions into various compartments of the suk. Covered suk galleries and their relation to open spaces. Public buildings - colleges and baths. The subterranean gymnasium [Zour-Khana].
The growth of urban towns and political power leading on to present conditions.
The rise, expansion and consolidation of Islam took place in the Eastern and Southern Lands of the Mediterranean. The message of Islam brought by the Arab was a belief in one God which would fuse the manifold activities of mankind to one purpose. In the religious concept of Islam all the qualities of beauty, greatness, justice, mercy and compassion are attributed to one God, and the faithful must live according to God's purpose. Culture exists for the glorification of God, and thus art must submit to the greater purpose. This is the direct ethical concept of Islam which regards the individual as a servant of God. ¹ This ethical driving force fused cultures into a unity which had been divided by national antipathies in the Pre-Islamic "Jahiliyah" period; politics and religion, material and spiritual were fused into the new form of culture which emerged. In the realm of space and environment Islam expresses a regional climatic unit. Its southern Mediterranean latitude and horizontal distribution throughout a sub-tropical zone is of significant importance in the emergence of a unified artistic expression.

Local variations in Islamic architecture, are largely the

¹ In Eastern names Abd. means servant, and in practice most names start with Abd. and a following adjective denoting God. Abd. Al Aziz. Abd. Al Hamid, etc.
result of different building materials in varied geological regions. The brick building tradition of the Tigris-Euphrates basin was brought into closer contact with a different tradition of stone construction. This contact which spread over the area of Islam gave rise to much of the specifically "Islamic" character in architecture. The colonnade of the classic period gave way to newly developed architectural forms in the round, pointed or horsehoe style; arches supported on thick piers—a style which had its origin in traditional forms of early brick construction and is now reflected in a great deal of the typical mosque architecture. The result was new proportions and a composition in space and void different from the classical. The space enclosure of the mosque court "Sahn" arches is the element of space composition and definition. Vaulted structures executed in brick and stone are particularly noteworthy for the local variations which were the result of long practice by local craftsmen. This individuality of vaulted domes and arcuated design involved structural problems of a different nature from the classical with the result that it achieved a less formal architectural style than the rhythmic classical proportion; yet retained inherent unity in the extensive climatic region of the Islamic Mediterranean.

Brick forms affected stone, and the result of a decorative clay treatment begins to make itself felt on stone and
column architecture. The plasticity of the column is transformed to a more "Static composition" by the association of the decorative art of carving; thereby enriching and enhancing architectural forms to the carved-sculptural rendering and texture that characterise Islamic art: it is this quality that leads the casual observer and Western eye to term it an "exotic" style. Traces of such a development were seen earlier in Syria and Sassania where Persian influence is reflected in this architecture of the Eastern Mediterranean, which is of such a markedly different character from the Greco-Roman style.¹

The ruined palace of Al.Mshatta (winter camp) in Transjordania is a famous monument of early Muslim architecture and decorative art. Hersfield explains the Mshatta as a country palace of the Badira which was built in the form of a hira or small settlement as an occasional residence for an Umayyad.² Barrel vaulted rooms and the use of brick and

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¹ Rostovtzeff in "Dura Europos and its art", pp.6-7, writing on the subject of Greek Hellenistic culture in the Near East, maintains - "But this Hellenistic Greek civilisation was from the very beginning and remained in the most important parts of the Near East the civilisation of minorities, of the ruling class only, and never completely absorbed the ancient civilisation of the various parts of the Near East ... Greek civilisation was no more than a kind of veneer. Beneath it the long established civilisations of the past acquired new force and began to grow and to take firm root.

² See Mshatta - Encyclopaedia of Islam. Its date (Mshatta) is not known for certain, and some people attribute it to
stone in the structure suggest a connection with Iraq and Syria. The decorative designs in stone which have been taken to Berlin museums are now world famous as an example of early desert ornamentation. The monument is of great historic and artistic interest since it is one of the few visible expressions parallel with the abundant writing and poetry of the same period. It is stimulating to notice the enrichment of the Arab language to an eloquent and poetic expression during the Islamic epoch. It becomes the language.

Footnote continued:

a date before Islam, but in this connection it is important to think in terms of the early Arab Badia settlements. Arab kingdoms in the fertile crescent were known before the coming of Islam, e.g., the Gassassina in Syria, the Manathere in Central Iraq, and Al Anbatt in Butra (Petra). The palaces of Khawarnack and Al Sades are talked of in Arab poetry. D.T. - Rise to Antiquity - page 276, who was in charge of expedition to Hira, writes: "The city of Hira was founded sometime in the 2nd or 3rd century A.D. and for the next four or five centuries it thrived, not only as the capital of the Lakhmid kings, but also as a trading city and river port. We read that ships from India and China were even wont to ascend the Euphrates as far as Hira, where they discharged their cargoes for conveyance by land westwards and northwards. At a later date Hira became the centre, the very soul in fact, of Pre-Islamic Arab art and literature. It was at Hira that the poets of the "age of ignorance" [the common line incorrect translation of the Jabilihah Epoch] congregated, and it was there that were nurtured many of the artistic manifestations of the Islamic period. It is thus to Hira we must look for the origin of the idea of those desert places such as Mshatta and Ukhaidir.

(1) For details see folio sized plates in Creswell, "Early History of Muslim Architecture", plates 57-60 and 63-78, details to scale 1/12th. For other details of stone desert ornamentation see Qasr-Al-Tuba. Plate 79, fig.C.
of the Southern and Eastern parts of the Mediterranean region and is another reflection of the spiritual and mental vitality of the period although not expressed in tangible monumental form.

The importance of the Mshatta lies in the introduction into architecture of a new carving value expressive of the inner quality of the stone material, enriching form without destroying its structural simplicity, suited to the stern climate of the desert environment.

The Quasyr Amr (little palace of Amra)² represents a

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1. Western art scholars and historians often fall into the error of maintaining that no artistic achievement can be attributed to the Arabs before Islam. With the false view of unfamiliar scholarship they go on to compare the Arab and the Goth. Such an attitude is limited to the visible expression, whereas an artistic mind is the same in the visible and non visible. The rich Arabic language and poetry could never have evolved without an inner and deep artistic feeling. In writing about the influence of environment on the art of the desert, Sir W.M. Conway attributes the flourishing development of literature instead of architecture to the influence of climate and material poverty. "That is why Arabic language has grown to be the richest and perhaps the most poetical language in the world." Domain of Art, London, 1901.

2. Discovered by Musil 1898, about 50 miles east of Amman. See Creswell, Vol.I, plates 47-51. The work of Creswell in 2 folio volumes contains historic detail and illustrations of Islamic architecture. He has compiled a full chronological biography of Islamic architectural monuments. The text is historical while the illustrations give a glimpse into Islamic architecture and detail.

For other Badira palaces, see Qasr Al Hair 60 miles N.E. of Palmyra, one of the oldest Muslim fortified enclosures in existence. See illustrations and measured drawings. Creswell, Vol.I, pp.330-349.

On the purpose of these desert residences and for other historical information, see American Geographical Society of Oriental Exploration and Studies No.4. Appendix IX, pp.277-297. "Country Residences of the Ummayid."
native, desert, vaulted structure of medium size. It strikes the observer as a type of building which in turn could germinate a stylistic architecture - a prototype of architecture suited to a settled desert environment. Accepting the limitations imposed by a vaulted stone structure, the general architectural composition secures a unified effect of broad simplicity. When such unity is observed internally as well as externally, details will serve to enrich the building and give it a sense of self expression and refinement. The lack of timber and transport difficulties inevitably connected with a desert site resulted in a natural and practical evolution of barrel vaulted and semi-dome coverings.

Barrel vaulting is formed by an extension of the protective power of the wall to the roof covering which thus becomes a round concave "roof-wall". The repetition of this same theme on small adjacent buildings and annexes creates an informal architectural composition which yet retains an underlying unity. A balanced architectural expression is achieved by grasping definite broad principles of construction and accepting certain limitations with due regard to local material and environment.

The principles involved in mosque design were those of the rectangular court or Sahn. Numerous gateways afforded
an entrance from various directions to this central enclosure.
The central open spaces remain the focal unit of mosque
design - a treatment which is dictated by the needs of the
Mediterranean climate and has been discussed in connection
with temple and church design. Rostovtzeff discusses the
court temples of the Dura Europos which were designed again
on the basis of religious needs, thereby fusing the function-
tional and the religious. Religious architecture symbolises
a secular need of court design dictated by climate and the
resulting social usage.

In Islam the horizontal volume of court space was pro-
nouncedly monumentalised and enriched by architectural treat-
ment and decoration to the Islamic purpose. The genesis of
its layout has not changed from the abiding Mediterranean
type which is illustrated in the intrinsic relationship

(1) Writing on the type of Oriental Court temples dis-
covered by Rostovtzeff who writes: "All these temples
follow the same general plan, with certain modific-
tions of variations. They are all of them temples of
the Oriental type, of which a court is a prominent
feature," p.42, Dura Europos and its art, Oxford,
1938. On the development of reason for such type
reference to climatic significance and its part in
the religious expression of the temple would help
to give a guiding approach. Similarly the court
temple is referred to in the Bible in connection
with Solomon and the House of God.
between Mosque [Bayt Allah meaning House of God] and house layout. In a similar sense both the cottage and cathedral bear an intrinsic relationship to Northern climate. Since the cathedral is largely designed for indoor use in contrast to the outdoor function of the mosque, it follows that the latter does not inspire such a degree of formalism as the cathedral nave. People can enter the Sahn and sit for hours freely discussing secular and religious welfare, food is brought and distributed free, as a vow, to those in need. Within the Sahn, there is shelter from summer heat as well as an open air square for outdoor prayer, and gatherings. The surrounding piers or niches or cloisters form rooms and shelters (small Iwans) during the period of winter rain or solar heat as well as rooms for gatherings or for use as book stalls. Water basins which are needed for the ritual cleansing become decorative architectural features in the court signifying the importance for use, as well as for aesthetic design in these climates.

A covered roof-spaced enclosure forms the interior of the mosque. Usually it lies on one side of the court, an extension of this shelter in sufficient depth is referred to as Al Mughatta. 1 Rows of colonnades and arcades with

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1) Translated literally the word 'Al Mughatta' means 'covered part'. The phrase was used by Al-Mulkadisi in describing the mosque at Damascus. Le Strange translates the word as "main building". (Description of the Province of Syria including Palestine, p.42.) In referring to Tabori, the well known Arab historian Richmond uses the term 'Zulla' which he translates as sanctuary. This term is also used by Creswell.
arches support the roof forming a series of avenues or aisles. The primary significance of the sanctuary is to provide a protected space for prayer which must be on a floor level, never on a raised platform. Thus the relationship between Al Mughatta the sheltered 'sanctuary' or zulla becomes of architectural importance. The 'bay' unit of the exterior court has to be related to the interior arrangement thereby bringing the Sahn and the enclosure into a unified composition. The cloistered walks from the gateway to the Mughatta provide a shady pathway to the mosque sanctuary. E.T.Richmond comments on this fact in his observation of the site layout of the Aqsa mosque in Jerusalem. He describes the function of the cloister as a shelter during bad weather for those who enter the mosque from the city streets and wish to make their way to the sanctuary. Thus the idea of a covered pathway or street to offer protection from the sun becomes an element of civic design and layout which suggests a repetitive unit. In the case of Islamic architecture the arcuated bay (i.e., arched, vaulted and later in the Ottoman period, domed)

(1) E.T.Richmond, Moslem Architecture, pp. 23-24. He accounts for the absence of cloisters on the Southern sides which lie East of the sanctuary as the result of climate and site. The presence of cloisters on the North and West sides is the result of great traffic entering the sanctuary from these sides because of the position of the city. Hence most of the entrances and all the minarets are on this side.
becomes the elementary form replacing the classical orders with new proportions largely inspired by the use of brick and associated ceramic treatment.

Inside the sanctuary, Mihrab indicates the direction of Mecca; it does not serve as an altar. The Mihrab sometimes takes the form of a niche in the wall erected as monumental examples with decorative emphasis. The interior Minbar (pulpit) for recited services of Imam, offers an expression of Islamic decorative artistic achievement executed with technical skill and craftsmanship. For instance, the minbar panels of the great mosque at Qairawan represent such an achievement of Moslem wood craftsmanship. Arab geographers who have recorded their travels describe the decorative artistry employed in both mosque and mihrab. Describing the stone sculptural ornamentation of minbar, Mustawfi comments that it is so intricate that it might represent wood carving.

(1) For illustrations see Creswell, plates 89 and 90.
(2) Le Strange, "Lands of the Eastern Caliphates", p. 89.
This book is compiled from original sources of Arab, Persian and Turkish geographers. His other work: "Palestine under the Moslems" is also an excellent informative source for studies of Mediterranean medieval history. It includes a synopsis of the works of most Arab geographers of the period between the 9th century and the 16th. See also Bibliotheca Geographorum Arabicorum. Edit. M.J. de Golfe. Pars Tertia. Descriptio Imperii Moslemici.
The evolution of the minaret (Manara)\(^1\) introduced a new and graceful form to the Mediterranean landscape. They are towers for the call to prayer and serve a useful purpose in architectural composition. As towers of perpendicular form they punctuate the corners of buildings and help to achieve a composite transition from one side elevation to another in a pleasing way. It is interesting to trace the evolution of the varied minaret styles throughout the Mediterranean region of Islam. In Iraq during the Abbasid period, the Malwiyan in Samarra, a tower with an outside ramp, shows the relation of this architectural form to the early ziggurats of Assyrian and Babylonian times. Such influence penetrated to Egypt and may be noticed in the mosque of Tulon where the minaret has an outdoor ramp but on a smaller scale than that at Samarra.

The minaret with the mosque forms a focal point and guiding centre. Its skyline arrests the attention and points the way to the mosque not only for the citizen but also for the distant traveller. In places of uninterrupted landscape horizons they are in fact as well as spirit true to their name of "guiding light". The minarets welcome the first and

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\(^1\) Means a guide towards the light of virtue. Also called Midhana, meaning platform for Ethan or call for prayer by Muezzin.
last rays of the morning and evening sun. Thus they are functional in the needs which they fulfil and symbolise the vernacular in their aesthetic character and practical requirements. Naturally they varied in treatment in different regions according to available local material. For instance, where stone was unobtainable, as in Iraq and Persia, the monuments were constructed in brick covered with enamelled tiles or mosaic in monochrome and polychrome patterns. The stone minarets of Syria which did not have such a covering were representative of a different topographic condition.

The relation of the dome to mosque design is one of evolutorial development. Dome structures (Qubba) for saints' sanctuaries were typical instances of the practice of erecting a vaulted structure round a central point. This was the logical practice which prevailed long before the rise of Christianity and Islam. When mosques were also places of sanctuary and pilgrimage, the dome became a dominant aspect in design. The ceremonial circumambulation of a sacred object formed the religious ceremonial known as "Tawaf" and the dome served as a covering for this sacred altar. Quabbat Al-Sahra (the dome of the rock) erected by the Caliph Abdul Malik at Jerusalem in the year 726(692 A.D.)
is a notable example of such a dome. It is a part of the Aqsa mosque and must not be mistaken for the mosque itself.

When this idea of a dome structure was related to the covered space of the mosque it was erected in front of the Mihrab as seen in the mosques of Damascus and Qairawan. Later Byzantine church architecture and Turkish development of the mosque made greater use of the central dome covering unit by relating it more closely to the structure of the covered space.

During the Mameluke period, and again more noticeably in the Ottoman period, the design of the mosque was perfected on the basis of the central dome with a change in emphasis from the columned supported roof. The Sahn with domical bay units forming the cloisters was also practised so that the dome form of covering became the primary unit of construction and design. Thus the art of roof covering as reflected in the Imperial Mosque of Constantinople became a composite design of grouping varied sized domes in a distinctive style. Eastern craftsmanship and skilled building labour were employed in the service of Islamic religious art. Such labour, sometimes brought from various cities of the Islamic kingdom, helped the spread of specialised technical crafts from one region to another, thereby contributing to the architectural unity. Arab geographers mention such special craftsmanship which was brought from distant lands to
serve the Khalifs and help in the equipment of mosques. A parallel may be found in Old Testament references to the employment of skilled artists for Solomon's Temple.¹ This is a factor that accounts in part for the relationship to earlier Byzantine and Persian work before the rise of Islam.

The dome of the rock described with such rich praise by Al Mukkadisi and others in the 10th century provides many later writers with a rich source for the study of the Muslim achievement in decorative art. The representation of trees and natural surroundings in mosaic reached a high level of composition and colour sense which reflects the skilful observation of a native local character. The Barada panels in the mosque of Damascus are another example of Muslim landscape decorative art. There is a suggestion of garden architecture reflecting the colonnade, balustrade and flat roofs of the surrounding Damascenc landscape. They are a visible representation of the splendours of the great Arab metropolis setting described by so many geographers and poets. It is interesting to notice the degree of similarity with the Persian representation of garden art.

(1) "And King Solomon sent and fetched Hiram out of Tyre, a worker in brass and he was filled with wisdom and understanding, and cunning to work all works in brass. And he came to King Solomon, and wrought all his work." I Kings, 7:13, 14.
DISCLAIMER

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In general spirit and inspiration these Damascen representations of country scenes differ from the Greco-Roman motifs. Although the general climatic conditions prevailing in the Mediterranean works for a high degree of similarity, the two styles reflect a different tradition and different local regional expression. The clarity and lightness of colour in the Damascen representations is suggestive of a drier climate. Distant objects are brought into the foreground because of the clarity of the light and this factor combined with the tradition of the Mesopotamian plains might have contributed towards a lack of perspective representation. On the other hand, Roman or Pompeian frescoes have the perspective quality in their mosaics although such mosaic representation does not seem to lend itself to perspective. Thus mosaic treatment tends to have so inherent a connection with Eastern practice and the flat surface that it does not easily lend itself to perspective treatment.

It is important to trace a relationship between Islamic decorative art and the Southern zone of the Mediterranean climate. The development of "wall surface architecture" has made a great contribution to Mediterranean art in material, colour and texture. Its decorative value is never achieved at the expense of structural stability. When decoration loses its architectonic relationship to structure, the character of the architecture often becomes flimsy, tiresome
and exotic. The protective wall surface, as distinct from the massive fortress type was developed to characterise a peaceful and religious purpose. This is particularly noticeable in comparison with the early Assyrian and Babylonian treatment of battlements which function primarily for military reasons. In the mosques of Islamic architecture, on the other hand, the same element of architectural design becomes the graceful finishing note of the elevational façade. As such it provides a decorative treatment for the flat roofs. Herzfeld sketches the evolution of these battlement forms in relation to earlier Assyrian and Sassanian development.¹ This decorative architectural arrangement is fitting in the Mediterranean climate where the roof usually serves as an upper court in the daily life of its people. In addition, it reduces the exterior massiveness of the wall and in the tracery pattern of solid and void it weaves the blue colour of the sky into the wall finish composition. Harsh horizontal lines are softened and given a melodic expression without producing an architectural character of weakness.

Colour glazed tiles and calligraphic inscriptions are also typical of Islamic friezes. The dark solid blue seen

¹ E. Herzfeld-Paikuli, Monuments and inscriptions of the early history of the Sassanian Empire, p.4 and Fig.3.
through the battlements is regarded in the ceramic colour composition shown on the frieze; it denotes a sensitive awareness to one of the primary elements of landscape—the sky. Dry weather, clear light and desert environment make such a treatment suitable and architectonic in a southern Mediterranean region, whereas it would be obtrusive and difficult to absorb in the architectural composition of the North. An added recommendation is the way in which this coloured tile treatment makes the building restful to the eye by helping to reduce glare from the white surface. It is difficult to reach a full appreciation of the architectural character of these buildings through the medium of photographs and measured drawings. Its typical character is the outcome of climate, and academic study should never separate the two. The humidity and acid fumes of smoke and soot in a Northern climate will render a Mediterranean colour treatment vulgar and unsuitable. The art of colour and texture composition in the North will depend rather upon the sensitive choice of material with an inherent colour value so as to defy the weather condition of the North. Thus the northern eye which is not trained to these particular conditions of light sees something strange and exotic in the colour schemes of the South. Probably in a similar way Medieval Gothic architecture might strike an unfamiliar Southern observer as strangely profuse and too nervously energetic.
Both European and Islamic Medieval architecture was religious architecture. Unlike now, artistic work was exercised upon hewing stones or brick slabs or mosaic surface, carved timber and metal work which all take their place in the structural assemblage. In both the craftsmen were men of feeling and inspiration; artists who were doing specific tasks with a real building purpose. The evolution of both was based upon an intrinsic quality profoundly affected by climatic environment.

The large expanse of decorative stained glass windows introducing a blaze of colour into a screen wall between massive buttresses represents a high artistic achievement of Northern church art. These same windows could never have been evolved in Southern architectural expression since the whole function of the wall is a protection against the sun's rays. Moreover, the grey clouded sky of a Northern climate softens the quality of light which penetrates

(1) Traces of this still evident in some traditional quarters which reveal a very ancient practice. Craftsmen artists brought to the site start their temporary workshop. Besides their wages they are regarded partly as occupants and they have their food and lodgings while they are engaged at work. "And the house when it was in building, was built of stone made ready before it was brought thither: so that neither hammer nor axe nor any tool of iron was heard in the house while it was in building," a statement revealing the opposite as the common practice. I Kings 6, 7. Common reference to hewed stone sawed with saws is another instance still to be seen in building preparations on the site in Middle Eastern countries. In the House that Solomon built for Pharaoh's daughter, whom he had taken to his wife, "All these were of costly stone, according to the measures of hewed stones, sawed with saws, within and without, even from the foundation unto the coping, and so on the outside toward the great court." I Kings 7 (9).
through Gothic windows. W. Harvey makes some interesting observations on the differences between Northern and Southern atmospheres on the quality of light entering through stained glass windows. 1 "A piece of glass that glows like soft cushions of green moss at Canterbury might flash like an emerald at Jerusalem or Cairo and throw into the interior different quality of light."

In this respect, the window treatment in Moslem architecture is worth particular consideration. The type of pierced window slabs has been mentioned already as a method of introducing light into the interior. De Vogue 2 has published four examples of such pierced windows, and H.C. Butler refers to others at Shqqa, Dayr, Sayta and Kafr Ambil. 3

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(1) See W. Harvey, J.R.I.B.A. May 1922, Colour in Architecture, p. 493.
(3) H.C. Butler, Architecture and other arts, p. 374. At Shqqa in a place assigned to the Romans he found "one of the most chaste and beautiful little windows in the whole range of Roman architecture." (See photograph facing p. 82, Creswell, Vol. I.)

"At Dayr Sayta in a church which he dates as the sixth century, he found remains of plates of tracery that filled the windows. He relates such treatment to climate as a method by which large windows were protected from the weather and from the direct rays of the sun. Though no pieces of glass were found on the spot, flat glass has been found in many other rivers. These remnants of tracery, though much weathered certainly show grooves for the insertion of leaded glass or some other translucent material." In this connection it is interesting to notice that the use of the lead as practised in the North would not be suitable under the solar heat of the Southern sun.
The development of the window as a carved marble grille or intricate wooden geometrical frame reached a stylistic and perfection in Islamic architecture of arabesque craftsmanship. Its origin lies in the response to the demands of climate, where adjusting the source of light and excluding intensive sun rays in the aperture medium between the outside and the interior becomes of primary importance.

Window design in the dome of the rock and the Ummayid mosque in Damascus are representative examples of Islamic windows. The space and void composition of window frame design plus Moslem craftsmanship has resulted in a lively response and specialisation motivated by solar climatic requirements. Such windows produce a particular textured facade very different from Northern space and glass void. They invite timber lattice work on the outer wall surface which gives a typical Southern character and specially marked in the Islamic zone of the Mediterranean by decorative arabesque treatment as opposed to the green shutters of the Northern Mediterranean. In English architecture the surface glass glazing of Elizabethan and Georgian windows characterises a graceful Northern elevational treatment well suited to the quality of Northern light.

Windows of coloured glass set in plaster were also

(1) "And for the house he made windows of narrow lights", I Kings 6 (4).
characteristic of Muslim architecture, and E.T. Richmond
describes the method in detail.¹ The effect of coloured
glass windows on the interior tends to soften and harmonise
the varied wall colours and textures. For instance, brick
and polished marble are merged in a harmonious interior
atmosphere. But in this connection, the trained eye of the
architect must depend primarily in harmony and material

(1) E.T. Richmond, "Moslem Architecture, pp. 40-42. "A
frame of wood is made to fit the opening left in the
masonry. This frame is laid flat on some smooth sur-
face, a table or a slab of marble. Liquid plaster of
Paris is poured, to the depth of the frame, over the
area enclosed by it, and allowed to set. Plaster ex-
pands in setting; and therefore, when set, the slab is
tightly gripped by the wooden frame. When the plaster
is hard the pattern is pounced on its surface, and then
fretted out. The outline of the patterns is formed by
the plaster which is not cut away. The little bits of
coloured glass needed to cover the open spaces are then
glued on. In the sixteenth century windows little
tunnels of plaster are bored during the process of
fretting out the spaces. These tunnels, which are about
three and a quarter inches deep, are often wider at their
inner than at their outer ends, so that they form trunc-
ated covers sloping slightly downwards. As the light
comes through the glass the surface of these little
white plaster tunnels is tinted with the colour of the
glass. The colours used are red, blue, green, yellow
and white ... In the earlier windows the panes are
rather larger than in the later; and the lines of
plaster, which fulfil the same function as lead in our
windows, are barely more than half an inch wide. The
glass is set at a distance of about three and a half
inches from the outer surface of the plaster and on the
inside is held by a fillet of plaster bevelled on each
edge and about half an inch wide and half an inch deep.
This fillet covers the joints between the panes. The
designs consist of geometrical patterns or of inter-
lacing floral scrolls of different colours."
composition on the choice of building material rather than remedy his mistakes by what might be termed theatrical illumination. When interiors are composed with due regard to the integrity of colour and texture they will please the eye at all times and under every type of light. To spend a stretch of time within a mosque interior would help to train the eye in the perception of detail. Nowhere is it more important to express the integrity of material than in such religious edifices. When surface colour and decorative treatment are an inherent part of the material, they express an artistic truth which will help to serve as a religious symbol. Simple unadorned structural edifices have a more truthful lasting quality than an exuberant falsely decorated surface treatment unsympathetic to the building material.

The transition from diffused indoor lighting to the intense outside blaze has been partly overcome by means of cloisters (Ruwaq) or verandas leading to the court, which is also an enclosed open space. Rhythmic shadow repetition in the Sahn, exterior decorative treatment of walls, mosaic and floors/vegetation all help the eye to adjust itself to the glare of the sun. Cool colours, dark and light blue, white and sparse black with green and yellows help to produce a cool colour scheme while the sight of water from fountains (Mafoura) is a primary factor in a cool exterior architectural monument symbolising the use of water everywhere in Mediterranean countries. The Mashrabiya or extension of the window
grille is carried out by intricate timber craftwork. In contrast with the plain wall, its fenestration is architecturally pleasing and affords a wide scope for architectural composition. It is the picturesque symbol of the East in Palestine, Syria, Egypt and North Africa. Besides its purpose of affording light and air, the Mashrabiya also gives a sense of privacy by its projection as a type of balcony. This was a common necessity in narrow streets where opposite rooms tend to overlook one another. (Ishraf) Extensive screens of similar craftsmanship to the Mashrabiya which separate without interrupting the interior space volume are another feature of common use. They secure the flow of light and air in a broad planning arrangement.

Window light in the barrel type of vaulting was introduced by a small dormer type of window, a particularly interesting feature. An example of this method which was particularly suited to the structure may be seen in Khan Urtumah now used as museum of Abbasyid art in Baghdad.

Vaulted ceilings form a protection against the vertical rays of the sun in Southern Mediterranean latitudes, whereas roofs in the North are primarily designed to meet the problem of rain and snow. This illustrates the idea of skeleton development of wall and roof in the North as opposed to the protective shell of the South. Thus domes in Northern climates are introduced primarily to achieve a monumental
architectural character whereas in Southern zones they are an inherent form in response to a particular climatic necessity. The skeleton rib and panel type of dome were evolved for protection against Northern rain and snow in contrast to the primary solar heat protection of Southern mass expanses. The degree of this difference is reflected clearly in the Northern border of the Mediterranean expressed in the Renaissance and the Southern desert character of Islamic civic and rural expression.

The character of Islamic detail is at its best when it does not impair the structural expression imposed by climatic conditions. On the contrary it should help to define and accentuate forms and connect the various phases and transitions. Decoration is often structural and much will depend on the inner quality of the material which reveals itself in structural units when cut, hewn and grouped. In vaulted structures, the architectonic effect of grouping is not swamped by the treatment of details. In the transition from the square to the round, the "mukarnas" treatment of the squinches has been elaborated, sometimes producing a stalactite effect of a three dimensional geometrical arabesque. Brick was built in projection or recess according to a desired pattern. A study of such patterns which were always on a structural basis would provide an excellent training for the architect and the draftsman of today. The well known
Otesiphon arch (Iwan Kusra) is a monumental edifice of the Sassanid period illustrating a sculptural textured façade in brick. Corbels with a decorative geometric treatment were frequently used in building construction. They were also used in courses for support to a projecting balcony as seen in minarets and cornices. Unfortunately the profusion of elaborate decoration sometimes reaches such a pitch of exaggeration that it gives a profused and unbalanced impression.

Calvert in discussing the relation of decorative art to the structure in Alhambra writes, 1 "The Moors ever regarded what architects hold to be the first principle of architecture - to decorate construction - never to construct decoration. In Moorish architecture not only does the decoration arise naturally from the construction but the constructive idea is carried out in every detail of the ornamentation of the surface. A superfluous or useless ornament is never found in Moorish decoration; every ornament arises quietly and naturally from the surface decorated. The general forms are first cared for; these were subdivided by general lines; the interstices were then filled in with ornament again to be subdivided and enriched for closer inspection. The principle was carried out with the greatest refinement, and the harmony and beauty of all Moorish ornamentation derive success from its observance. The greatest distinction was thus obtained;
the details never interfering with the general form. When seen at a distance the main lines strike the eye; on nearer approach the detail comes into the composition; upon yet closer inspection, further details are seen on the surface of the ornaments themselves." Decorative work of the Alhambra has been closely studied in a monumental work of Owen Jones and M.T. Goury, the French Architect.

Islamic sculptural treatment in architecture (Alnaqsh) is inherently a carving process as opposed to the plastic forms and moulding conception of Greeks and Romans. This attitude is expressed in preparing clay slabs and applying decorative carved treatment in panels. For illustrative purposes, the decorative panels at Hira and the Mshatta are early examples. During the later Abassiyid period, Iraqi influence from Samarra penetrated and extended over the Mediterranean region, in the Mosque of Ibn Tulon and in the Mosque of Qairawan in Tunis. The Islamic contribution to Mediterranean art had its effect on the classical conception by introducing a carved sculptural value. Thus some of the architecture of the Renaissance was not only a classical revival, but a further development influenced by the flat Islamic conception of carving.

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(1) See illustrations D. Talbot Rice, The Oxford Excavations at Hira, 1931.
(2) Adrian Stokes in "Quatro Cento" and "Stones of Rimini notices this development but does not clearly relate it to architectural development in the Southern and Eastern Mediterranean, and its influence on the art of Venice. He is directly inspired by the value of stone, and his books stimulate an understanding of Mediterranean stone architecture in relation to the quality of light in this region.
Three dimensional sculptural representation of the human form was alien to the spirit of Islam. Idolatry was regarded as a fanatical pride in local gods (Asnam) which characterised the Jahloya, and was denounced by Islam as contrary to the idea of one God. J. Strzygowski strongly maintains that Christian art in church decoration was non-representational in its origins and even as late as the 4th century.¹ A wide ethical concept of religion works against definite naturalistic human representation as a symbol of religious expression. The iconoclastic movement in Christianity may be compared with this feeling in Islam. The Mediterranean Christian Gothic represents the human form in a concept less plastic, more carved, which incorporates the deep rooted artistic attainment of the classical age in new reflected forms which are less secular and more spiritual. Phases of art history reflect such struggle between the secular and the religious, and the interpretation of the Renaissance in relation to Classical and Christian.

While in Christianity pictures served as a medium to illustrate the life and story of Christ and the Apostles, in Islam calligraphic art served a religious and decorative purpose by inscribing texts of Koranic ethics. Arabesque decorative art and the adoption of abstract geometrical forms tend to prevent the attention diverging to worldly objects

¹ J. Strzygowski, "Origin of Christian Church Art".
and help to create the atmosphere of absorbed spiritual contemplation during prayer.

The use of dome flutings on the exterior of Kairawan mosque produces shadows which have a restful effect. In other instances the use of colour and tiles and mosaics on the dome illustrates the same principles involved in the treatment of the wall. Thus the use of green and turquoise coloured tiles on sanctuary domes affords a restful view to distant travellers.

Artists, carvers, writers and engravers were all employed in the service of architecture. Their work achieves a quality of permanence, and a system of apprenticeship has preserved this artistic legacy. In studying Islamic decorative art, it is important to notice how the formal or geometric pattern is constructed on a well designed plan. Writing about the decorative art of the Alhambra, Calvert states:

"In surface decoration by the Moors, lines flow from a parent stem; every ornament, however distant, can be traced to its

(1) For representative examples see Frisse D’Avennes “L’Art” 3 Folio volumes, with coloured plates and measured work of the best examples of Islamic inscriptions, enamelled tiles, colour scenes, wood carving and metal engraving. It shows the relationship of the minor arts to architecture. See also M.E. (Pantu) Catalogue du Musée Arabe, Cairo, 1931. Excellent examples of carving and woodwork typical of the best Arab details.

(2) “Alhambra” Introduction, pp.xlv-xlvi.
branch and root; they have the happy art of so adapting the ornament to the surface decorated, that the ornament as often appears to have suggested the general form as to have been suggested by it. In all cases we find the foliage flowing out of a parent stem, and we are never offended, as in modern practice, by the random introduction of an ornament, set down without a reason for its existence. However irregular the space they have to fill they always commence by dividing it into equal areas, and round these trunk lines they fill in their detail but invariably return to their parent stem. "... "All junctions of curved lines with curved, or of curved with straight, should be tangential to each other. The oriental practice always accords with this principle. Many of their ornaments are on the principle which is observable in the lines of a feather and in the articulations of a leaf; and to this is due that additional charm found in all perfect ornamentation which is called 'The Graceful'."

The frequent indiscriminate copying of architectural decoration resulted in the loss of a living character. Dead ornaments unrelated to the structure of a building are superficial in themselves as well as evidence of architectural decadence. A true understanding of the purpose and use of decorative art must take its part in the scheme of architectural design. In the same way as wall paper could never
disguise true surface value, so decorative art must be regarded in the light of its architectonic and craftsman-like quality. With these general critical values as a guide, inferior quality of work will be more easily detected and universal appreciation of the particular will be less liable to prejudiced judgment. Many artistically interested writers,\(^1\) as for example L.M. Phillips\(^2\) go so far as to claim that emotional colour belongs to the East and plastic intellectualism to the West. Such a psychological interpretation is then magnified into a philosophy, whereas in reality colour and form should not be separated.

The time factor must also be taken into consideration in colour schemes. The mellowing effect of this weathering process deserves a conscientious concern on the part of the architect. Thus the effect of atmospheric conditions in different climatic zones becomes an important consideration in the 'artistic welfare' of buildings. In Islamic colour schemes, the attempt to combine the use of colour with surface permanence has developed with the art of native skill and the long practised skill of the potters. Floor mosaics and coloured tiles obviously needed a depth of

\(^{(1)}\) Summary of various authorities and opinions on the nature of Islamic ornament is contained in Chapter X "Mohammedan Arch. in Egypt and Palestine", by M.S. Briggs.

\(^{(2)}\) L.M. Phillips, "Form and Colour", 1915.
pigment colour penetrating deep into the material, not merely a surface coating. Thus a process which had been developed through the art of pottery was cultivated in architectural practice. These coloured ceramic surfaces illustrate the rise of clay as a building material and also reflect a vital use of colour which does not conflict with the Mediterranean weather conditions of this dry arid zone of the South.

The changes in some colours which result from long periods of exposure to the sun's rays suggest that some colours changed in the process of time. But the bright primary colours which seem to follow naturally under Eastern Mediterranean conditions do not mean that any garish colour scheme could be justified because of climate. There is a scope for refinement in the use of colour just as in the relationship between form and moulded shapes. The highly developed academic treatment of colour schemes in mosques and houses of social significance which characterises the architecture of Arab Islamic countries illustrates the primary developed use of pigments.

(1) See Encyclopaedia Britannica on Colours.
Domestic Architecture

Within the essential unity of domestic architecture throughout the Mediterranean region, Islamic homes (Bayt or Dar) present a varied treatment of the same theme. There are frequent discoveries illustrating the early type of house which existed in different Mediterranean regions. For instance the discoveries in Dura Europos described by M. Rostovtzeff as the Pompeii of the East, represent a prototype of the prevailing 'Oriental House'.

The court is the nucleus of the whole layout in the same way as the Sahn is the constituent unit of the mosque. In urban development, the court ensures privacy. It gives access to the more sheltered covered spaces, and the various rooms and floors are distributed around it. This results in the orientation of rooms to four aspects and the individual is free to move within the court according to the time of day or season of year. The enlargement of one particular aspect

(1) Writing on the type of houses in topography and buildings of the town he writes: "The private houses, though varying in size and decoration, are nevertheless all of the same character. They belong to the widespread type of the Oriental house built upon a Court. Very similar houses are still in use all over Mesopotamia." It certainly shows great similarities with the earlier and later Babylonian houses and may go back to them, pp. 48, 49. Dura Europos and its Art, Oxford 1938.

(2) 'Oriental House' known at present as Tiraz Al Aharqi to differentiate it from the European or Western style.
to meet the needs of summer and winter quarters would obviously lead to an extension by means of additional courts as Herzfeld indicates in his report on the houses of Samarra. Elimination of the direct source of radiant heat and the cooling flow of air are two factors which have to be related in the architectural problem of dealing with summer heat.

The need for privacy within the court is met by a bent entrance known as Mi'ajaz which avoids a direct view from the outside street to the court. This is more noticeable when the house has only one court forming one centre of the household. In richer households the Salâmîluk (reception quarter) and Haramluk (private household) are separate. Thus the influence of climatic needs and social convention are intermingled. There is evidence in the Old Testament that this practice existed as a logical consequence of social culture before the rise of Islam.¹ Herzfeld's report on Abbasid houses of Samarra provides descriptive illustration of the court type of house which was evolved to meet these needs.²

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¹ I Kings, Chapter 7, verse 8.  
² Houses of Samarra. Reprinting in Creswell, Early History of Muslim Architecture, Vol. II, pp. 282-83. "The houses of Samarra are built after a fixed scheme. A covered entrance leads from the street or lane into a roomy rectangular court for which the proportion 3:2 is preferred. At its end lies a L shaped main hall with two smaller rooms in the corners. The grouping of rooms is occasionally repeated in a second court, and we must thus regard the two similar layouts as Serai and harem, but when they are repeated on opposite sides of the same court they indicate summer and winter dwellings. The

Footnote continued:
People of high social and religious standing use their house for festive gatherings and even religious congregations. The court is usually the centre of such functions and so the wealth of decorative treatment embodied in the architectural elevation reflects the dignity of its owner. Climate undoubtedly affects social welfare and human temperament. Thus it becomes necessary to separate the personal, domestic activity, from the social function of the house. Many houses served as social centres in the neighbourhood, and the significance of the house for shade and shelter is evident in Arab folklore. To shelter in the shadow of one's home denotes the need of an escape from heat. In an Old Testament reference such meaning is noted, "for thou has been a strength to the poor, ... a refuge from the storm, a shadow from the heat, when the blast of the terrible ones is a storm against the wall."¹

Footnote continued:
rest of the court is surrounded by rows of rectangular dwellings and store-rooms. In most houses of small side courts, with store-rooms, is to be found. The houses always have baths or canalisation and not seldom wells; in one case an installation came to light which certainly is not to be taken for anything but a place for making coffee. Occasionally open halls on columns occur (tarmahas) and underground dwelling rooms with ventilating arrangement (sardabs); one house possesses a long row of separate shops on the main street not unlike the plan of Pompeian houses. ... The roofs were without exception flat timbered roofs.²

(1) Isaiah, 25, 4. "They shall hunger no more, neither thirst any more; neither shall the sun light on them, nor any heat." [Revelation, 7, 16.]
The Iwan system of planning was customary in large houses where it was necessary to cater for a number of families. The recessed space off the court forms a private hall which can be repeated in a large court to serve the needs of a large family (Hamoula). Besides forming a semi-open space, the tarma or veranda also provided access to other more sheltered rooms. On upper floors it becomes a hall for use in the early summer mornings and evenings or during a prolonged period of mild weather. When orientated to a Southern aspect, the Tarma is a warm resort in winter. Its height and open character provide a source of ventilation for the adjoining rooms while a modicum of shade is preserved which enables these same rooms to have a wall of windows executed in an exquisite craftsmanship of latticed woodwork tracery. Work of such a delicate nature would suffer greatly if it were exposed directly to the rays of sun and to the wide range of temperature changes which occur within the day.

The idea that small windows are a practical necessity under Mediterranean conditions is not a strict guide to architectural practice, although such windows would give

(1) Iwan, Sometimes referred to as LIWAN, meaning a covered recess shelter open towards a court.
sufficient light in accordance with the Northern custom of thinking in terms of enclosed rooms and relative window space to provide the necessary lighting. In reality, large windows are often used in a semi-outdoor treatment with protection from direct heat by the shade of verandas. The problem of lighting and ventilation could be solved by this method of space composition.

Lofty ceilings provided for a free movement of air and also allowed more light to penetrate and reflect into the further interiors; a practice which is obviously undesirable under Northern climatic conditions where the primary object of domestic architecture is to eliminate draught and create the feeling of a cozy interior by means of lower ceilings.

The serdab or basement provides a solution to the pressing need for a shelter during the intense heat of summer afternoons. The serdab is either completely underground or what is known in Persia as Neem-Serdab where steps go down to about 6 or 10 feet. Thus the mass volume exposed to the sun is almost completely eliminated in these vaulted living cellars. The dry sun-warmed air is driven down vertical shafts or Badjeer to meet water or a source of moisture. This method of ventilation seems to be very ancient since it existed in Ancient Egypt and has already been discussed in this connection. Thus within the same day there is a
sharp contrast between the escape to an open flat roof and the retreat to a closed vaulted cellar. Whereas the atmosphere in the court space on the ground floor tends to become stuffy, the flat roof serves as an evening resort since its height ensures the greatest benefit from cool breezes. In towns and closely built up areas, the flat roof becomes the esplanade and substitute for a garden stroll when there is no space for the latter. The roof is often a centre for festive evening dinners as well as sleep. This custom is very ancient and there are many references to it in the Bible. Sleeping pavilions are still in use on the roof and Jews still erect booths with branches of palm, myrtle or olive in the seventh month. Beds are constructed with a skeleton frame and furnished with light hangings known in Iraq as "Kulla". It is possible to sleep on the roof because of the certain knowledge of a definite summer period with clear rainless nights. A sheltered covered space (Bayt Al Frash) usually at the head of the stairs, becomes necessary for storing the bedding and roof equipment.

Wall recesses treated with decorative work are frequently used in the court for housing large water basins. The

(1) Nehemiah 9,16. "So the people went forth and made themselves booths, everyone upon the roof of his house."
arches over the recesses form what might be described as a brick mosaic. The practice of setting these arches and preparing them on the site is still customary. Skilled craftsmen specialise in making arches. They use bricks approximately 12" x 12" which are brought to the site on the backs of mules, and usually handled by two men with a saw (Mishar or Sharugah) which they operate to cut the bricks diagonally in halves. The bricks are cut into small shaped pieces according to a specified design and the flat arches of small sizes are laid out on the floor. After these are dried and set by a process of plaster baking, they are then carried to their allocated space to form a covering façade. The evidence of Assyrian and Babylonian palaces suggests that there is a long tradition behind such practice.

The vaulted ceiling (igada) of the basement and ground floor rooms is the pride and chief interest of many Oriental houses. It is a specialised craft and skilful "arch and vault designers" are very highly paid. When court, veranda and flat roof are the elements of design, the balustrade strikes an obviously important note. In recent times, wood from India has been replacing the Cedars of Lebanon famous

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(1) References to Biblical times. I.Kings, Chap.7. "According to the measures of hewed stone, sawed with saws, within and without even from the foundation unto the coping.

(2) Assyrian inscriptions portray the carrying of wood logs by river crafts. This would obviously mean down the Euphrates from the Syrian mountains in Lebanon.
from Biblical times. Because of its light structure, it is customary to use ornate timberwork on the upper storeys while the ground floor is usually constructed with a thick wall of brick or stone. Timber is affected severely by a rot which results from damp as well as the ravages of the ants.

It is part of an old tradition that foundations (Al Assas) should be dug as deep as possible until water level is reached. The value of such a costly practice, although not good in itself, lies in the fact that if the water level rises, it will be beneficial to have the entire foundations receiving an equal impact. This will partially counteract the effect of shifting ground caused by the rising level of underground water. E.T. Richmond\(^1\) has clearly stated the implications of this factor in his survey of conditions in Egypt and its effect during the winter flood season.

The approach of the summer season is the signal for the removal of carpets and hangings. Thus paving becomes an important feature of architectural treatment. The surface coating of a mosaic has to be thought of in terms of wear and tear, and polished brick slabs are often used for paving courts. They do not reflect heat to the same degree as

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glazed tiles or stone and marble pavements and it is an easy matter to sprinkle cooling water without the drawback of a slippery surface.

Islamic garden art prevails throughout the whole Southern Mediterranean areas in the design of palaces and country residences. The influence of Arab garden architecture is particularly noticeable in Spain. Arab literature is full of travellers' tales describing gardens, and Paradise itself is depicted in the Koran as a tranquil garden for the faithful with running streams and fruits of the earth. The development of garden culture in the Southern Mediterranean has many distinct characteristics and problems. Here the problem is restricted in terms of water supply and long periods of summer drought and as the Mediterranean garden depends on the efforts of man, it is therefore bound to differ from the semi wild park garden of the Northern latitudes. The small scale character typifies the garden of Islamic Mediterranean country life.

In Spain, the patio garden is the reflection of Mediterranean conditions in a domestic setting. It serves as an indoor garden as well as an outdoor salon. The influence of Western Asia is felt in the attempt to create an equal or rival to the prosperous achievements of the Arab caliphs
at Damascus. In climate, Andalusia was remarkably similar to North Africa and West Asia\(^1\) and thus the wealth of artistic tradition of the Eastern Mediterranean was easily transmitted. The need for technical and theoretical information on agriculture and farming inspired many Arab books on these subjects. The work of Ibn Awam in the 10th century is the chief source for the sum of scientific knowledge and agricultural enquiry during this period.\(^2\)

Agriculture and horticulture received great encouragement from the Caliphs who were guided by the direct inspiration of the Koran on this matter. The extent of garden cultivation in Granada, Cordova, Seville, and Valencia illustrates Arab achievement. Arid stretches were converted into land suitable for full living, while in their urban development, gardens were intimately connected with architecture. Arab writing seems to prove that such gardens as those established

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(1) Al Makkary, a well known Arab historian. History of the Mohammedan Dynasties in Spain. 2 vols. English translation from Arabic, by Pascaul de G. Yangos. Describes Andalusia as very similar to Syria as regards the freshness of water and clarity of air.

at Alcazar in Seville, Al-Zahra in Cordova. Alhambra and Generalife (Jennat - Al Arif) meaning Paradise of the thinkers, were part of an urban scheme for man made garden cities in the Mediterranean. This fact is further illustrated by the elegant quality of decorative art in architecture which marks a peace and prosperity in contrast to the former character of military castles. Trees set in gardens helped to reduce the intensity of the arid heat, and soften the massive quality by introducing a much needed element of shade, thereby showing man's influence on nature and climate. In garden art the influence of climate explains the particular character of Arab and Islamic gardens which distinguishes them from European practice. In this Southern Mediterranean

(1) M.S. Byne and A. Byne. Spanish Gardens and Patios. A book that explains the influence and penetration of Arab or Moorish on the development of the Andalusian Garden writes in Chap.I: "The Andalusian Garden is an urban, not rural creation. It existed in and near the town. In Moorish days, the Caliph having accorded special encouragement to agriculture and horticulture, the verges of Granada, Cordova, Seville and Valencia had been converted from arid stretches into smiling orchards and gardens; but the Spaniard on conquering the same appears to have huddled ... close to the towns ... At any rate the old gardens that have survived are in or close to cities. In Seville we have the grounds of the Alcazar, overlooking Granada, the Generalife - Cordova's great garden Medinat Al-Zahra, now but a memory, lay only three miles from the Mosque; if it be true that the Cordova of the Caliphate was twenty miles in extent, then Medinal Al Zahra must have been within the city."
zone it was not possible to provide a striking note of green by a cultivated grass lawn. Polychrome tiling and mosaic pavings were part of Arab Eastern tradition brought to the architecture of the Iberian Peninsula. It may be difficult for a Northern or Western eye to appreciate the artistic quality of such a coloured tile garden. In this connection it is not so much a question of taste as acceptance of physical climatic conditions. Such acceptance in a Northern climate led to the development of a romantic trend which found its expression in the famous "Garden Anglais". This was nature's gift of rain and humidity and a romantic appreciation of this gift led to a cultivation of winding paths amid the surrounding 'wilderness'. By retaining the inspiration of the underlying physical pattern there grew up a wisely cherished art of landscape design indigenous to the North inspiring a romantic trend in literature. In the South, such garden art could not prevail, and the garden assumes a different character through the relationship of planned vegetation and architecturally built up floors and terraces with a decorative and architectonic character in their craftsmanship. The primary stone material represents the different architectonic character of classical and Renaissance practice from the art of ceramics, pottery and lattice work in the Eastern Arab and Islamic garden.
Water display was an integral part of Andalusian garden design. Decorative fountains gave a cooling effect and the stem of water provided a pleasing contrast to the background of green leaves. The art of water design was highly developed in Andalusia during the period of flourishing Arab culture inspired by old tradition such as the hanging gardens of Babylon.

Water basins and fountains were designed to give the maximum sense of the movement and life of water. Water was brought into the garden by means of terra-cotta canals. The function of water in the Spanish garden is clearly stated by Byne who writes: "Water was too precious to be silent in a broad expanse; it had to be confined in terra-cotta canals through and made to murmur all its course. This thin stream was held to its course so that no drops escaped to nourish where not necessary. In the case of terraces - the concave ranges of the stair might conduct water from an upper fountain to a lower - the water was made to show itself in as many places as possible before it was carried off to the more utilitarian Huerta."  

(1) M.S. Byne and A. Byne, "Spanish Gardens and Patios", p. 59. The Moors were great hydraulicians and what one sees today of scientific irrigation is but a miserably small fraction of what they left when driven out of the Peninsula.

(2) Byne, Mildred Stapley and Arthur, "Spanish Gardens and Patios". Huerta is the garden for vegetables and fruits. It was devoid of shade and flowers in contrast to the patio, because it was necessary for the successive crops of the year to ripen quickly.
Because of the lack of moisture, garden beds tend to be sunken rather than raised. In Northern climates on the other hand, excessive moisture suggests the natural remedy of raised beds. In one case, the problem is how to bring water into the cultivated areas, in the other how to drain away surplus water. Thus the use and grouping of flower pots tends to become a speciality of the South and the art of garden pottery is a well-established profession. Steps leading to a higher floor level, terraces, tarmas (verandas) and balconies were all decorated with these pots and thus it becomes possible to introduce change and movement in the design of a Southern garden. This artistic wealth of detail should not be separated from architectural design.

The design of these gardens provides an abundant contribution to the minor arts. Something which might have been only a miserable backyard is transformed into an open air lounge.\(^1\) The effect of light and sun has made such a small enclosed open space into a cozy open air shady salon. The influence of the Andalusian garden reached the similar

\(^{(1)}\) Examples of the many types of designs would in themselves afford a scope for a thesis. All that is attempted here is to mention the general trend.
climatic zone of America.  

There the architectural development of Mexico and California was inspired by what is termed a Moorish influence. It is usually seen in a romantic tendency which resorts to forms in colour as distinct from the classical Northern Mediterranean. The different topography of the latter region combined with the influence of stone strata pivoted the classical landscape development on sculptural forms. The American house tried to combine the two expressions while basing the design on Spanish houses and Italian villas. Like its court, the Eastern character of urban gardens retains an indoor quality. This factor combined with a use of a decorative mosaic treatment instead of sculptural representation marks the difference from the Christian gardens of Renaissance Italy.

Spanish interior design bears the print of Arab influence in its carpentry work. Wooden beams are frequently

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(1) In an illustrated work "The Spanish House for America" and a later book "Mediterranean Domestic Architecture in the United States", Rexford Newcomb stresses the fact that in design furnishng and garden, the Mediterranean type of house finds a congenial home in similar climatic provinces of America. He notices that a certain 'desert' quality in Arizona where the roof becomes flat, bears a close resemblance to the North African Moorish type.

(2) References to illustrated work. See A. Byne and M. Stapley, "Spanish Interior and Furniture", 3 vols. Photographs and Drawings illustrate the Spanish native quality fused with Arab influences. In his other work "Provincial houses of Spain" the Spanish Mediterranean character of these houses amply repays detailed study.
used in the austere native houses of the rural Mediterranean type. The introduction of a new element by decorative carving did not impair the primitive structural integrity. It helped to enliven and enrich the inborn quality of the timber and provided a pleasing contrast in colour and texture to the plain plastered wall façade. This style known as "Mudejar" fused the Arab influence with the local native Spanish style. It is a regional architectural style of Spain and the Balearic Isles, and reflects a particular Mediterranean rural character thereby harmonising Southern Mediterranean front with Mediterranean Europe.

In Spain and the Balearic Isles this new style represents an architectural development and artistic advance on the local Mediterranean character. It absorbs the new architectural value of decorative art, and thus Spain became the meeting and fusing point of the North and South Mediterranean for a period of about six centuries. This development was largely the result of climatic similarity which facilitated the introduction and fusing of new ideas.

Arab travellers from the ninth to the thirteenth century provide some interesting information on aspects of Islamic town planning in the Mediterranean. In particular they
comment on the climate of the various towns thereby proving
the importance of a choice of site in relation to wind move-
ments. There are many references to the degree of coolness
in the air, and how this effect may be facilitated by a
careful choice of garden vegetation. Numerous descriptions
tell of air perfumed by flowering plants and shrubs and the
birds of singing gardens - Persian miniatures of the six-
teenth and eighteenth centuries convey the spirit and detail
of Islamic gardens, while the Barada panels in the mosque
of Damascus illustrate the environment talked about by the
travellers of this great Mediterranean capital city of the
Arab kingdom. Fruits and vegetables are of primary importance
to health in this climate, and so the orchards and gardens of
the neighbourhood are often mentioned.

The description of a town layout is hardly ever given
from a consciously architectural point of view. But Mustawfi
writing in the first half of the fourteenth century describes
the Persian town of Tun with regard to its layout. He writes:
"The plan of the town was laid out after this fashion: first
they built a mighty fortress with a very deep waterless ditch,
then round the fortress they set the markets, next the houses

(1) A contemporary of Ibn Batuta the Berber - Mustawfi
"Nughat Al-Qulub", p.142. Translated into English by
G.E. Le Strange, 1919.
of the city were built round the markets, then gardens of Mulberry orchards were planted round about the houses, finally corn fields further outside and round the gardens, then beyond the corn-lands they raised dykes to gather up the rain waters for the irrigation of the corn-lands, and in among these dykes they grew melons without need of further irrigation, which same were of extraordinary sweetness. The water of the town is from underground channels, the climate is temperate, both corn and fruit being grown, and silk too produced." This is an interesting and comprehensive description of the town with regard to its regional setting, marketing activities and the transition from the open field to orchard, houses, market and civic centre.

The focal point of civic architectural layout in Islamic towns is the principal mosque - Hasjid-Al-Jami, or "Friday mosque" of the Orientalists. It is the administrative and cultural zone of the city as well as a religious centre. Gateways leading from the Sahn to the street became an important feature of Islamic architecture and civic art. These portals are usually built on the form of a large pointed arch raised to a higher level than the enclosing arcade or niches of the Sahn. They were given names and the early Arab travellers have left us detailed descriptions.¹

(1) For a list of names and descriptions, see Le Strange - "Lands of the Eastern Caliphate, and references in index under the word "Bab."."
beast. (East of 5am - Place of Peace)

Built as a summer residence as an escape from the heat of the desert, one of the most important cities of M. Tree. The Great Knesset, named built in the 6th century - 773, and later became the central hall of the district of the

use in those Arab countries which had been subject to Byzantium. The covered street provides a solution to the climatic problem of summer heat since it is both a living and working quarter during the day. Goods have to be protected from the direct rays of the sun and at the same time they must be fully exposed to the view of prospective customers. Courts of the small mosques and the caravanserai type of Khan lead off the suk streets. The street becomes a busy corridor hall leading to the centres of varied commercial and professional activities and it is quite common to see two or more floors of shops in some suks.

Colleges (madaris) are among the important public buildings. Besides the finest market in the Arab Mediterranean world, Damascus had twenty colleges and two hospitals (Haristan). The numbers of public baths (hammams) are frequently mentioned. These are vaulted structures to which the principle of the rectangular court and Livan system were applied. Thus the court was closed, only allowing small holes for lighting. The main object was to keep an even temperature, and thick walls and vaulted ceilings served this purpose. Small indirect passages not only avoided wind but also

(1) Le Strange, "Palestine under the Moslems", pp. 255-6. The Oriental J. Sauvaget in an article on Damascus in the Arabic periodical Al-Mashriq, No. 34, 1936, pp. 151-208, compares the Qaisariya to the Bourse in its function.

(2) Ibid., p. 255.
helped to give a sense of privacy. The central fountain was an important feature in the courts and covered lounges of Public Baths.¹ The Gymnasium (Zoarkhana)² is another public building of an Islamic town barely mentioned by writers. It was a vaulted indoor cellar with a cooling arrangement similar to that already discussed in the treatment of the Serdab. These devices helped wrestling to become more practicable in the lassitude of summer heat.

It was an act of piety to erect small mosques, colleges and public fountains. The names of benefactors were usually inscribed on the monument, and Islamic architecture owes a great debt to this source of private generosity. In many instances the building takes the name of the donor. Waqf property includes all buildings and lands left for the welfare of the Islamic religion.

In contrast to the self contained and unchanging rural way of life, the spirit of urban development was subjected to change and political upheaval and therefore tends to evolve in a separate channel. The influence of external

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(1) For architectural illustrations of Islamic baths, see M.E.Fauzi, "Les Hammams du Caire", 1933.
(2) Persian word - Zoar means strength and Khan place.
factors in the later clash of Arab and Persian rule made itself felt in the order of town planning. At first the material power and magnificence of the Abassiyd period was reflected in a "baroque scale" and proportions of its buildings and layouts; this was a superimposed development, unsympathetic to human scale environment containing the seeds of decay and disruption which followed. The "Golden Age" of this period magnificent in outward display, was lacking in the deep core of Islamic spirituality. 1

The rule of the Mamelukes and later Mongol invaders widened still further the gulf which separated governors and governed and thus the logical development of towns became a sectional indoor arrangement reflecting fear and insecurity. It resulted in small sects grouping themselves into towns within a town. Co-ordinated effort was lacking from public service with a consequent degradation in the healthy order of urban society and the spread of disease.

This throws a heavy burden of responsibility on the present which can learn so many lessons from the practical

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(1) The City of Samarra an expansion of material magnificence is to be seen by the grand dimension. The city stretches for 33 km. (20 miles) along the Tigris. The Balkuwara palace, which the Caliph Mutawakkill built for one of his sons, forms a square of 1,250 m. (say ⅔ of a mile) on each side. One of the giant mosques measures in plan 260 x 180 m. (528 x 594 ft.). Quoted by Oswald Spengler "Decline of the West", vol. II, Footnote (1) from Herzfeld, Ausgrabungen von Samarra, 1912.
experience of the past. The interdependence of agricultural and urban environment must be preserved by the stable outlook of people and authorities concerned. When urban societies become divorced from a physical and spiritual response to their environment, they always bring an unhealthy civilisation without the blessings of ethics and culture which in turn will affect the surrounding countryside. This is especially true in the hard climatic conditions of the semi-arid regions of the Mediterranean where mutual dependence is so essential to man's whole wellbeing. The rise of Islam gave a set of ethics and practice with an intrinsic value to the life of settled Arab peasantry. These should inspire the architectural expression of the Arab village in the Mediterranean of the future.
PART IV

CHAPTER VIII - Present Transition and Mediterranean Culture
CHAPTER IX - Regional Planning and Rural Settlements.
CHAPTER X - Urban Planning.
CHAPTER XI - Architectural Design and Building Material.
CHAPTER VIII

PRESENT TRANSITION AND MEDITERRANEAN CULTURE
PART IV

Chapter eight

THE PRESENT TRANSITION AND MEDITERRANEAN CULTURE

Modern north-western civilisation penetrating to all areas of the Mediterranean region and bringing a transitional change. Modern civilisation tends to be independent of natural environment. This trend is reflected in modern architecture. Divorce of scientific thought from artistic content is the nature of the present problem.

Technics and the place of art in world unity. Regional styles helped by modern technics. Consolidation of regional character into 'national culture'. Means within present education to cultivate spirit and body towards environment if an objective Mediterranean attitude is to be realised. Importance of education in terms of environment to relate modern scientific knowledge of familiar local surroundings. Necessary to derive first-hand knowledge by such early outdoor observation. The open air theatre.

Serious lack of appreciating or understanding of rural character at present; architects to be trained to their visual environment. Effect of architectural training abroad on departmental office work. The social and political significance of regional character. Arab unity should aim to help to foster the growth of an artistic outlook in the near future.
ment of technological advancements, such an attitude is justified.

With pride we can admire the progress and rapid development. Generally need to denote such a development and pointed to eternal character. The term modern architecture is as they may possess tack and real or deep feeling for the

which they are subjected to. Such superscripted differences

into a unity with the physical and cultural surroundings

Not even an apparent attempt has been made to fuse these

are important modern architecture that could be anywhere.

of the modern buildings in the expanse and benefit for instance

Many present day architecture and the urban developments.

a perfection of the tendency is clearly illustrated in

directed further away from local climatic environment

East and West, North and South, human mind and energies have

the meeting of interests is the result of a new and complex set of problems.

an penetration which although promotes wider intercourse

interests have served as the wedge to move complete political

feel the full weight of western civilization. Economic

of chance, and the whole world in particular is beginning to

region as a whole is undergoing a transition period

penetrating into every quarter of the globe. The Mediter-

full force of this impact has penetrated and is still

societal, political, economic and international sphere. The

modern civilization has a tremendous impact on the
a result of present confused thought revealed in the lack of co-ordination between technical progress and the artistic concept. Scientific thought and accuracy are not presented through an artistic vision or content. The sharp division between scientist and artist in western industrial nations advance of at present is a new concept. While the/technical communications has fostered an internationalism that brings all quarters of the world into closer contact, it is important not to overlook the integrity and attainments of the various groups that form the material substance of such international association. It is an instance of the good of a whole depending on the well being of its parts. The weakening of such cultural bases means the danger of continued conflict, and any attempt to avert such a threat should be welcomed in a period like the present.

Education in terms of art and human understanding should receive serious consideration in Mediterranean countries which are undergoing a transitional upheaval of technical civilisation. Education in terms of environment is one expression of such an artistic attitude. It should be fostered early in childhood so that the adult grows more responsive and alive to his own regional surroundings.

Architecture reflects people as well as the architect concerned. Just as a sympathetic audience at a musical performance fuses conductor, orchestra and audience into a
unity which brings spiritual satisfaction to all, so the architect will be at his best when people are more sensitive to form and composition.

This type of regional education fuses the particular and the general since it stresses regional culture and at the same time gives a tangible expression to the broad view of art. The truly cultured and sympathetic individual will enjoy and gladly accept the essential differences of other regional qualities. Thus response to one's own environment is by no means a negative or isolationist attitude. On the contrary, it builds a sound general outlook through a cultivated awareness to the values of place and time.

The future of art in Mediterranean countries must be safeguarded by a due appreciation of the importance of a right education based on a regional understanding. Education in terms of environment will create the nucleus of a consolidated regional culture that groups itself into a 'national culture'. Thus regional culture is at the root of 'national culture'—a term which is used so loosely at present.

The objective attitude to art and national culture has been conveyed by Plato early in Mediterranean history, when he speaks of Music and Gymnastics in the sense of the cultivation of spirit and body towards environment. The present
trend of civilisation as expressed in its developed urban
cities unfortunately contributes little towards this end.
The fusion of the two aspects is the secret of the glory
of Ancient Greece, it means vitality and healthy energy
directed boldly yet gently into arts. Exclusive gymnastic
education is dangerous without the arts. It leads to a
harsh rule which has often been experienced in the Mediter-
ranean as for instance the times of Sparta, the gendarme
rule of the Turk and modern colonial infiltration based
on the rule of material force.

In the sphere of educational activities there is a
flexible medium for revealing a creative skill which relates
and develops both poetry and gymnastics. Camping\(^1\) and
similar orderly outdoor activities could inspire and help
to foster an attitude of co-operative organisation which is
needed so badly in Middle Eastern countries. Such an
attitude is the root of the problem of art and architecture
since sympathy with environment is part of the poetic con-
cept of architectural character which has to be related
ultimately to people and place. Wrong methods of education
have been largely responsible for the lack of response and
feeling for present regional art creation.

(1) Camping will also familiarise people with Bedouin art
and give an instructive sense of structure which is
needed in everyday life.
Education should help to combat a modern tendency to cram facts without first testing their relevance against the background of familiar environment. Modern scientific textbooks in the countries of the Near East are often content with literal translations from Western Europe and when using examples they are often foreign to these regions thereby deepening the gulf between technique and natural environment. A more practical education combining the practical and the aesthetic, the useful and the beautiful is one of the tasks of the future. It is important to fuse science and art at an early age and not to attempt any premature specialisation which so often produces an individual crammed with facts which cannot translate into the problems of everyday life. It is of primary significance, for instance, to relate the programme of village schools to the tangible facts of their own environment. This is more important than cramming with facts and dates of a Charlemagne or a Napoleon which contributes little to the real well-being of a village boy. College graduates are often faced with serious difficulties when called upon to translate their intellectual book knowledge into everyday practice. The shepherd who

(1) In a recent Middle East Conference (Cairo 1944) this fact was recognised and constructive criticism was levelled on the relationship of education and rural environment.
cannot read or write but still sings is more of a genuine artist. If our aim for the future is a cultured Mediterranean civilisation it is imperative to direct human energy to the cultural welfare of its localities.

The gymnasium and open air theatre are reflections of past achievement which could play a great part not only in pointing the way to future activities of a similar nature but also in stimulating genuine enthusiasm and understanding bringing the past into the present. The importance of oratory in Southern climates reflects social and climatic environment. Such tendency could be stimulated by the open air theatre and class activities in the vicinity of schools and colleges. Literature and poetry recited in a natural open setting will stimulate artistic appreciation in every sphere. Appreciation of music and poetry will be linked with the visible composition in architecture and town or village environment. To strengthen and encourage the relationship of man to his environment means paying at present more attention to rural life and its maintenance on a sound healthy basis. The services of architecture to rural planning should embody such a relationship and give it a worthy symbolic expression. This most significant aspect is unfortunately considered very little in the present drift of civilisation in the Mediterranean. Architects are often replaced by engineers who had their scientific training abroad and return
home to build and create without due consideration or sympa-
thetic awareness of rural environment and character.

Urban scholarship should help, never destroy, the rural
culture of an essentially agricultural Mediterranean. The
promotion of Mediterranean studies by home and world insti-
tutions should be encouraged and the fruits used in build-
ing the future. The study of ancient culture is linked sig-
nificantly to Mediterranean conditions, yet it receives
greater recognition in non-Mediterranean countries than its
homeland. Greek culture should bear a paramount role in
the historic study and arts of the Middle East, and Arab
countries. Classical architecture is a direct source of
inspiration for similar climatic provinces of the Mediter-
ranean and as such needs a more detailed and attentive
study at present.

Architects trained in European universities often return
to the responsibilities of governmental work. It is un-
fortunate that their training so often does not include the
outlook essential to their art, since they have been con-
cerned mainly with theory and practice largely relevant to
a different climatic environment. The acquired architectural
vocabulary is reflected in their creative work. Copying
with superficial adaptation does not stamp their design with
the necessary intrinsic character. Undoubtedly it is essen-
tial to be equipped with the science and technics involved
in building which has been mastered by the North West. Yet provided there is no serious lack of technical efficiency, stimulating scholarship and the activities of interested societies should awaken a human artistic attitude in the practising architect. Promotion of Islamic and Hellenic studies in particular might furnish a guidance to the architect who is adrift. Although the problem seems largely self-evident, the present thought and attitude seems hardly aware of its existence.

Architectural education in particular should aim at training students to study buildings in their environmental setting. The result of such visual training should be particularly beneficial when the student comes to design for himself. There will be less need for copying and catalogue guidance since he will have a more tangible architectural vocabulary from which to derive regional inspiration. Students should be encouraged to visit places of architectural interest in order to study local architectural styles. Records of such work should take the form of analytical studies and measured work should be a part of the programme. In the same way compiling architectural surveys of small and large towns should form part of future architectural activity and research.

It is important to relate the regional climatic character
in buildings to their social significance. Only too often
government buildings are designed from a central office with
no regard for the effect of the character of the building
on the mind of the people who are supposed to use it. In-
stead of symbolising the co-operation which should exist
between people and government, such buildings tend to become
oppressive and do not inspire allegiance. They have no local
character and in many instances people are reluctant to send
their children to schools built in the harsh manner of re-
inforced concrete. Separation of people and government is
one of the major problems of Mediterranean politics awaiting
solution at present. There is a latent source of true demo-
cratic feeling in the medium of buildings which should not be
dismissed as mere meaningless sentiment. Responsible local
authorities must recognise a philosophic, cultural, artistic
and social demand for the expression of a true character in
regional architecture.

At present the Mediterranean is witnessing a new his-
toric development. The whole Arab world in the Eastern
region of the Mediterranean is experiencing a revived sense
of unity. At such a moment it is essential to recognise
the need for an artistic outlook in the present reconstruc-
tion. Already conferences have been held to co-ordinate
mutual problems of economics, agriculture, engineering and
transport in the future. The need is urgent to realise the necessity for a fundamental approach to fine arts and cultural strength. Such an approach would make it possible to encourage artistic scholarship, institutions and exhibitions to create central and local trusteeships for architecture and allied arts, to introduce new lectureships in colleges and universities. This aspect must be emphasised in education, craftsmanship and technics so that the nucleus of a healthy culture and its attendant benefits may be firmly established in these most ancient homes of mankind.
CHAPTER IX

REGIONAL PLANNING AND RURAL SETTLEMENTS.
Chapter nine

REGIONAL PLANNING

Regional planning and the Mediterranean climatic conditions. Effect of water conservation and its planned distribution on future settlements. Co-ordination of inter-related programmes in a regional scheme. Diagnosis of some causes for disease and discussion of role of regional planning for improving the general health conditions. Better climatic conditions of particular districts could be realised in a foresight coordinated regional planning.

Modern technical advance in discovering and utilising water sources helps to promote a stable agricultural life. Bedouin and Fellahin (cultivators) settlement a desirable need. Improvement of cultivated oases in desert surroundings is an interesting feature problem.

Water planning and hydraulic conserved power. Link between use of power and domestic and craftsman work services. Relation of agriculture to fabric and textile art industry.

Forestation and its effect on relative humidity of a region. Two-fold effect of trees - they act as a filtering agent against the worst nuisance of dust and reinforce the loose shifting sand, thereby helping cultivation; forestation for building timber.

Prospects of high altitude zones as summer resorts. Importance of historic and archaeological sites in future planning. Landscape and civil engineering programmes. Aesthetic expression of water in the regional landscape. Quarries for building material could play a great part in preserving regional character of a district instead of importing unsuitable alien products.
Physical and Mechanical Aspects in Planning

Air-conditioning - mechanical cooling devices etc. are to be regarded as auxiliary services. Some physical adaptation to climate is to be secured, it works for better energy and health; acceptance of limitations of new forms of conserved energy in man's physical existence in nature.

Rural Planning and the Mediterranean climate

The due recognition of the integrity of the village settlement microcosm of Southern Agricultural country planning; future prospect of its sympathetic Mediterranean architectural expression could be a conscientious development stimulated by a new responsive art scholarship.

Climate and the architectural composition of the village settlement. The compact grouped type of village.

Principles of physics related to planning for coolness. Cool ventilation in relation to village and town planning.

Arab villages and their cellular open court composition. The place of the minaret or church tower in Mediterranean villages. Regional character and the new colonial village settlements.
The Mediterranean region is an outstanding example of an area which needs the benefits of regional planning to restore its fertility. The need has been felt already and a few reclamation programmes have been put under way. The monumental scale of achievement in the Tennessee Valley will undoubtedly prove an example in Mediterranean provinces which are climatically similar. Arid climate makes irrigation a living necessity and problems of water collection, distribution and storage will obviously necessitate planning. Modern scientific methods could be employed for this task in the many areas which have suffered the consequences of neglect. The fertility of the soil has been ravaged by the forces of erosion and the general desolation is tragic. Vanished city sites whose names evoke a historic past could regain their former prosperity in the Middle East and move on to a renewed cultural life.

In order to restore a region to normal standards of habitation and cultivation it is necessary to co-ordinate

(1) In Italy, for instance, land reclamation programme (Bonifica Integrale) of the Italian Government was directed towards the problem of proper utilisation of the clays of the Apennine foothills. C.V. Jacks and R.O. Whyte, The Rape of the Earth; World Survey of Soil erosion. See Chapter II, Europe and the Mediterranean.
the inter-related programmes for improvement in water problems, agriculture, forestation, health and transport. It is an economical project that will contribute to material welfare and improved conditions of living. Advance in technical efficiency and material welfare need not be made at the expense of spiritual and cultural values.

Regional planning could contribute a great deal to climate and health in the way of prevention rather than cure. For instance, the spread of malaria could be checked by removing such root causes as unhealthy swamps. In a fully conceived programme for national health it is now possible to eliminate the evils of polluted and unhealthy sites which Alberti and the Ancients would have avoided but now we cannot afford to ignore their unhealthy existence.

The rainfall and underground water sources of various climatic regions can now be more easily ascertained. Modern technical equipment and the location of boring plants are factors which help the growth of settlements thereby opening a new active era in Mediterranean countries. This should ensure a measure of security in agricultural settlement and could help to maintain a stable rural community.

The settlement of Bedouins to agricultural village life could be effected to the advantage of all. It should also be possible to develop the green island oases into flourishing agricultural entities presenting a striking contrast to their
desert surroundings. The scope for improving the oasis is a task awaiting the creation of departmental institutions and practical research. There is even a possibility of utilising wind power to generate necessary mechanical energy.

Regional planning also means the utilisation of natural sources such as waterfalls for energy and electric power which would be an important and effective aid to local craft industries. This is one of the material assets which distinguishes the modern age and it could be harnessed to the services of 'art' and domestic requirements. Agriculture is related to industry; mulberry cultivation, for instance, should also mean a flourishing local silk workshop as mentioned in an earlier connection. Textile craftwork is a famous Mediterranean industry which should be revived and not allowed to die in face of the present influx of inferior counterfeit factory mass products.

In the near future, if not already, people will again realise and appreciate the lasting quality of primary materials worked with human personal care which combines efficient use and artistic sensitivity. The absorption of labour into craft work is a sound investment for the future in an awakened world beginning to be tired of a primarily mechanical output. This attitude is reflected in the present increased appreciation for antiques in industrial countries.
Artistic work is more suited to the temperament of Mediterranean peoples than regimented factory labour. The intellectual and emotional aspects of personal expression find an outlet in individual creation. Moreover craft industry is suited to the agricultural life of a southern climate and does not involve serious upheaval in social and domestic amenities.

Forestry is of great importance in the sphere of regional planning. There is a real need for such study since gradual deforestation in the past has had disastrous effects in spreading the process of erosion and making once fertile land a desert.¹

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¹ The importance of forestation is stressed in various reports, for instance the Palestine Royal Commission on Forestry 1937, states: "The fact has to be faced that there are today no real forests in Palestine and that if there is one country in the world in which afforestation is desirable that country is Palestine." Cyprus also furnishes a typical example of the damage effected by continued deforestation. R. O. Whyte summarises this tendency, The Rape of the Earth, p. 41. "Authorities state that there are no indications that the climate of Cyprus has changed during the last 3000 years. The change from fertility to aridity has been due entirely to deforestation. Those forest areas which have been more or less preserved for the past fifty years are showing much improved growth and a thin humus layer is forming on the soil. The need for preservation in other categories of forests is not fully recognised by the people; the natural vegetation has been seriously disturbed by unrestricted pasturing of sheep and goats, the latter being an important source of livelihood in the hills ... Considerable areas have been denuded of natural vegetation by cutting of fuel, the demand for which becomes increasingly acute with the rise in population.

Footnote continued:
Tree growth can also effect a change of climate since it alters the relative humidity of the atmosphere. It is important to consider the growth of trees with a view to the climatic needs of a district. Conditions in semi arid regions can be considerably improved when trees are planted since bare rocky hill-sides would be protected from the intense heat reflection and the harsh glare by a protective covering of soil and also the constructed shade of the trees.

No less important in improving the climatic conditions of a site or a region is the problem of excessive floating dust in the atmosphere. Though no statistical calculations showing its relative content in various regions have yet been compiled, the problem is particularly distressing in arid

Footnote continued:

The exposed hills on steep slopes are very susceptible to erosion and the numerous streams and winter torrents rushing down from the mountain ranges during the rains remove enormous quantities of soil, which are either distributed over the plains as a thin layer of very erodible silt or carried out to sea. Forestry, dry stone walling or terracing, reduction of livestock (particularly goats), and prevention of fuel cutting are methods being used for control of soil loss and excessive run-off.

For similar observations in Syria, see H.C. Butler, Deserted Cities, Century Magazine, vol. 66, pp. 217-227. "Olive groves are occasionally found in ruined towns and cities where the soil has been held in place by ancient walls."
conditions. The clarity of the air is destroyed and intense irritation affecting the health conditions such as, for instance, the spread of the eye disease of trachoma or lung diseases occurs. The cooling blow of winds instead of proving a blessing in summer, is cursed because of its dusty and sandy composition. No mechanical devices can hinder its penetration indoors since the dust is so fine, it can filter through the smallest crack. The broad concept of regional planning could help to remove the fundamental causes for these devitalising nuisances. The problem might be partially overcome by appropriate methods of afforestation. The filtering action of trees would afford a protective zone. In conjunction with agricultural policy, such trees would bring advantages in other concerns of an economic nature.

The extent of the problem has been sketched here to show the immeasurable opportunities under man's control for alleviating and overcoming the local climatic inconveniences. Control of soil drift is a problem which has been considered in Russia. The Russians were among the first to plant shelter belts as windbreaks in the steppes, and great benefits in moisture conservation and crop growth are claimed for them.

(1) Jacks and Whyte, Rape of the Earth, Chap. XIII.
The effect of dust on vegetation and tree growth is extremely serious, trees round farmsteads are smothered and die because of the lack of moisture, due not to a lower but to a less effective rainfall.\(^\text{1}\) Tree growth and vegetation helps to reinforce loose soil formation or sand dunes and makes them suitable for reclamation and cultivation.

Trees also have a beneficial effect in preserving water courses from the dangers of excessive evaporation. At the same time they form an important source of building material and fuel which are both vitally needed in Mediterranean countries at present. The moist climate of regions of high altitude in the Mediterranean would thus be complementary to the need of the plains and urban development. The unity of the Middle East helps a great deal towards a sound regional economy.\(^\text{2}\) With improved methods of transport it should be

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(1) Loc. cit. Other examples of this practice in Turkestan, Australia and America are mentioned.

(2) This fact has lately been recognised. The Times in a leading article on Arab League and the unity in the Middle East [more correct to say the Near East] refers to the past mistake of not recognising the unity of the Arab countries East of the Mediterranean, and states: "But serious mistakes had also been made. These were mainly attributable to failure to recognise the fundamental unity of the area; and this failure led her to neglect policies of economic and social development, which were practicable only when undertaken for the region as a whole, but on which the stability of every government within it eventually depended. ... that the well-being of each country depends upon the kind of economic progress which is impracticable without the development of the entire resources of the Middle East. The lesson that democratic institutions do not of themselves ensure a prosperous economy has been well earned and has in turn led to a clear perception that prosperity depended upon regional rather than local organisation." Times, 10th April, 1945.
possible to bring wood for building purposes. The cedars of Lebanon which used to be brought down the Euphrates to Babylon are still urgently needed for the carpenters' workshops in the towns and villages of Iraq.

High altitudes within a more or less similar latitude provide the Mediterranean region with cool summer resorts. The mountainous areas in North Iraq, Syria and Lebanon could all be developed still further along these lines, thereby demonstrating the unity of the Near East and the orientation of Iraq towards the Mediterranean. Similarly, the French and Italian Riviera together with North Africa provide a winter resort still within the limits of the Mediterranean region.

With the quick and easy development of transport these mountain regions will be more easily accessible for greater numbers of people. This is bound to lead to new building and commercial development, and it is important to think in terms of natural amenities at an early stage before unhappy exploitation takes place. This would come within a co-ordinated regional scheme and should be considered in a spirit of co-operative enterprise by the various governments and localities concerned.

Water courses and trees are public amenities not only because they form natural beauty spots to be preserved from
serious violation but they also are valuable climatic assets. Polluting the atmosphere or a water course is a serious offence since it upsets public interest.

The many historic sites of the Eastern Mediterranean should be treated with reverence since they are likely to become the original museums of scholars in the future era of easier travel. On no account are these sites to be exploited for commercial advantage, nor should indiscriminate building with no attention to regional style or local building material be allowed.

The artistic values in relation to landscape are of the utmost significance when translating these regional schemes into reality. The attitude of a civil engineer, for instance, should be guided by the artistic valuation of landscape. Unfortunately, technical knowledge of the engineer at present is not guided by an artistic scholarship. Many new designs carried out in steelwork, bridges, waterworks, tank storage towers, bear no visible intrinsic relationship to environment. A sensitive guidance would tend towards the acceptance by engineers of local material executed as the better alternative design. It must be stated that even from a scientific point of view, the extensive use of steel in bridges or aqueducts in southern landscapes is unsuitable and even when involved calculations and complex work has overcome the problem of expansion and contraction, the presence of such erections is alien to the Southern latitude.
The need to convey a sense of coolness in the landscape should stimulate artistic enquiry to relate water engineering to this purpose. It would mean choice of stone for instance rather than steel in bridge design. Wherever he looks an ordinary observer sees the association of water with stones, in the rocky girdle of the Mediterranean sea, the gush of water through limestone or the beating of rain on stony hills. Besides fulfilling material requirements of water supply there is a great scope for the architect to seize his opportunity to create the need for cool environment. The outlook of the water engineer tends to be strictly mechanical with no thought for the aesthetic considerations of water display and its cooling effect on the landscape.

One aspect of regional planning which has never been considered is the possibility of allocating quarries in regional districts to meet local building experiments. This would combine a larger economy with what might prove the first and most important step towards a regional architectural character. The latter would express itself naturally since building material will not be exactly the same in all localities because of different geological formations. It would

(1) A due and worthy artistic appreciation of Mediterranean stone architecture is revealed in A. Stokes' work "Stones of Rimini".
establish an organic relationship between the natural landscape and the architecture of the region since regional character and the 'vernacular' quality is mainly affected by building material.

Hydraulic power provides one way of generating electrical energy. It can serve a great purpose in combating excessive heat and providing the summer need for cooling water. In general, planning should be guided in harmony with nature as a healthier attitude to Mediterranean civilisation than continually trying to escape from one's surroundings. A high degree of dependence on mechanical devices in city life tends to separate man from the benefits and pleasures of nature. It tends to enfold him in a mantle of physical and spiritual lethargy. Hence it is most important to accept the limitations of the new forms of energy in Mediterranean regional planning.
Throughout history, the Mediterranean has witnessed disturbances and upheavals and the present age has a great deal to learn from the past in order to achieve a continuous stability. The agricultural community and its expression in a self-contained village society is the natural, logical, and most desirable way of life for a peaceful and contented Mediterranean society. Its disruption in the past was followed by the temporary exotic growth of urban life which reached a climax in unnatural non-organic civilisations, which subsequently were bound to fail. Our present advance in technical knowledge should aim at strengthening the healthy village society which is the real microcosm of Mediterranean culture.

We must avoid the mistakes of the past especially when there are ominous signs of a drift towards the same threatening phenomena of complex urban life. Such city development is fostered by the impact of technical civilisation, the educational system and the social recognition attached to urban governmental posts. Despite superficial attempts

(1) This fact has been recognised and attempts of educational reform in regard to rural culture are partly being put under way. There is a department for rural agricultural education in the Iraq Ministry of Education, but as yet this is more nominal than real and depends on the personal vision of those assuming responsibility.
and schemes for the revival of rural culture so much still depends on leadership and co-operative thought. It is to be hoped that with the revived unity of the Arab region the plea for rural life as the culture of the Arab nations will bring renewed life and prosperity to village settlements.

The reclamation of land and water distribution both come within the scope of regional planning and would secure the material basis for a revival or evolution of village settlement.

Climatic factors will undoubtedly influence architectural expression. The semi-arid climate of the Mediterranean affects the type of settlement. The abundant rainfall of the North would favour the development of isolated farms. By contrast, the Mediterranean community clustered round the water source. Thus the closely knit built up area of village formation becomes the regional character related to the Mediterranean type of climate. It also denotes an integrated society dependent on co-operative effort, protected from the heat by virtue of its compactness and shady quarters. Such an inter-related composition affords also protection against the glare of summer light by its shady spaces. Moreover, it is suited to the winter warmth requirement by its closely knit grouping arrangement and the resistance to winter cold wind.

The hot dry air of the semi-arid environment has to be made cooler in its passage through the living quarters of
For example, to find in temperature
extract heat from the main body of water, which there-
less than that corresponding to the water temperature?
less than that corresponding to the temperature of the air at the
water surface in the same manner as it would heat a metal
partly immersed or the steam in the air. The
the physical law governing the above phenomenon.

The absorbed heat from the radiant heat of the sun
shattered from the radiant heat of the sun's
demonstration of the temperature of the water
without exposure to the air or to the air remotely.

In an example it was shown that the
water exposed to the excess of the water temperature
exposed to the excess of the water temperature.

It is not generally recognized however that the same
phenomenon due to the absorption of heat by the air,
air and water are passed over water produce a fall in the water
air and water are passed over water produce a fall in the water
air and water are passed over water produce a fall in the water

It is common knowledge that a stream of steam on
part L. pp 620-629, January 1822.

(1) A.W. Scott, "The Convective Effect of a Hot Air Stream on

private foundations in tillage settlement.
root of the joint and aesthetic appeal of the public and
extent to which the foundation at the time
of water departs in retention to the movements in
of the foundation the real estate.

the foundation phenomenon which must be observed
over water, a convective phenomenon which must be observed

between sun heated open air and cool shady places creates an

Mediterranean plant composition. A current of air
of the major aspects of
town or village. This should be one of the major aspects of
Clusters of buildings form a compact group composition; the apparent lack of open layouts in the streets and public places of Arab towns and villages is mitigated by the interior court formation within the pattern of grouped houses. An outsider only sees the narrow lanes where in fact the idea of exclusion and privacy enclose the court spaces (Hawah or Sahat or Barrani).¹ It is only possible to gain a true idea of the village layout from the height of a minaret. The mosque with its wide open sahn and well constructed shady places forms the nucleus of the village. Its open character makes it a cool resort for evening and the sanctuary and ruqas are shady spaces free for public use. The mosque fuses social and administrative activities in the life of an Arab village. The minaret is an open air tower which occupies a fundamental and symbolic place in the rural landscape. It marks the identity of a village and serves as a guide to travellers and strangers. (The name Manara denotes such a meaning.) When this idea is translated into architectural terms we accept the purpose of the minaret in completing the unit of utullying village houses. Thus the architectural

(1) Barrani in Arabic from Barr meaning the vast open spaces; it is used mostly in conjunction with large urban houses.
expression is imbued with a good and purposeful meaning.

In relating village composition to the landscape we should observe a sensitive architectonic relationship between the two. This is especially important in hilly sites where distant travellers see one composition for village and landscape. The site itself would denote a strongly marked individuality. To recognise this fact means the first step to an inherent harmony and the achievement of a vernacular quality in architecture through the acceptance of the use of local building materials. In contrast to a superimposed pattern this makes for an inherent response between the organised architecture of a built up area and the landscape from which it springs. When analysed by an artist, the underlying spontaneous pleasure sometimes referred to as 'picturesque' is a reflection of this relationship between buildings and landscape. We could then afford to attain a consciousness of fine quality "architectonic" if the recognition of landscape is felt and the raw material of the stony hills were set up and hewn to shape. The relationship between the built up wall and ground landscape invites particular attention from the architect who in capacity of a composer could not ignore the ground material in this regional architectural creation. Even if other materials for building purposes suggest themselves in particular districts, it is important to master an effective transition
between the sloping ground and vertical built up wall. Local materials nearly approaching their natural state should suggest themselves for rural use. This practice suggests itself to the local builder who acts with an unconscious theory of design. Whitewashed wall surfaces would at least be made more harmonious when the surface texture of the wall base retains an intrinsic relation to the ground and thus avoids a sharp transition between ground and wall. A similar inspiration underlies the Greek temple stylobate for instance which denotes a masterly and sensitive grasp of the relation between ground surface and column order.

The question of colour and landscape has been discussed in a previous instance but in this connection it is important to stress the problem of glare and its relation to the texture of building material in southern conditions of light. The dominance of the wall exposes extensive surfaces which become a source of intense reflected glare when rendered smoothly as for instance in the common use today of white cement. The metallic character of reinforced concrete wall surfaces is particularly harmful and restless to the human physical sense of vision. The appeal of white surfaces to modern architects is perhaps more apparent in a sketch design representation which often seems to lack a sense of realism.
with regard to the quality of daylight. Though this treatment of buildings is justified because they suggest coolness and would shine brightly in the evening light, it is important to think of them during working hours and experience the glare and irritation which they cause. Even camera lenses find it difficult to record their photographic image. The texture of primary building materials such as stone in hilly sites or the making of yellow brick in the plain is a happier and more restful surface for the eye. The material itself and possesses an inner quality of light/brightness without reflecting surface glare and so its appearance is more inherently restful.

Creating shadows by such devices as textured decorative wall rendering, mouldings, carving, joint recesses or fluting helps to produce a more restful conceived design with protection against undue glare. Besides their suggestion of coolness, green spaces and their shade form a material means of avoiding glare.

In the hilly and mountainous landscape where the colour tone of rocks and mountains suggests heat because of the deep warm tones it would be desirable to adjust a cooling contrast. Here is an instance where local building material of such deep fat colour need not necessarily be used throughout the whole construction. In this case the particular end in
practiced by cartesmen.

The permanent quantity of expectation in expressions that lack
with abruptness. To express in a superficially manner,
It resolves to dress up the buildings in a superimposed manner.
To produce an effect on character is often very superficial.
The new buildings in the near east and north Arabia the attempt
are needed for a fully developed architecture. In many of
the local environments, both of which
study of the local environments, not necessarily direct by a serious
and abrupt partial tradition, nor intended directly to understand
architecture would seem to be neither attempt to understand
achieve a serious work of regional art. Town planning and
town planning schemes. In general, these schemes fail to
motives have affected the preparation and execution of many
partitions, with the underlying economic and political
facets Italy in Libya or German Jew's immigration into
such as French enterprise in North Africa, for instance,
into debate. The influence of European colonial development
more visible and local settlements can be expected to spring
more probable extension of the scope of regional development
are the idea and creation of many settlement schemes. With the
Colonial development in recent years has resulted in

As it is to attempt to produce a cool sensation.
It would represent a happier outlook if the architect or town planner made a serious attempt to include local labour and craftsmanship in the realisation of his scheme. It would contribute to and enrich the local character. If the town planner aims at a higher artistic standard in the future he should attempt the harder but more profitable task of making certain that all the associated work in his scheme is well developed. The modern town planner acting in a rural capacity would have the advantage of potential local craftsmanship in addition to a wider scope for theoretical and contemplative study. This should mark a new stage of progress in architecture.
CHAPTER X

URBAN PLANNING
Chapter ten

URBAN PLANNING

The relation of agriculture to urban development. Need to guard against present tendency for modern towns to be independent of environment. The lesson of past civilisations should be studied in this connection.

The town as a nursery of craftsmanship to serve village requirements. Interconnection of stable agriculture and local industry. Suk activities dependent on the prosperity of rural countryside.

The suk as a workshop in towns. Need for a cool summer environment in the suk. Shelter against heat means a roof covering; "to construct shade" a primary necessity of Mediterranean town planning is reflected in suk design.

Air movements between open and shady parts of urban environment. Vertical air circulation by means of "badger". Design of open places in towns to be thought of in terms of air movements through gateways and openings to shady parts.

Climate and the architectural character of town; closely built architectural formation as opposed to the "garden city" idea for Mediterranean conditions. One aspect of town planning is to cater for both summer and winter requirements - protection against heat and cold.

Diagnosis of the unhealthy atmospheric conditions of existing towns. Particular remedy in each case is dependent on local topography and relative moisture in the atmosphere. Effect of gardens and increased vegetation on climatic conditions in hot arid towns. Correspondingly, reduction of moisture is the problem in the local humid areas. The control of climate and atmosphere must be exercised for the public benefit.

Drainage. The effect of a poor drainage system on the urban health conditions.
Gardening in relation to drainage. Principle of applying compressed air in the problem of town waste.

Boggiano-Pice process. Overcoming the dilapidated appearance of towns and the dangerous effects of sub-soil water on town buildings. Social effect of associations of bad drainage on present architectural appreciation. Technical and scientific advance could help to nourish and healthily maintain the regional architectural character.

Western European town planning patterns in Mediterranean countries. Need to guard against evils of ribbon development. Town expansion could be controlled by determining an outer garden belt or agricultural zone.

The housing problem. New housing suburbs lack a regional civic expression. Traditional court design pattern versus European cottage type. Possibility of the court theme variation for the prospect of architectural composition. The classical example of the Pompeian house provides an inspiring composition capable of infinite variation. Modern methods of urban sewage should make it possible to develop the court or patio arrangement to a healthy and recreational advantage, expressive of southern volume space design.

Adjustment for winter requirements. Open air loggias facing the sun; thick walls and small windows also provide protection against winter cold. Dangers of indoor heating by means of a central brazier. Research on the ill effect of over-heated interiors. The use of a deep recessed fireplace in winter rooms [Dewa Khana]. Southern expression of the fireplace.

Relation of modern scientific advance in cooling and heating to the theory and practice of architecture.
URBAN PLANNING

The urban problem lies in the rise and expansion of towns and there is a real danger in the trend of present development to disregard their relationship with environmental conditions. The urban problem cannot be isolated from its rural and agricultural environment. When the complex evolution of urban society has become spiritually and physically divorced from the rural life of the Mediterranean regional environment the forces have been set under way for its gradual downfall. This is the lesson of the ancient and near past. The Abbasid development of glorified urban towns was not dependent on a consolidated village society; Ottoman rule is another instance of the lack of a co-ordinated relationship between village and town, while the present threatens a similar decay and disruption unless the various authorities concerned can approach the problem with a broad, long term, stable policy.

Movement of people towards town in search of work is a feature problem to be guarded against in modern urban civilisation. Such trend of large cities is fostered by the magnitude of mechanical projects, these problems lie within the realm. At this juncture of transition it would be wise if the human ecological relationship between towns and regional surroundings is observed as the physical basis for such new urban civilisation.
When the village is consolidated into a primary physical unit with the help of water distribution in regional planning scheme, the town can serve to accentuate and contribute to the welfare of the village. The town is the nursery for craftsmen. Its inherited and well established artistic skill would serve to supply the necessary equipments and tools required by its inhabitants and the surrounding villages. A flourishing industry subservient to man's local needs is an important factor in the stability and continuity of Mediterranean cultural attainment. It has served this purpose in the past and should do so in the future. It fulfills the emotional and intellectual sides of man in a worthy labour.

Usury, which is forbidden in Islamic teachings would favour a society whose primary economic structure is based on local craftswork industry.

Local requirements are fulfilled in the suk or bazaar and the flourishing of business in a market town usually follows the seasonal harvesting festivities. Thus stable agricultural villages will help to ensure a reliable local industry. In the past fluctuations of rainfall and the lack of organised water planning meant years of poor harvest felt in a corresponding economic crisis in the market. This need not occur when technical advance has made it possible to ensure a water supply which is a primary requisite for a stable agriculture.
The suk is the workshop for the town and the need for a cool urban environment is of primary importance under the summer heat conditions of Mediterranean region. The sun is the source of radiant heat and a suitable roof covering acts as a barrier against its penetration. The covered suk is a dominating aspect of town design, especially in relation to the climate of the Eastern Mediterranean and North Africa. This idea of 'constructed shade' is a primary purpose in the architecture of the Mediterranean climate, so that "neither shall the heat nor sun smite them". The change in temperature from the hot sunny places to the cooler shade could be utilised to effect movement of air currents between the two places.

A vertical movement of air suggests the domestic "badger method" which could be extended and developed to the scope of civic planning. Turrets facing wind direction could be developed as a feature design in Southern countries where the need for cool rooms is essential to living comfort. Similarly, the distribution of open places and piazzas in relation to closed rooms is another aspect of what might be termed horizontal air movement to distinguish it from the vertical badger method. When sheltered spaces are designed

(1) Isaiah 49, 10.
without a due regard to these considerations of air movement they are likely to result in stillness of air and stagnation [known in Arabic as Wakhma]. Thus shade alone is not sufficient to ensure a cool atmosphere, the air movements in the interior must be controlled. Sun heated air is healthy and a steady gentle breeze in the suk interior serves a hygienic purpose.

At present the reaction is resulting in the creation of diffused open spaces, which is unsuitable and has resulted in lack of adjusting cooling urban atmosphere, besides the loss of Mediterranean architectural character. The popular Northern "garden city" idea of scattered type of buildings

(1) In this connection it is interesting to notice the analyses of air in various spaces and the oxidising action of direct sunlight. In a research H.H. Seymour of the Royal Astronomical Society in Canada states: "In a cubic meter of air taken from over the ocean there was found only one bacterium. In the same amount of air taken from a Paris hospital there were 79,000 bacteria. In the open air of the country there are many less than the city air which as a rule is shut off from direct sunlight.... Bacteria spores or "seeds" are protected with a hard casing which renders them much more difficult to destroy than the present bacteria. The figures given for the life of the tubercle bacilli are as follows: Dark places, 2-18 months. Difuse light, 6-24 hours. Sunlight, 10 minutes to 1 hour. (Journal Royal Astronomical Society, Canada, Vol.XIV, No.4, page 130, May 1920). Abridgment of a paper presented at the Ottawa centre of the Royal Astronomical Society of Canada.
is obviously not suited to the Southern climatic conditions of the Mediterranean. It offers neither the heat shelter in summer nor warmth from cold wind spells in winter. Also an inherent lack of architectural unity is evident when seen in reality. Though the new dispersed type of development might deceive a visual unity to the town planner when seen on paper, it is important to imagine the three dimensional setting into practical reality. The architectural character of the new modern scattered type of urban environment also lacks the restful stability which a close formation possesses. Architectural composition of the south should provide in general a pleasing static contrast to the busy movements of people and traffic. At present there seems to be a tendency to regard civic design primarily as a problem of regulating motor traffic. The exaggeration of this aspect imposes an unsatisfactory standardized solution and it is important for town planners in the future to observe the relative volume of traffic in the neighbourhood of the 'small scale' town character of Mediterranean conditions.\(^1\)

The traditional pattern of town planning often does not need such drastic change as is sometimes assumed. Emphasis

\(^{(1)}\) When few cars are likely to be in real use, their movement need not impose a harsh grid-iron pattern of open streets. It is often a pleasure for pedestrian and car driver to watch the car passing through an archway.
should lie rather on removing the causes for congested traffic conditions and this ought to come within the scope of wise regional planning. The introduction of a broad avenue need not alter the essential pattern type. The cardinal crossing streets in ancient classical town planning are capable of being adjusted with advantage for modern problems.

That the relationship between height of buildings and width of street is influenced by climate has been indicated already. The effect of southern latitude location on the angle of the sun is important to observe in determining the street width. Here a narrow street is well lit by the sun and would afford a greater contrast of light and shade than in northern latitudes. It is necessary to provide shady walks for the protection of pedestrians in the open type of street or square against the piercing vertical rays of the southern sun. Colonnaded streets are semi-open roof covered highways.

In the far south towns of Arabia near the Equator, the skyscraper development of Hadramut for instance suggests a compact town grouping which could be theorised here in relation to the effect of solar climatic conditions. The vertical trend of repeating floors with lofty ceilings suggests protective shade with mass surfaces exposed as little as possible to the direct solar heat from the top. The pierced
type of window opening on to narrow corridor streets helps to ventilate the interior and also exclude the sun. Roof lanterns when used to bring light into the covered suk interior should be covered from top and provide a slit side opening. The idea of a dormer window to the vaulted roof structures of the suk is also another interesting possibility for not too direct lighting as well as for ventilation.

The lofty height of the suk corresponds to the generous proportions of the Islamic architectural interior. This interior volume of air is especially necessary when punkas are in use as a limited volume of air would get overheated by the applied mechanical energy rendered by the electric fan. The possibility of heat conserved in walls, floors and attics can be washed away by effective air circulation. The design of gateway openings in relation to enclosed urban spaces are thus to be thought of in terms of regulating air volume movements.

The collection of climatic data of a particular town and district can help in the physical solution of an urban climatic problem. However useful the service of a mechanical cooling power such as the refrigerator, it does not alter the problem of town planning which must remain mainly a physical one. This fact needs to be stressed in present attitude of civilisation. A more fitting and more lasting adjustment of man to his environment must be the cultural background
to a better Mediterranean civilisation.

The need to design open spaces and gardens has a climatic significance in the composition of a town. The balanced distribution of open, semi-open and closed areas has been the theme in architectural design throughout history. Today there is an urgent need to extend the idea of architecture to town planning and the lesson of traditional architectural composition could be learned in modern town planning design and reconstruction. The court theme for instance is capable of imaginative variation that should not be discarded in favour of mere buildings and streets.

The prospect of improving the climatic conditions of many existing towns clamours for attention; it should be duly regarded in Mediterranean conditions as a significant aspect in present and future town planning. The problem is bound to differ in various towns according to particular conditions. When introduced with a sense of discretion as regards climate to the densely built-up areas, public open spaces not only serve as recreational amenities but also result in generally improved climatic conditions. By way of contrast, a new scattered building localities would do with an increased density of buildings to provide necessary cooling shade and reduce glare. Where arid conditions prevail as in the lands bordering the dry desert or cases sites of
southern and eastern Mediterranean towns, the problem resolves itself into reducing the effect of extreme contrasts in temperature within the day. Increased vegetation will help to reduce such contrast. A reverse problem of reducing the content of moisture in the atmosphere exists in other towns. Damp heat of such sites which are exposed to excessive evaporation from marshes or a great density of tree vegetation could be relieved and heat conditions alleviated when some public control is exercised. Reclamation and drainage schemes and some control over certain types of vegetation could help to revive the site and a better and more invigorating drier air could be maintained. Climate affects the health and welfare of all inhabitants and as such it is the first to be considered as a public amenity.

With this view in mind a detailed survey study of such conditions would help to suggest a policy and a programme for the particular region and town.\(^1\) For instance, it might allocate certain zones to be left unexploited for buildings and control some types of vegetation. Smoke sources from

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\(^{1}\) This could be done by appointing certain regional Commissioners who have in view the climatic welfare of town and district in a co-ordinated policy. A mere economic survey does not necessarily secure such better climatic condition. The reverse is sometimes the case. The suggestion of a general and particular policy of improving the climatic conditions of towns and districts has not yet to my knowledge been consciously observed or suggested.
certain industries or kilns would not be allowed to blow in the direction of the town.

Drainage is a serious problem in the health conditions of urban towns. In the typical close, compact urban order of the Near East, the lack of effective drainage system brings its train of attendant evils. The polluted air is responsible for poor health and a notable increased death rate. Sun and open air surroundings reduce the gravity of the problem in a village setting. It is evident that the oxidising effect of the sun's rays acts as an effective means of decomposing organic waste material to the advantage of the soil. It is in the town that the worst evils are felt, and here it is essential to stress that a close, narrow street formation is only well suited when special precautions are taken to ensure the disposal of dirty water and refuse. It is here that the advance of science and technics can play a great part in making it possible to maintain and develop the narrow street and the climatic regional architectural character.

The narrow street is often blamed as a cause of bad health, but the real root of the trouble lies in the lack of efficient drains and sewers. The streets in many towns become a breeding home for parasites and disease-bearing microbes. The stench of decomposed matter pollutes the
urban environment. Small courts and patios in the densely built-up areas have a central pit which serves as a cesspool for refuse and dirty water.

This practice has led to a widespread reaction against the court type of house which is condemned as unwholesome. A garden space in conjunction with the court affects general cleanliness by utilising rubbish to fertilise the soil. This aspect would involve legislation in the public interest, where local authorities or waqf land administration should coordinate their efforts so as to provide the built-up areas with such healthy public garden spaces. The erection of public fountains or buildings in Islam has been an act of piety, the same idea could be extended to the provision of public garden spaces with fountains.

The problem of sewage in urban life and its relation to agriculture has been discussed in a recent Middle East Agricultural Conference.¹ The daily need for fresh fruits

(1) Held in Cairo, February 1944. The need for fertilisers suggests the possibility of using town refuse. The simplest method in small market towns and villages seems to be a process of "controlled deposition". Rubbish is dumped at some distance from the town and covered with about 6 inches of soil so that it gets sufficient air to ferment very slowly over the course of years when it can then be dug up and used. The chief defect of this "controlled deposition" lies in the fact that often it cannot be controlled. Earth cover cannot be made complete and consequently the place becomes a maternity home for rats, mice and flies. In regard to towns a new method is suggested, known as the "Boggiano-pico" process, which, it was stated, has been used with satisfactory results in Beirut. The principle observed is that advocated by Sir Albert Howard who concluded that the future of fermented town rubbish lies in the use of compressed air.
and vegetables in Mediterranean towns suggests an outer belt of fruit gardens and vegetables which would absorb town waste to best advantage.

Lack of controlled water disposal is largely responsible for the dilapidated appearance of town buildings which is so characteristic of Near Eastern plains. Urbanism and the damaging effect of a changing rise of subsoil water on buildings has been partly discussed previously in the discussion of the historic development. Bulging walls would threaten imminent collapse to the danger of human life and security during a severe wind storm. Many buildings have been known to collapse injuring and killing occupants or passers-by. Structural stability of buildings is effected by the nature of the soil in the foundation; the upward pushing movement of such soil when water increases its volume causes a pressure resulting in serious cracks or bulging. Stressing the meaning of the foundation in Arabic and Biblical literature is deeply rooted to these physical conditions. "I will liken him unto a wise man, which built his house upon a rock: And the rain descended, and the floods came, and the winds blew, and beat upon that house; and it fell not: for it was founded upon a rock."1

(1) St Matthew 7, 24 and 25.
The problem calls for a general comprehensive scheme for water disposal with regard to the particular site so that a certain degree of structural integrity can be maintained. A general study of rainfall in relation to topography and the nature of the soil should make it possible to exercise a control over sub-soil water. The rich artistic wealth and craftsmanship of many buildings is threatened by this process of dilapidation unless a public planning authority is given the power to effect extensive remedies by looking into the causes. Thus services allied to town planning would contribute to leave the art of architecture free; colour and texture of brick building tradition or carpentry may be preserved; and a true weathering process rather than dismal dilapidation would be an acquired beauty in buildings throughout time. This would add also to maintain an appreciation of the value of time and tradition which is threatened with extinction.

The hygienic factors are part of the scientific aspect distinct from the artistic quality of regional character. There is a danger lest the present period of transition results only in one-sided reaction.

Technical efficiency and change is penetrating further each year and while there is apparently little likelihood of a serious lack of skill in this direction, yet technical efficiency has to be shaped with artistic vision. It is
most important at present when such opportunities seem to lie ahead and before any more real damage has been done not to overlook the continuity of an artistic legacy which has been developed in response to regional climatic environment.

The impact of modern western European and American practice in architecture is largely that of an alien climate which has developed a high degree of technical efficiency to meet its different climatic problems. It is unfortunate that present development in most countries around the Mediterranean, especially in North Africa and Palestine, where colonial interest is most active, should impose an alien climate pattern in its new town planning schemes. The familiar evils of traffic and ribbon development threaten coastal areas and newly constructed arterial roads.¹

Where the land is a public property as it is in many cases (Arathi Amseriyar meaning government controlled land) means of defining certain areas that surround the residential in town-to-be/agricultural zones could not only effect better climatic conditions but also a better defined urban town expression. To keep the town within a garden zone of fruit

¹ These evils are hinted at in the town planning Advisory Report for 1957, Section I, clause 5. Recommendations to take action in due course by the declaration of regional areas and by the introduction of suitable by-laws are suggested to prevent the spoliation of the arterial roads recently opened along the coastal plain and elsewhere.
trees and fresh vegetables is the primary logical and natural basis in the "agricultural-industrial" life of Mediterranean countries. The transition from the open fields to the town areas could be happily created by such useful fruit and vegetable zone areas that surround the built-up area. The substitution of the military defence wall of the past by a series of orchard garden walls and trees is a progressive social development that would mark the security of our time.

An early outlook of observing such physical and obvious principles could help a great deal in avoiding the creation of problems, which then would call for a mechanical solution. And because of our mastery in modern technics we are not likely to hesitate to find an immediate application of our one side technical genius.

Housing schemes are a principal feature of modern town planning problems in all Mediterranean countries. As it is to be seen in North Africa, for instance, it has often led to the creation of a new town environment beside or some distance from the old. Such new town seems to bear no relationship to the local regional character of the old. The new pattern of

(1) See Reports of some Mediterranean countries in International Housing and Town Planning Conferences with statistics concerning the housing problem from a social standpoint.
these towns lacks the Mediterranean civic sense of grouping. The scattered lineal development of detached housing replaces the composite grouping round a court space. The court principle of architectural design groups the open, semi-open and closed in a synthetic composition to suit the open air and sheltered needs of domestic life. It answers the theoretical and practical principle of design in a Mediterranean climate. The classical example of the Pompeian house is a composite achievement which might well be adopted in the formation of modern civic housing schemes in terraces or a composition round a central garden court. Such enclosed gardens would also provide an excellent recreation ground for children and a cool evening promenade for the population of the district. While each house could have its own small private court (or composite courts) and have a private garden space or terrace beyond, it would also enjoy a public amenity of such a large central space providing the public with festive or sport facilities. Suitable variations of the classical rather than the European cottage theme have not yet been attempted in present civic and housing schemes. A development along such lines would bring a civic architectural formation that combines privacy within the home and its private open spaces with the social amenities and friendly expression suited to the Southern neighbourly habits.
The idea of a court house should not be dismissed as a luxury for the rich; it is an integral constructed open space. Even in the humblest Arab house the small court and Liwan recess constitute the elementary pattern of the Southern Mediterranean house.

In relating the court house to winter need, the court and the semi-open space of tarna could still function as open air living rooms during the many sunny days of the season. It is then that the sun becomes a warm bathing resort. The Southern aspect of the court and sunny loggias thus would be preferred to be the main winter rooms.

The court house has been criticised severely on grounds of health and inconvenience during the winter season when the court is the only means of communication to other parts of the home. The temperature contrasts between court and inner warmth are often extreme and when it rains, it is sometimes even necessary to use an umbrella to walk from one part of the house to another. Sheltered communication by means of colonnades or interior room planning could easily look after such difficulties.

Inconvenience of cesspool flooding is not the fault of the court, but of bad drainage services, and the fountain is the most worthy central focal point of the Southern house. It is a serviceable monument since it does not only splash water in summer to cool the air but also receives winter rain.
and could direct it by means of constructed channels to a
garden space beyond.

It is helpful in southern planning to note the signifi-
cance of the central point as the focal open-air altar,
compared to the side hearth in the North. The water in the
fountain can often be seen in the distance as a focal or
sub-focal point of termination, as well as defining an open
space.

While planning for summer requirement is the main theme
in the sub-tropical conditions of the Mediterranean climate,
the winter requirement of indoor warmth is usually an applied
adjustment.

The advent of the winter season is well marked by the
annual preparations; heavy textured curtains and upholstery
create the necessary atmosphere of warmth and help to con-
trol and eliminate draught. The thick wall and small window
which were a barrier against summer heat now exclude the
cold evening wind. Braziers which provide a source of heat
have many serious drawbacks. In the course of burning char-
coal the slow poisonous effect of carbon monoxide is threaten-
ing to health and breathing organs, besides the slow smoke
rising blackens the ceiling and interior furnishings. The danger of overheated air is evident. The serious effect of such overheated interiors has proved most dangerous. Medical researches are an important factor regarding temperature conditions in the Mediterranean region.

(1) Researches of New York States Ventilation Commission under chairmanship of Professor C.E. Winslow published in Professor E. Huntington's book "Civilisation and Climate", New Haven, Yale University Press, 1924, discuss injurious effects of overheating and stress that these are far more serious in their effect on human health and efficiency than had generally been realised.

The experiments of the Commission have in general confirmed the conclusion of earlier investigation that the first and foremost condition to be avoided in regulating the atmosphere of occupied rooms is an excessively high temperature. We have found that even slight overheating (75°F) produces the following harmful results.

(1) A burden upon the heat-regulating system of the body leading to an increased body temperature, an increased heart rate and a marked decrease in general vasomotor tone as registered by a fall in the Hampton index.

(2) A slight but definite increase in rate of respiration.

(3) A considerable decrease in the amount of physical work performed under conditions of equal incentive — a decrease amounting to 15 per cent at 75°F and 28 per cent at 80°F.

(4) A markedly abnormal reaction of the mucous membranes of the nose, leading ultimately to chronic atrophic rhinitis and when followed by chill producing a moist and distended condition of the membranes calculated to favour bacterial invasion. In animals exposure to high atmospheric temperatures particularly when followed by a chill, diminishes the protective power of the blood and markedly increases general susceptibility to microbial disease.

The report ends by recommending strongly that every effort should be made to keep the temperature of the schoolroom and the living room at 68°F or below.

With regard to the problem of relative humidity it is obvious that a high moisture content combined with high temperature must always be harmful, since the effect of a humid atmosphere is to decrease the heat loss from the body by evaporation. The specifically harmful influence of unduly low humidity which has been postulated by various writers upon ventilation has, on the other hand, not been apparent in our investigations.
If an open fire is used, it would be recommendable to introduce a deep recessed hearth in the winter living room. The fireplace need not be designed in the Northern manner as a focal centre in the planning arrangement of the room. It could be given a southern expression denoting its short seasonal use by various methods such as fitting it into a large enough recess with adjusting shutters screen for summer use. In houses with a long standing social tradition where there is a need for a winter reception room, known as Dewakhana, the hearth can also help to keep warm the coffee service in these surroundings.

While the introduction of mechanical energy for heating or cooling has many possibilities, the need for shelter remains primarily a physical and regional problem. This theme has been stressed throughout and when it is firmly grasped mechanical means can safely be used in the service of regional expression. Many recent books and ardent modernists claim that climate is no longer a factor in modern architecture since science has advanced to control climate and make possible a new international style. This is a false theory and it is evident it proves a bad practice. Such practice

\[(1)\] A term of Persian origin, meaning an Assembly room.
would not solve the problem directly but rather creates more problems, which ultimately resort to applying mechanical means. Once again the fallacy arises that a problem is created because of a near to hand technical solution. It is not a sound acceptable attitude that heat or cold are allowed to penetrate buildings through a wall of 9" or 11" thickness with large unprotected metal windows, because it is possible to combat such heat or cold with the new energy of electric fan or central heating. Many cases are known where blinds are pulled down during the daylight in many new offices and electric light has to be used so as to avoid the heat and glare of the sun.

The first step towards a solution of the climatic problem of each building is made by town planning. This secures the best relationship between a particular building and its immediate neighbourhood. The idea of shelter is not to be thought of merely in terms of each isolated building, but rather a group of buildings providing the necessary convenience of sheltered houses adjusted to the surrounding as a whole. The problem thus designates a collective activity characteristic of the social attitude of the south. Men must take an active part in creating their own town and looking after its climatic welfare; and it is for the town planner and artist to act in a learned capacity to reveal a worthy expression of the idea of town society.
CHAPTER XI

ARCHITECTURAL DESIGN AND BUILDING MATERIAL.
Chapter eleven

ARCHITECTURAL DESIGN AND BUILDING MATERIAL.

Right response to building material an important factor in design. Building material and civic design. Analysis of character of existing towns and villages with regard to use of and weathering of building material is a helpful and stimulating study. Architecture and the need for scientific research into the nature and properties of building material. Such research should help to prepare and cultivate the primary building material for architects and local craftsmen. Landscape and built-up environment. Practical measures to maintain the local character of a town. The responsibilities of municipalities and local authorities.

Relating building material to the conditions of climate: heat stresses, moisture and reflective light. In research the technical efficacy of efficient resistance and the aesthetic considerations of colour and texture are to be inseparable. Technical and architectural disadvantages of reinforced concrete as a surface building material in Mediterranean climate. Effect of steel and reinforced concrete on the Mediterranean character of the wall.

Reviving arcuated and vaulted structures with the preparation of good building material and the training of building labour. The historic resources of the past provide a scope for such a study and its development. Building materials and the weathering process. Need for climatic data and district observation, analysis of properties of building material and surrounding atmosphere is a further help. Quality of mortar in brick joint to be related to the method of rain and heat resistance. Developing brick size in relation to mortar, its tile character and the structural advantage to wall thickness and pleasing texture appearance.
Elasticity of building material in relation to temperature changes. Comparison of brick paving and marble - relative power of heat and light reflection. Intense radiation from corrugated iron roofs and partitions.

New services of reinforced concrete in the sub-soil conditions in the plains. The pile method of construction, the use of reinforced concrete can help to preserve a flourishing clay brick tradition with associated ceramic art, combining structural endurance and regional architectural character.

Stone building tradition in hilly and rocky regions. Responsibility of local authorities to preserve this tradition by controlling use of alien building material in positive solution. Helping to provide suitable building material.

The need for a good supply of timber by governmental aid to forestation. Necessity for co-ordinated research with regard to suitability of timber for various building needs.

Need to develop local vegetation for matting and furnishings that will help to effect cooler interior and suitable local character. Reed partitions instead of corrugated iron. Control of glass wall surfaces and southern wall character.
Any fully and properly conceived architectural design must have a real regard for the form, colour and texture of the materials through which design is given visible expression. While material serves as a means in the art of architectural design it should also be an end in itself. The right response to the quality of material in itself will contribute greatly to the architectural composition. Appreciation which centres on abstract design without regard for material would lose a great deal of the meaning in general compositions. A good design depends on the assembled details which form a composite unity. This fundamental link between material and the idea of design characterises many of the buildings of the past and ensures them with a lasting appreciation.

Materials make buildings and buildings make the town or village. This explains the attention which the architect and town planner must pay to the effect of building material on the artistic quality of town or village architecture. By a direct and positive approach to the historic study of architecture it is possible to develop the sensitivity required for the art of composition by observing the relation between material and form in the particular geographic surroundings. We are inherently inclined to attribute the best fine quality in architecture when such link between form and good building material is observed.
One of the most important aspects in present architectural development should be the preparation of good building material for the craftsman and architect. "For the better the material has been prepared, the finer is bound to be their products."¹ This is a maxim that holds great truth at present. The preparation of building material involves research and technics for which present scientific advance could be utilised. But there is an urgent need for some artistic guidance in such a research. The purpose is to ensure the preparation of building material which not only possesses the necessary resistance and efficiency but will also have a quality of colour and texture that harmonises with their particular surroundings. Unfortunately what is claimed to be scientifically prepared building material today is generally lacking the aesthetic vision. The relation of building material to the climate of a district should coordinate the scientific and the artistic approach to the problem. The two might be stated as inseparable in a good design; a good textured surface is also a more efficient building material, as will be seen in this discussion. The scientific attitude should not be confined solely to the properties of a particular material but should extend further

(1) Aristotle, Politics VII, iii, 6.
to include the proper use of its potentiality to the particular surrounding. The mastery of this combination will then represent an extension of the scientific principle. Such a combination of building material and climatic surroundings will make it possible for the architecture of the future to advance with the benefits of both presently acquired technical improvement and the artistic legacy of the past. Preparatory research along these lines will place the architect in a happy position to translate his own theme into a harmonious composition of material and associated local craftsmanship.

The use of local material for building purposes is the most simple and direct method. It would mean an inherent self-organised harmony between buildings and their surroundings. In substance this will evolve a vernacular style and regional character will be a natural basic development. The unnecessary intrusion of unsuitable alien building material should be actively discouraged, and this is a task for local municipalities and town planning authorities, whose regard for

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(1) In the Annual Report of the Town Planning Adviser to Palestine for the year 1937 the particular need to use local building material is emphasised. It is appropriate here to quote the clause in full as representative not only of Palestine but also of other Mediterranean countries at present.

"It is obvious that every encouragement should be (and is actually) given to owners desirous of building in stone in such areas, bearing in mind that an excellent tradition exists for building in this material, and that stone masons are always available in such localities. Further, it is the duty of the Town planning Commissioners..."
public amenities should extend to safeguard against bad use of building materials in new developments. A positive and necessary guidance from research authorities action in this direction would mean supervision/on the methods of such preparation that ensure structural efficiency and fine architectural quality.

The allocation of certain regional quarry cones for building material is a logical outcome; the complicated inconvenience of long distance travel could be avoided. The general aim would be to ensure easy local distribution of suitable material and this would fall, as has already been hinted at, to be within the scope of future activities in regional planning.

The discoveries of such fine sources of crystallised stone or natural clay material from the geological strata of the earth's crust in many districts could enable a new wealth of original building types in many localities which

Footnote continued:

to prevent the spoiling of such areas by resisting applications from other owners who wish to build in a material other than stone.

Although it is admitted that the control of the character of a building (which includes its appearance, design and the type of a material used in its construction), has always been a contentious matter, in Palestine, where the districts are so dissimilar in so far as building materials are concerned, it is beyond dispute that the central authorities should continue to give a definite lead by legislation and advice in order to regulate the external appearance of towns."
would ensure a further progressive development of the historic styles of the past. In relating the use of material to the history of architecture we tend to accept what was in use then as to be the only available material; but the advance of our present geological exploration and the scientific co-ordination could equip us with easier means to discover and prepare more varieties and natural building material for our present architectural creation. Chemical and physical laboratory work at present is a further aid of test and knowledge with regard to the properties of material and their interaction with atmospheric conditions in various environments. In this way the new science and art could be fused into one in buildings and landscape architecture.

The almost universal acceptance of reinforced concrete as a modern building material should be regarded with careful consideration in the climatic conditions of the Mediterranean. Reinforced concrete has only a limited suitability in the architecture of Mediterranean countries. Besides the technical difficulties involved in expansion and contraction under Mediterranean conditions of heat, it reduces architecture to the level of building technicalities and robs it of its regional character. The metallic surface plasticity of reinforced concrete reduces its inherent surface expression almost to nothing as far as sculptural or carving.
quality is concerned and attempts to produce such effects as belong to stone or brick could never be tolerated.

The complex needs of the Western industrialised countries have sometimes reduced the function of a building to a mechanism and the use of reinforced concrete or pre-cast fabricated building material has helped to further the idea of technical efficiency as separate from the artistic content. There is no need for such a development in Mediterranean countries and it is unwise to accept such unworthy substitutes when there is a choice of developing primary natural material such as stone, brick, mortar and timber. This is especially true when modern materials such as cement or steel have to be imported from overseas with the cost of unnecessary transport and labour. Economy should also take account of the larger concept of the expression of the fundamental human needs in spirit as well as in matter. Even when reinforced concrete material is thoroughly tested for the expansion of joints and various stresses it only satisfies a partial need, since it replaces artistic craftsmanship and reduces building labour to the level of mere technical efficiency. The provision of good building material would help to secure a revived craftsmanship which finds its place in local architectural expression. The association of the architect with such developed craftsmanship would help to promote new yet sympathetic local character to place
and time. It would also benefit society as a whole by providing a reservoir of satisfying(blessed)work. Architectural design on paper depends ultimately on the craftsman if it is to become a reality. There has been a tradition of skilled craftwork in the past in the Near East and most Mediterranean countries. At present there is a strong tendency to rely on steel joist buildings, whereas it should be possible to combine good building materials with skilled labour to continue and develop the tradition of the arch and vault system of construction which belongs intrinsically to the climatic conditions of the Southern and Eastern Mediterranean.

The use of steel framework construction or reinforced concrete has impaired the Southern character of the wall. The thin walls expressive of modern practice can be seen in typical plans and sections which all indicate a widespread lineal representation of the wall which neither theory of climate and architectural design nor practice would favour.

The purpose of architectural training and vision is to acquire an instinctive sense of proportion not merely as abstract design on paper but in the relationship of such design to physical forces. Climate is one of the major natural forces and the wall proportions in thickness should express such a practical and aesthetic purpose. The proportions of the 9" or 11" wall thickness do not harmonise with the Mediterranean climate since they fail to express the
functional character of the wall in its resistance to summer solar heat and winter cold. Architectural expression needs to reveal the truth of its climatic setting. Whatever the new auxiliary means of introducing insulating material to the wall might do, such thin walling would be left under too much stress to enable a protective efficiency. Practical difficulties of adjusting suitable openings in such a wall are also an important factor to be related to the third dimensional aspect of the significance of wall depth.

The use of steel in wall and roof construction has been fostered and propagated because of the lack of supply of other building material. Timber for roofing has become very scarce with the gradual deforestation. Besides, what is available in timber is usually unsuitable to climatic conditions. The contraction and expansion owing not only to temperature but also to winter moisture demand certain resistant qualities in a type of timber that resists such stresses; a directed research effort in this study would be greatly welcomed. Another point which is of significance in timber study is that timber in the hot dry summer conditions is readily receptive to catch fire. Methods of seasoning and possibilities of applied chemical solutions etc. are a further aspect for building research.

An interesting development to be noted in present practice of roofing is the combination of steel joist and brick vaulted
construction. A flat brick arch springs between two steel roofing joists. A more complete vaulting method throughout would secure a structural unity in design which should be encouraged. The resources at hand of such past structures will guide such a practice; the supply of reliable building material and especially mortar would ease such task.

Building construction would achieve an architectural unity which besides its apparent aesthetic result would be a suitable development to the climatic condition in the arid region.

The dome and vault which extend the idea of the protective thick wall to the roof and express the need of shady and protected interior from the outside heat.

When related to domestic requirements the design of arch and vault does not involve great structural problems while in civil and religious architecture it contributes greatly to the attainment of a local and worthy self-expression. Structural beauty is the central theme of architectural design, and wealth of detail should form part of an inherent structural simplicity. Local craftsmanship will supply the necessary variation which combines with the simple elements of construction to form a symbol of the building’s purpose in its relation to environment and society. In general the vault and dome will ensure appropriate proportions in roof and wall thickness. The function of the roof as a shelter
from solar heat in Mediterranean latitudes is to be stressed; and it is significant that this need is secured more easily in the infinite shapely variation of domes and vaulted shelters. Examples of the past should be studied and wherever possible an attempt should be made to record historic buildings in detailed measured structural work. Such work could be used to illustrate structural design in a programme for building education.

It is important to study the effect of long periods of exposure on building material. The weathering process of will existing buildings serve as a guide to the action of climate in the particular locality as well as a practical basis for acquaintance with the properties of building material. A meteorological survey of certain localities is almost certain to reveal specific problems which might involve the careful choice of building material.

The effect of long exposure to sunlight is an aspect to be regarded in the weathering conditions in the Southern latitudes. The relation of the building surface to the local atmospheric moisture is an aspect of structural as well as aesthetic importance in the particular locality. Accumulated mineral deposits such as salt may not only disfigure the colour and texture of the wall but also cause a serious decay. This question of natural building materials and their susceptibility to deterioration caused by the crystallisation of
soluble salts forms one aspect of building science that requires a particular research in the preparation and seasoning of building material; the firing method of brick, for instance, could contribute to the degree of resistance to the weathering process. The possibilities of interaction between adjacent materials must also be considered, and public supervision over the preparation of fine and economical building material would be a happy and progressive step to modern architecture.

The relation of the mortar joint to the material of the wall has to be determined partly by the method adopted in walls' resistance to external damp and heat. The prevailing tendency today to use cement mortar joint, as being of high efficiency to resist dampness in conjunction with brick or limestone is unsuitable on theoretical and practical grounds. If such joint is to be used - and it is recommended here that it should not be used - then its relation to the nature of the wall material must be considered. Resistance to dampness in the Mediterranean could be met more efficiently with the thick wall surface of a relatively absorptive nature. The almost constant prevailing conditions of dryness and sunshine after rain secure evaporation and adequate protection with aesthetic weathering advantages which we appreciate. The building would proudly express its years of service which would be recorded in its exterior wall surface rendering.
Moreover, and this is very important to consider, the partial absorptive nature of building material is also to be related to the necessary elasticity under the daily changeable temperature conditions of the Mediterranean semi-arid climatic region. Building material expanding/contracting due to heat followed by cool conditions must have a self-resistance to such changes. The composite particle nature of brick with lime mortar or limestone qualify them to meet such stresses. A most interesting observation cited by E. Richmond in the extreme existing climatic conditions of Upper Egypt is the phenomenon of rocks splitting with a sound like pistol shots when the intense cool of the evening follows the heat of the day.¹

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¹ It is interesting to notice T.E. Richmond's observations in Egypt on the effect of temperature on material:

"There is an extensive range of temperature not only between winter and summer, but between night and day. Further the atmosphere of Egypt is remarkable for its dryness. The effect of rapid and frequent rises and falls of temperature is very manifest. In the desert in Upper Egypt, it is possible to hear the rocks splitting as the evening cools after a hot day, making a sound like a pistol shot. Experiments have shown that the range of temperature in the middle of a wall three-quarters of a metre thick in Cairo may be 40°F through the year, and that during the daylight hours, while there was little change of temperature in the heart of the wall, there was a range of eight or nine degrees at a depth of 10 centimeters from the surface in July and August. If temperature had been taken at night also the range for the whole 24 hours would certainly be found to be greater. But practical experience has proved more conclusively the experiment that, under certain circumstances (which will be described later) the changes of temperature may be such as to result in stresses greater than a wall can resist." Paper read before the R.I.B.A. on June 12th, 1931 "Building Methods in Egypt", p. 534, vol. xviii, J.R.I.B. A.
It might be recommended here that when such rocky natural stone is used, it would be appropriate to use it in small flat surfaces in the form of tiles laid out horizontally with a thick mortar joint, which beside reducing their surface power of reflective heat, would provide the necessary elasticity. It would also result in a desirable wall texture and reduce such dark and harsh tone of such rocky slate to a cooler appearance. The natural splitting into such shingle state of this material would be the natural effect of the solar heat action on the earth's visible surface.

Besides aesthetic considerations of poor resistance to the weathering process and lack of innate colour and texture, reinforced concrete structures present obvious practical defects. Their lack of elasticity necessitates complicated mechanical adjustments in the general design. The lack of an inner resistance in the material itself expressed in its rigidity complicates the problem. Modern practice of providing a positive barrier excluding completely all

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(1) It might be worth to mention here that the mathematical efficiency required is often very difficult to attain by labourers in those countries.
moisture is perhaps justified in regions exposed to long periods of heavy rainfall, a solution that could hardly be applied to the general dryness and continuous bright conditions of the southern winter. Cracks in walls and roofs in modern reinforced concrete structures can be safely traced to the effects of temperature changes. T.E.Richmond mentions such relevant examples. He states:

"There are two buildings in Cairo of reinforced concrete which are said to behave at certain times of the year in a highly curious manner. A movement or vibration takes place sufficient to move pictures on the walls; the buildings are not cracked, perhaps they would be more peaceful if they were. No explanation of their movements has been forthcoming, but it is thought that they certainly must be connected with temperature changes."

In several reinforced concrete buildings in Egypt it was found impossible to prevent the roofs cracking and a second roof had to be constructed to provide protection against the sun.²

Walls of brick and cement often crack within a short space of their erection. This fact has to be considered

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(2) " " " p. 545 " "
in light of their relative powers of absorption and range of elasticity with regard to temperature changes.  

Heat reflection is another important consideration in a southern climate. When building materials retain elasticity and are relatively porous it is likely that they will prove less of a source of reflective heat. But this is an important factor to be borne in mind with regard to buildings and the sun's rays. Because of their porous nature it is cooler to pave with brick tiles than concrete and marble. In the same way other building materials and types of stone could be tabulated with regard to the relative degree in which they reflect heat. Reinforced concrete walls have the serious disadvantage of radiating heat and tiresome light glare under Mediterranean conditions of solar heat and sunlight. Not

(1) Richmond states more observation in this connection from his practical experience in Egypt: "Of the boundary walls enclosing various groups of buildings erected on a desert foundation near Cairo, some were built in bricks and cement mortar, others in brick and local fat-lime mortar. Those built in cement mortar cracked vertically at intervals of from five to twenty metres throughout their length, while those built entirely in lime mortar were undamaged. It may be added that some walls were built in lime mortar, but with the top course of brick on edge set in cement mortar; whenever this was done the cracks occurred about five metres apart. The cracks extending only through the top three or four courses. Of two buildings near Cairo, similar in every respect except as regards the combination of material used, the one built in rubble stone of fat-lime mortar is uncracked, while the other built in well bonded brickwork and cement mortar cracked vertically at intervals." S.R.I.B.A. vol. xviii, p. 544.
only in building but also on open concrete surface roads which without the shade of trees are very irritating and tiresome to drivers and passers-by. Hence it should be apparent that aesthetic appreciation of colour and texture in brick, stone and mortar is not in reality separate from practical considerations of heat, light and moisture.

The understanding of the reflective power of building material is a significant aspect in the attainment of fine architectural composition in the conditions of Mediterranean light. If shapes are to be seen comfortably it means they are to be toned to be as such; since the light directed outwards from building material of a high co-efficient reflective capacity is to be duly considered, and sometimes reduced in intensity. 1

The prevalent use in Ancient Greece of ochre in their finishing maintained by Vitruvius could probably be attributed to such necessity. To-day in Greece new walls are frequently reduced in brightness by a coat of ochre reducing their surface from "ivory white" having a co-efficient of reflection of 77 percent to "ivory tan" having a co-efficient of 56 per cent. Adjusting the reflective surface capacity

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(1) This aspect of relating colour to light has been within the subject matter of a most interesting address by Waldram P.J. in R.I.B.A.J. 9th May, 1925. A white matt surface will reflect as much as 84 per cent of the light falling on it.

In architecture, no doubt, an immense loss of the time of Renaissance architecture is also due to the fact that Renaissance, the effect of the European Renaissance in different countries, have often incorporated such mouldings, in the countries of Europe and North America, Renaissance architecture spread into Europe and North America. The stone would also affect the moulding and carving. The stone would also affect the mouldings and carvings, and the moulding would also affect the stone. The effect of the colour of building materials, such as well as the surrounding environment, is relevant to the particular quality of light in the material. In a building whose work involves the architectural decoration, light is to be observed as a main part of the architectural decoration. The choice of natural stone, possessed of walls so as to attain a lightness without treatment...
Southern qualities. Even now one can sometime see brick columns copying a mixture order of ionic and doric. Classical architecture in its original Mediterranean setting should stimulate a first-hand reference in its comprehensive study.

The outward reflective power of stone building material has another important consideration. This time in directing light towards the building or its parts. In sketching one is reminded to note the reflective power of surrounding stone paved surfaces on the shadow of cornices and projections. This is a factor that could be embodied to a considerable aesthetic and emotional advantage in Southern architectural composition. The illuminated effect of such light and its rendering effect on wall and soffits has been particularly hinted by Atkinson and Bagenal and discussed in earlier connection with classical architecture. The principle of reflected light is an important asset in Mediterranean conditions that could be utilised to practical and aesthetic consideration. For instance, light could penetrate with practical advantage much deeper into the interior, when due consideration to the colour reflective capacity of material is observed in relation to the direction of light travel.

Structural building problems concerning primarily architecture in the plains, is of a paramount consideration.
As has already been discussed in the case of Egypt and Iraq on the damaging effect of moisture in the subsoil many works of architecture with the wealth of associated from craftsmanship suffer the disruptive forces of underground earth movement. The principle must be to safeguard the superstructure and ensure it a more lasting age, and to this end the services of reinforced concrete and with the asphalt resources\(^1\) could render a new and valuable contribution.

Many instances of the decay and dilapidation of historic buildings can be traced to the percolation of changing water level in the subsoil of these countries. The increase in volume of the subsoil with rising water is an obvious threatening force. In theory this problem has not been duly realised\(^2\) since a survey causing such conditions are not often observed. The general belief among people to stress the factor of foundation (Asas) as the cause of the problem has thus an inherent truth. The remedy is met in a general thumb rule to dig deeper, wider and stronger. The reach of water level in the foundation is often maintained as the

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(1) Abundant in Iraq and reputed in Ancient time could serve the Near East.
(2) E. Richmond, in an R.I.B.A. address has amply discussed this fact in regard to Egypt.
measure of security. The underlying theory would be that by reaching the subsoil water level the wall foundation will be constantly exposed to moisture from a subsequent water rise that effects an upward shifting movement. But this is often impracticable because of financial considerations, and if building takes place during the dry season with its rising water level, instability is bound to occur. It is here that the services of reinforced concrete could be utilised with economical advantage to provide underground security against subsoil water. The pile method is suitable and has been found satisfactory in structural building problems in Egypt and Iraq. "Up till a few years ago", states E. Richmond, ¹ "it was a common practice to excavate the whole of the area to be covered by a building, and to lay down a thick raft of concrete. The concrete was laid in layers and well rammed and watered. The ground was flooded before the concrete was laid, in order that any weak spots might show themselves. The raft of concrete has of late years been largely replaced by concrete piles. Holes about seventy-five centimetres across are punched in the ground by means of pointed weights dropped from a height. This results not

(1) Loc. cit., p. 543.
only in forming a hollow shaft in the ground into which the concrete to form the pile is rammed, but also in compressing the whole of the area built over, and so in compacting the soil to a very marked extent. The ramming of the concrete into these hollow shafts causes the weight of the building to be distributed laterally, as well as vertically. The tops of the concrete piles which are spaced about three metres apart, are connected by beams in reinforced concrete, and on these beams the walls are raised. This method has given, on the whole, satisfactory results." When piles are visible they must be treated as well designed structural columns.

The brick tradition in plains need not be violated by reinforced concrete buildings. On the contrary, reinforced concrete should be utilised to serve and develop the art of brickwork and terra cotta products in the non-stony regions where this tradition prevails; making it possible to continue the rich brick legacy of the past. In the dry and arid conditions of the plain, brick is the most suitable and fine building material to use, and every effort should be made in building research and analysis of the soil to master its make. The cool yellowish brick still in usage today is well suited in colour to the climate and blue sky.

The effect of the joint on the colour and texture of the wall surface has also to be taken into consideration by the architect. Mortar, colour and thickness play a considerable
part in the general character of the wall. Black mortar sometimes in use is of a harsh character and does not produce a happy blending with yellow brick while lime mortar is well suited in colour and general effect. The treatment of the joint offers many architectural possibilities in brick wall textural design. Wall surfaces of thin size bricks with a relatively thick mortar joint could be very pleasant and efficient treatment. The attempt today to copy a machine-made brick of large thickness, small width and length dimensions is not very sympathetic to brick character and the necessary thickness of wall in Mediterranean conditions. The large flat tile character is more suited and should be encouraged; it has been partly in use in the best Islamic brick tradition in Iraq, Egypt and in Roman brick structural design. A development at present in brick regions that aim at increasing the dimensions while preserving the tile nature of the baked brick would be a good step towards a better modern brick architecture.  

Preparation of good reliable mortar could help brick tradition to develop more unhindered. Vaulted structure and arches would not be difficult to construct when the tile character of the baked brick and the adhesive quality of mortar are maintained. Such brick when laid on edge is capable of being curved to span a large opening more easily. It could be used without a plaster finish on the outside or in interior design of recesses. The brick joint also provides a scope for recessing and infinite

(1) In connection with modern brick design it might be of interest to study Northern practice in Holland, where an attempt to preserve and introduce variation in brick character is to be noticed.
surface variation in light and shade textured rendering that would help to fenestrate and accentuate forms. To vary
the general thickness of the brick in various parts of the
design could also be another source of textured treatment.
When acquiring a larger mortar thickness it would be neces-
sary to observe a horizontal movement in laying out brick
to allow more time for the latter to set. This need not
hamper the labour speed seriously.

Brick and mortar could be made available locally and it
should be employed wherever possible instead of a plaster or
cement overcoating. In symbolic buildings at least the
architect should never attempt to obliterate the joints which
are an expression of the structural integrity of the edifice.
Modern buildings tend to cover the joint with a result which
is pleasing photographically but in reality becomes tiring.
In the same way as a poster glamour is not satisfying for
very long, plasticity alone is not enough to ensure a lasting
artistic quality. Brick craftsmanship and the associated arts
of claywork tile and pottery reflect essential character of
the semi-arid stoneless regions of the Mediterranean. There
are great possibilities for various themes in a brick archi-
teectural style. Like crude wool capable to be made into
fine textile weaving without destroying its inherent woolly
substance, so clay in building could be rendered into colour-
ful and textured wall surfaces and fine objects of use. The

(rendred means covered a coated - misleading)
brick making industry could be developed with the aid of modern laboratory work so as to eliminate the impurities of disruptive chemical compounds. The architect and craftsman will work in harmony to create arches, vaults and domes which are more suited to the conditions of climate and capable of progressive new developments.

The art of pottery is an ancient symbol of man's culture and should be stimulated to meet the needs of modern civilisation. Its use is not limited to the enrichment of architectural character but also extends to the buildings themselves. There is an essential relationship between the character of articles in use and built up interior surroundings. Tiles for dome covering or terrace paving need the art of the potter to produce material with a high degree of efficiency as well as pleasing, colourful surface. Bluish green tiled domes set in yellow brickwork help to suggest a cool restful environment in the rural or urban landscape horizon of the Mediterranean brick region. Pure white, often used at present to produce such desired feeling of coolness, results in a glare too intense for the human eye to bear. Material ought to be restful in appearance and public authorities should exercise some supervision so as to help to reduce the blinding effect of glare.

In relating architectural practice to climate the aim should be co-ordination of all factors rather than abrupt
application of certain dogmatic principles. For instance a statement as to the cooling effect of whitening a roof surface\(^1\) and preventing the unnecessary penetration of heat to the interior might be so used by architects as to produce a glaring surface which is undesirable for the general public. Extra thickness in the dome cover would help to reduce the degree of heat absorption and thus allow the use of tiles more suitable in colour and texture. While it is important to understand fully all the scientific properties of material, a single aspect must not be overemphasised at the expense of a more co-ordinated whole.

The widespread use today of concrete factory bricks violates rather than improves local character. Besides technical defects their appearance is not in tune with local climate and environment; this new type of brick walls is devoid of the pleasure of colour and texture. The joint is not happily related and its diminishing size is given to a larger height surface of this type of brick that takes out the liveliness of colour, texture and woof of the wall surface.

Brick regional character is so well suited in its relation to non-stony hilly country that even the best stone

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makes its outward appearance in walls appear alien in these environments. Local supervision should be exercised in preserving general character by determining the right use of material in good town planning. The obvious corrugated iron is often circulated as a building material for roofing or shelter. This is a folly which should not be allowed. In the heat of a summer day its defects are too obvious, and in winter the clattering noise of rain drops is tedious.

Having stressed the disadvantages of reinforced concrete as compared with brick for building material it is now possible to state some of the ways in which its use is particularly beneficent. Reinforced concrete structures might suggest themselves for use in countries exposed to earthquakes and it should be possible to allow for the demands of climate by providing brick or stone facing.

The problem of framework construction is an outcome of multi-storey development in "Industrial office-towns" which

(1) This fact has been noted in the Palestine Advisory Town Planning Report 1937. Section I, clause (8).

"It is curious to observe how unsuitable a stone building can be in such surroundings. In certain indeterminate areas where both these materials are used, there have been cases where owners have combined stone, concrete and brick in one building with unfortunate results. Irrespective of the district in which the building is to be erected, it is axiomatic that only one material should predominate in the external elevations."
need not be introduced or encouraged in Mediterranean villages or the small country towns of the agricultural south. Here the small scale character dispenses with the necessity for such a solution.

In water distribution, drainage and engineering services, reinforced concrete is indispensable. Precast concrete pipes are more suitable and efficient than the works of the past. Their use in new developments of covered drainage\(^1\) has proved very efficient and suggests the prospect of employing them in regional planning and agricultural services.

Timber supply is an asset to craftsmanship and architecture provided a public authority ensures a proper care for the future by means of forestation. The future supply of building material would benefit greatly by special research into the qualities of various timber and their resistance to damp and heat. Metal is largely unsuited for use in Mediterranean conditions. Screens and windows made of wood could hardly be replaced by the new window and door metal industry\(^2\) without serious inconvenience and loss of

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(2) Hope's metal windows are now standardised use in the Near East and specially in civil governmental buildings designed by public building departments.
the right character in design. Eastern Mediterranean Islamic art is distinguished by its well developed art of carving. Built-in furniture is not a new idea. It was practised with grace in the useful cupboards and recesses or niches to form part of the interior design. A progressive art development at present could be sensitive to the colour and character of timber-carving so as to master its orchestration, i.e. a sense of controlling a profused decorative character into a coherent "enriched simplicity" of interior composition.

Local products made from the local vegetation can help to contribute to the vernacular character in architectural requirements. They are capable of having a practical suitability to the climate and to harmonise well with their surroundings. Their use should be encouraged and developed, since reed matting even in its primitive use is more suitable for screens, partitions and carving than the imported corrugated iron sheets.

It is important to pay particular attention to the use of glass in southern latitudes. A.F. Dufton of Building Research Station who tested various materials with a view to obtaining information as to their relative efficiency in excluding solar heat ascertained that clear glass had a temperature excess of 100°.1 Wherever possible glass should be

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protected from the direct rays of a hot sun as a large expanse of glass will reflect excessive heat to the interior arrangements. The use of double windows to keep out heat instead of cold as on the continent suggests itself as logical development. Such double windows can be introduced easily when the wall is thick enough. But lattice work should take the place of the modern practice of steel wire netting.

However well insulated against heat, the thin walls of modern practice are bound to expose the windows to the extremes of solar heat and light. It is not easy to adjust the transition between hot open air and cool interior even when a projecting canopy offers some measure of protection.

(1) P.M. Keane - "Service Architecture and requirements of accommodation in tropical and sub-tropical countries with reference to Egypt and Palestine". Proceedings of Royal Society of Medicine, February 14th 1927. He stresses the great success of such practice:

"The amount of wall space given up to glazing in Egypt is extraordinary and can only be justified if the windows are double. Glazing is grossly overdone in the East and often renders buildings suitable only for winter residence. In addition, such windows admit too much light. By doubling this and reducing their surface area sufficient illumination is available during the daytime and ample perflation is assured during the night hours, when streaming air can be employed with advantage."

(2) This is an obvious feature in modern architecture. It attempts to provide protection by a continuous canopy over large expanses of glass in thin walls. Typical examples are found in the new buildings of Palestine, as for instance the work of Eric Mendelssohn.
CHAPTER XII

THEORY OF DESIGN AND MEDITERRANEAN CLIMATE
CLIMATE AND THE ELEMENTS OF ARCHITECTURAL DESIGN

It seems relevant in a concluding chapter to include a synthesis of the elements of architectural design in relation to climate which formed the underlying theme of the earlier approach to the historic development of architecture.

Open, semi-open and sheltered corresponding to court, veranda and closed room form the pattern layout of the Mediterranean arrangement. The open space becomes an integral living requirement and the central position of the court in various typical composite themes has been discussed. The veranda is a semi-open space in the layout. It also serves as a transition from open to sheltered rooms. It allows light and air to circulate by means of large windows, and doors, yet it also acts as a barrier to the direct rays of the sun, thus avoiding immediate contact with the immense glare.

The architectural unit for constructing the veranda is the column. Whether the simple pillar and beam construction or the arcade or pier repetition is used, the column is a primary element in Mediterranean architecture. The relationship between climate and the proportions of the column combines practical and aesthetic considerations. These are
deeply rooted in Mediterranean classical architectural expression where the proportions of the classical columns are in sympathy with the Mediterranean climate. Where the structure is dependent in the main on columnar design [not wall surface] the column becomes the main element of design and as such it should embody inherent proportions relevant to the climatic environment. A sensitive architectural feeling for proportions should find its relevance in climate. Only through this subjective approach is it possible to arrive at a true objectivity in the idea of better abstract proportions. The column provides infinite possibilities for variation in architectural composition whether in a portico, veranda or an upper gallery.

Similar factors can be observed when relating the proportions of wall thickness as protection from heat and cold in southern climate. Cavity walls can be introduced with obvious advantages to suit a Mediterranean climatic problem, providing care and efficiency is maintained in the selection of material and its efficient construction. With modern advance in building methods, reinforced concrete and asphalt can ensure a dry cavity. It is most important to see that the cavity is well ventilated to prevent the wall from conserving heated air. Insects and parasites would find congenial home in cavities when deficient construction and dampness is not well secured.
The intense heat of summer afternoons makes it imperative to resort to cool spaces less affected by heat transmitted through surface walls exposed to the sun. The problem is usually met by constructing a serdab or underground retreat which as a volume space is not directly affected by the heat from the outside. Reflected light through doorways or grilles is adequate in the conditions of the Mediterranean. The choice of building material with a desirable reflective capacity is thus to be observed. Cooling ventilation is ensured by means of the "badger system" and it is well worth while studying and developing this physical principle at present.

The theory of mass composition in relation to climate is to be considered in architectural design in the Mediterranean. The greater the mass surface exposed to the full force of the sun's rays, the more heat would penetrate. This is in direct contrast to another requirement of generous spacious interior. This need for small mass surface exposure combined with generous interior volumes was expressed by various styles such as classical or Islamic historic composition, where the court system of composition remains a central theme in design.

The present trend of buildings and town design influenced by northern practice imposes a new pattern in which Mediterranean court composition is not adhered to. Detached
buildings, fully exposed to a direct source of heat, do not form a sympathetic mass composition in the south.

The small window in a thick wall represents the typically Mediterranean climate. Combined with the large void of colonnade or arcade it forms an element of elevational design. Window openings could afford to be larger if duly protected from the sun; semi-open verandas act as a screen to such larger windows or doorway openings. In southern architecture it is important not to think in terms of the wall and window alone. The repetition of a bay recess is an inseparable unit in planning.

In utilising evening outdoor cool conditions it is a good practice to trap cool air in the interior by leaving windows and doorways open in the evening and shutting them in the morning. The adjustment of semi-open spaces in good composition is often ignored in a modern architecture which copies the different need of northern practice. Under northern conditions such semi-open places are inconvenient and since they/draughts/form a barrier to the needed sun and light. In the south it is desirable to maintain an interior circulation of cool air which can be effected by the arrangement of door and window openings so as to cause such a cooling air movement.

The balcony door window on an upper storey represents an extension of floor space to the open air. When protected
by a small projecting roof it functions in a manner similar to a veranda bay, privacy could also be ensured by a dignified yet open air expression which provides restful feeling of transition from sheltered to open. This instinct for privacy is particularly important in the Islamic social setting and balconies rudely and aggressively exposed are not inviting to resort to. Flower pots and shrubs on such balconies or upper terraces because of their moisture source help to cool the hot dry air when it penetrates to the interior. There is a useful practice of fixing a covering of selected dry weed sandwiched between two panel frames and fixed on the outside of the window surface and allowing a water source to percolate, with the resulting evaporation caused by the dry sun heated air a fall in temperature is brought about.\(^1\)

In arid regions of the Mediterranean, the roof plays an important part in daily life. It forms an upper floor living space used after the sun has set. Heat conserved in the building material during the day makes it intolerable to stay on the ground level in built-up urban areas.

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(1) Fixing an electric fan on the outside of this window frame is a device used in the Museum of Antiquities in Baghdad with satisfying cooling results. Often the high winds in open places would not need the electric fan, which in the case of the museum is used to force an air current.
Effect of roof surface in the evening cooling process is thus to be noted. Clay surface finish reinforced with mud would obviously prove much cooler than concrete tiles, stone, slate or glazed tile surfaces. Surfaces such as asphalt or lead would obviously be an unsuitable surface finish. Light weight brick tiles could be very satisfactory from the climatic point of view as well as the architectural surface colour treatment; this would be especially the case where the roof has a social function of festivities and gatherings.

A general practice to cool the roof surface and the surrounding air is to sprinkle water at about sunset. The porous nature of this type of tile brick would be more effective in such a cooling process.

The practical need for water in the living space of roof could thus stimulate imaginative designs to express its aesthetic and emotional appeal in the design of roof fountains and water display in these higher terraces.

This could be easily connected with the water system of the particular edifice which should combine the aesthetic and practical use of water in cooling the open and closed interior of the building.

Cavities could be introduced as means of heat insulation in the flat. They not only reduce the weight and thrust on wall or pillars but also act as a natural insulating pocket.
protecting the inner structure from the great range of
temperature variation. In addition they could form an
effective barrier against heat transmission. As in the case
of the wall and even more important in the conditions of
roof and their direct exposure to solar heat, particular
attention must be paid lest this air space acts as a storage
depot for heated air. Hence, ventilation considerations sug-
gest the introduction of small openings which could take their
places to form a part of the cornice treatment.

This "upper floor ventilation" could find an expression
in a low height upper gallery treatment, and this space could
also be utilised as a walking or lounging promenade. The
architectural effect of such upper gallery could be seized
into a good design; the contrast of such upper void in
relation to a dominant solid wall, is a source of pleasing
fenestration in the crowning treatment of buildings. It
could happily combine the heavy solid weight wall resistance
with lightness and elegance in a vernacular expression that
caters for such open and sheltered needs not only during the
changing seasons but also during the changing climatic con-
ditions of the day. In many designs of the past, such treat-
ment has been inherently observed in Mediterranean conditions.

Roof parapets act as a screen and invite decorative
architectural treatment that also expresses the dignity of

(1) When thou buildest a new house, then thou shalt make a
battlement for thy roof, that thou bring not blood upon
thine house, if any man fall from thence. Deut. 22, 8.
the roof floor as a living space.

When considering the relation of vaulted structure to outward form, the dome is a single and definite shaped roof. It is intrinsic to Mediterranean arid regions where timber or stone for beam and post construction is difficult to find, the dome is therefore related mainly to brick using regions, since stone regions would usually suggest neighbouring high altitude where timber from trees could be more easily obtained. The two forms, dome and flat roof, combine to give a definite regional character to many Arab villages and towns forming such a unified composition that it becomes wrong to impose a pitched roof. The dome has been developed (and should still continue to do so) as a shapely protective roof covering, capable of infinite imaginative architectural variation. Its use is not restricted to large scale and monumental buildings only; it can be easily economically and beautifully constructed in the domestic and small scale character. In rural village architecture, the peasant still brings the walls of his small building into a natural dome covering. This vernacular expression should not be forsaken in favour of the slavish use of modern steel framework or the corrugated iron covering. Boredom and monotony are felt in most modern quarters with their unrelieved sky line and lack of a visible and architectural stability. The settled curvilinear form of the dome is capable of presenting a restful
appearance and unity in mass composition. Curved roofs based on semi-barrel or barrel vaulting follow the structural method of the arcuated style and could afford pleasingly functional architectural forms that would be related to dome and flat roof composition.

The low pitched roof is characteristic of the less arid regions of the Mediterranean in southern Europe, Italy, southern France and the Mediterranean islands. Compared with the steep-pitched roof of the North, designed to throw off snow as well as rain, this southern roof involved less constructional difficulties. Timber roof structural designs of the North might be compared with the parallel structural problems of ship building.

A winter fall of snow in high altitudes of Mediterranean Europe can be met with advantage by the low pitched Mediterranean roof. The snow would then form a warm protective blanket. Also heavier rainfall in the northern region of the Mediterranean accounts for the consolidated formation of a pitched type. It is also important to note that the pitched type of roof has a capacity of resisting solar heat from penetrating to the interior. Its angular formation suggests throwing away the heat rays of sunlight, while the triangular cavity could also act as an insulating medium. It might also be noted in this connection that protection is needed
at the two ends of the pitched roof, where such cavity insulation will be very shallow; the projection of the eaves would secure more protective space at these points where heat transmission to the roof material and the interior is to be avoided. The use of insulating material against heat as well as dampness would also suggest themselves at the gutter sides. The ventilation of the triangular pitched space would necessitate the design of ventilation openings under cornice or in the ridge.

A terra cotta covering to roof surfaces is characteristic of the Mediterranean environment. It introduces bright and inherent colour tone of baked earth. Slate is more useful for northern rain conditions since it has a material quality resisting a more lasting dampness. This instinctive choice of rich red tile serves a practical and pleasing purpose. When used in conjunction with a white or ochre washed surface it defines the composition in a restful appearance which minimises the effect of glare and introduces a contrasting pleasing note of colour composition against the clear blue Mediterranean sky. The vernacular Mediterranean pitched type of roof has an ancient tradition in Greek classical expression and its identity should not be disturbed in the future by a violent distortion in the degree of the pitch. It is one of the contributory amenities of a southern
Mediterranean landscape and need not be replaced by the alien $30^\circ-60^\circ$ pitch of European cottages. The southern climatic character of the roof is revealed by the work of landscape painters, and resorting to them for a study would form a valuable visual part of climate and architectural landscape appreciation.

The decorative treatment of window openings is another deeply rooted climatic aspect of design. The slit of pierced screen window characterises southern latitude elevations; it is distinctive, for instance, from the flat glazed windows of gracious Georgian or Elizabethan architecture which expresses a northern lighting treatment. The pierced screen design of interior partitions in decorative craftsmanship is related to the climatic need of providing a breezy movement of air in the interior. The same free flow of air has to penetrate built-in cupboards and recesses in which glazing tends to result in the formation of hot air pockets. This idea of designing primarily for coolness resulted in a decorative spindle treatment of doors, which will help to create the necessary draught when related to facing windows. Furniture also must be thought of in terms of a cool interior. The art of basket weaving, selected, seasoned and treated straw plaiting and reed matting should be encouraged to develop to fine design for summer furniture and various equipment. Steel wiring on windows or doors in common use
should be substituted by such local fabrics.

The symbolic value of water in Mediterranean architecture can never be emphasised too highly. The significance of the fountain in domestic and public buildings, town, village and garden and its cooling effect on the dry air has been stated throughout on many occasions.

In arid countries where clay is the natural medium, the art of the potter and polychromatic tile glazing is sought in designing a fountain. Coloured glazed tiles in blues, greens and yellows are associated with surface treatment suited to running water not only in fountains but in public baths and swimming pools.

Except for the mainly brick regions of the plains, the fountain basin of limestone material of the Mediterranean Basin, when polished, hewn or carved to shape is an architectonic symbol of the Mediterranean geographic and climatic environment. The outdoor living environment extends architecture to a more positive treatment of the garden in the southern climatic conditions. The architectonic treatment is more closely relevant to southern climate than that of the North. The wild English garden is a result of a Northern moisture effecting a widespread green vegetation that made a garden of the whole country. Such garden architecture relating structural design requirement to outdoor vegetation is a southern garden feature. The pergola for instance
while providing a pleasing shady walk and linking other parts of the house, is also useful to the adjustment of the vine bushes that are made to climb into shape. Whether in beam and post, pitch, vault or dome, such pergola forms are a further inviting southern aspect of design.

Construction of open water channels in gardens is a distinctive feature; it is also desirable that such channels are to be protected in most of their length by shade. In order to avoid excessive evaporation in summer such water economy is needed. A rich source of garden design relating to good and economical use of southern Mediterranean latitude could be derived from Arab and Persian practice in Medieval times.

Introducing the open hearth in a garden could be an appropriate suggestion of a southern adaptation suited to such evening and grilling festivities that take place in the open.

Terrace paving round the house is a protective necessity not only from dampness but also from insect breeding close to the living walls. This aspect has been emphasised in health reports, but the suggestion given often of concrete surfaces treatment is only partial; protective efficiency with colour, texture of ceramic clay work could render them to be suitable and economical surfaces. The present practice of tile making in coloured concrete machine slabs is a widespread counterfeit that should be discouraged by
necessary supervision and the revived past industry of better tile making.

Mouldings are other composite elements of design in buildings: their inseparable practical and aesthetic purpose is relevant to the building material and climatic surroundings. Their sustained architectural shapes in classical stone display the material in response to the quality of light falling on it. Polishing and carving stone is a revelation of its inner light; and architectural aim in lightness finds a subtlety of illuminated lightness possessed in the limestone of the Mediterranean.

Analysing the elements of architectural design in response to practical and aesthetic requirement of the Mediterranean climate, would still leave architects free to fuse them into the particular composition. Whether the need is of a religious, civic or humble dwelling, such intrinsic relation of design elements whether in space layout composition or the details of a moulding, form part of the ingredient elements that we cannot afford to discard their relevance to climate in an assumed irresponsible free expression. Architecture could never be robbed of its freedom of presentation, yet such freedom could be helped when adherence to the normal climatic conditions is duly observed and respected.
ABSTRACT

ARCHITECTURE AND THE MEDITERRANEAN CLIMATE.

Studies on the effect of climatic conditions on Architectural Development in the Mediterranean Region with special reference to the Prospects of its Practice in the "Near East."

Dissatisfaction with present architectural development in the Near East in particular has prompted this attempt to discuss architecture and the Mediterranean climate in order to understand and define a more relevant architectural attitude. European practice influenced by different climatic conditions produces fascinating lineal compositions on paper, but less intrinsic design in its harmony with the southern environment.

If architecture is to be an art exercising a positive influence towards the good, then an attempt must be made to discuss its relevance to ethical values of society, traditional values of time and the cultural values of space; these three considerations make up the fundamental basis of its comprehensive scholarly understanding needed in face of present chaotic mannerisms.

The relation of Mediterranean civilisation and culture to climate is the scope of the second part; climate has hardly changed throughout the historic period, the study of
architectural development which forms the scope of part three is directly related to the similar climatic problems of the present.

The stylistic development of the Ancient, Christian and the Renaissance, and Arab-Islamic are discussed in the light of an intrinsic connection of a vernacular Mediterranean climate. The court provides the theme of both the vernacular and the developed styles whether in the typical Greek or Oriental house or in the monumental religious and social expression of the "sahn", temple or palace. Regional variation in design can be traced as structural forms developed in sympathy with the building material of the landscape. The stone trabeated classical column formation or the "arcuated" Islamic arches on brick piers represent definite stylistic variation to the same need for adjusting semi-open spaces between the court and sheltered rooms.

The study of Islamic architecture as an expression of Mediterranean sub-tropical latitudes would help to explain to European scholarship its general unity, and the relevance of its decorative aesthetic qualities to the physical and structural requirements of climate. The effects of Islamic art on Mediterranean classical development in the Middle Ages can be traced to the influence of brick wall tradition and associated ceramic, pottery and stucco panel decoration on the vernacular stone design. A potential
enrichment in the carved textured treatment of stone surfaces is reflected at its best in what A. Stokes terms the Quattro Cento.

Relating Renaissance architecture to the effect of Southern European climate is discussed and the relevance of Alberti’s written work on architecture is pointed out in relation to the Mediterranean conditions of climate.

While the fourth part surveys the present problem in the light of the full impact of a northern civilisation it develops and emphasises a southern attitude and cultivates a response to natural environment. Modern means of technics and research enlightened by the art legacy of the past is to create in architecture a new symbolic expression of space and time.

There is a wide scope in the new civilisation for a coordinated regional planning towards a healthier environment. New agricultural village settlements need not be alien in expression to the climate and physical surroundings. The scattered type of 'garden city' development is compared unfavourably with the Mediterranean pattern of a grouped formation. The court theme such as that of the Pompeian house rather than the sporadic grouping of the European cottage type is capable of imaginatively sympathetic variation in housing schemes and civic composition.
Among the cooling amenities in civic design is the significance of water display and the fountain symbol in Mediterranean architecture. Mass composition in relation to adjust a natural and effective cooling ventilation is discussed and the wind turret, the "badgeer" as a means in such prospect is also pointed out with a view to future possibilities of development. The heat stress, resistance to moisture and light reflection are aspects to be related to building material. Developing the cultivated use of primary building materials such as stone, brick, mortar and timber in accord with technical and aesthetic climatic considerations is to be directed and with a revived associated craftsmanship and skilled building labour a trend towards a better climatically suited structural design than the present indiscriminate use of steel framework and reinforced concrete would be realised by a conductive policy.

Reinforced concrete can be used with great advantage for foundations and it has a great part to play in connection with sub-soil movements and the pile method of construction in the plain regions where its services can be used to help to maintain and develop the clay, brick and ceramic art tradition.

A final chapter summarises the various elements of composition in relation to Mediterranean climate.
A book of illustrations is included as an appendix to show various aspects of vernacular and stylistic development in the conditions of Mediterranean climate; mainly that of Islamic architecture and its detailed elements. The bibliography also includes the principal works of Islamic architectural reference.
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SYNOPSIS
Part I

Chapter One

INTRODUCTION TO ARCHITECTURE

The importance and significance of a philosophic understanding of architecture in relation to the present. The meaning in architectural "fine" expression is a synthesis of expressing human values relevant to (1) Society, (2) Time, and (3) Space.

(1) Architecture and Society: Ethical values:
The relationship of the individual to a society and of that society to humanity. Architecture is a tangible means of expressing "ethical values". Relevance to the meaning of "fine art" in architecture. Plate on the reflection of "the good" in the arts. The effect of ethical values on the scale and composition of buildings: intellect and human purpose in the arts.

(2) Architecture and Time: Traditional values:
The individual and the family in the concept of time; the process of transmission, continuity and reaction. The value of time in architectural expression. Amenities. Objective quality of beauty and the subjective data. Inter-relation of theory and history of architecture in the continuous process.

(3) Architecture and Space: Cultural values:
Relation of time to environment; space, time and architecture. The physical and spiritual values of environment in everyday living; nature an eternal source of inspiration. Artistic creation and the response to physical and climatic environment. The particular pattern and the objective concept of beauty. Regional character and the vernacular quality of theme and variation; accepting climatic and physical limitation of space is a regional theme capable of infinite yet indigenous variations. Alien influences and their effect on regional character. Revival and continuation of art. Response to environment. Relation of geographic studies to landscape.
PART II

Chapter Two

CLIMATE AND MEDITERRANEAN CULTURE

The significant relation of culture to climatic conditions; climate gives a significant unity to the study of the history of architecture in the Mediterranean. Scholarly work in history of art loses a great deal of constructive meaning if not related to the climatic background. Mediterranean climate and religious expression in architecture; climate and social institutions.


Climate and the agricultural mode of life. Importance of water in type of settlement; hill and alluvial sites. Significance of water planning in the life of villages and cities. Symbolic importance of water - in religion; fountain and water temples.

Mediterranean culture and the primary community; bazaar and sanctuary correspond to the material and spiritual need. Civilisation and rural culture. Relation of "Classical" and "Romantic". Relating the significance of architectural achievement and civilisation in the "golden ages" to its regional substance.
The 'small scale' character of "village-town"; its organic maintenance and cultivated expression is the microcosm of Mediterranean culture. Classical culture and Mediterranean climate.

Relating biblical literature to climate and Eastern Mediterranean culture.

Chapter Three

CLIMATE AND HISTORY

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Fluctuations in rainfall characteristic of Mediterranean climate. Therefore great demands on men's wisdom and foresight. High degree of dependence in Mediterranean countries on co-ordinated effort of authorities in power.

Historic phases of the Mediterranean;
(1) River Cultures: Tigris, Euphrates and the Nile Valley. Effect of large river sources on civilisation in the Mediterranean.
(3) Atlantic phase - further expansion. Present development through air navigation.

Greek cities of the Mediterranean. Reflection of commercial activities in the city markets of Mediterranean lands. Greek and Eastern Mediterranean culture. Effect of commerce with the Mediterranean Orbis Terrarum on art in the past compared to the present international penetration of contrasting climatic regions of Northern latitude.
PART III

Chapter Four

ARCHITECTURE AND HISTORIC DEVELOPMENT - ANCIENT

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Climatic influence in comparing Chaldean and Assyrian forms to Egyptian. Vaulted structure and cool shade shelters. Influence of brick material on the evolution of structural forms; the genesis of dome evolution is more relevant to brick region.

The monumental expression of the Ziggurat in relation to flat and dominant stary landscape.
Hypothesis of flat landscape and the two-dimensional representation in art. Inscribed bricks and sculptured tablets remain to be a significant and noteworthy contribution to the art of architecture.

Palace layout - horizontal and vertical mass composition; effect of height as a guide in the flat plain.

Climate and court planning in Mesopotamian palace architecture compared with similar Aegean and later practice. The niche or semi-dome recess are primary characteristic forms of the brick regions. The two needs of open air living and indoor shelter from the heat brought open court and massive character of wall; daily and seasonal changes of temperature and their effect on the house plan. Assyrian and Babylonian houses are early evidences of the court constructed type.

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Stone formation in the beam and post element of structural design: Der El-Bahari and the geologic formation of the landscape. Pyramidal form a distinctive feature of Ancient Egyptian architecture.

Brick in Egyptian architecture. Sir Flinders Petrie's account of its use by the ancients and the technical problems involved. Water and clay in the sub-soil. Statements by J.E. Richmond and Sir Flinders Petrie on the structural problems in relation to underground water.

Climate and colour in Egyptian architecture. Hypothesis on sculptural representation and climate, statement by W. Harvey.

Early type of Egyptian peasant dwellings; clay models at the Ashmolean museum.

The windowless interior and the problem of ventilation; tracing early evidence of the "badger" as a cooling and ventilating device in the interiors of Egyptian houses. Slit windows. Reflected light.
The Aegean and the development of classical architecture

The nursery of later stone developed classical architecture in the Mediterranean islands of the Aegean.

Architectural studies from the Palace of Knossos. Street architecture of an early Minoan seaport. The 'romantic' character in the sense of an ardent response to natural and climatic conditions. Developing an indigenous 'romantic' character into Mediterranean "classical" forms. Climate and local material in Aegean and classical architecture. Stone and hill site levels and its effect on planning; outdoor and indoor steps; Aegean columns.

The climatic explanation of certain aspects of planning - borrowed lighting, air circulation, window openings above doorways. Heating by means of braziers.

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Stone and the Mediterranean. Stone in the making of landscape; limestone is treaded upon in the natural terrace. Stone composition in the architectural landscape design of hilly elevated sites.

The Greek House; marked continuity and uniformity of type of house is to be attributed to climate; the research evidence of E.C.Rider on the history and development of the Ancient Greek house. The place of the court in the living order of the house; inclusion of an open air room in planning composition.

Open air living would mean the "contemplative" attitude towards nature. Climate and Greek Gods worship in the open air.

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Acropolis as a monumental example of landscape regional architecture in the geographical and climatic conditions of Greece. Symbolic expression of climate and environment in the Temple religious edifice.

The structural and architectural unit of the column. Southern climate and the columnar style of classic architecture. The Portico as a sheltered open air resort; a covering from the sun and rain showers. Column design; flutings and their aesthetic purpose. Articulation within the classic composition - mouldings.

Mediterranean light and classical details. The quality of stone and its effect on the exactness and precision and endurance of constructed line and silhouette. Intensity of sun-light and its effect on the colour surface of buildings. Glare of surface material. Principle of reflected light one of the most important considerations in southern architecture. Practical and aesthetic considerations of the effect of this reflected light from paved terrace to building projections, mouldings, column and sculptural decoration.

The clarity of the atmosphere and its effect on distant views. Optical illusion as evidence of contemplative design in clear light conditions. Colour and climate in Greek architecture.

The Pompeian House
An accomplished classical arrangement of southern type of house. Space and volume composition of atrium, peristyle and garden. Southern light and the small court.

Civic Buildings
Open air theatre and the hilly stone landscape. Gymnasium court layout. Agora - the civic centre type and market agoras. The street in urban classical composition. Colonnaded streets - arcade constructed walks. Climate and public social life - the portico in Roman Civil and recreational architecture.
PART III

Chapter five

CHRISTIAN ARCHITECTURE

Court architecture and the basilican church. The narthex. Cloister court an integral part of space composition in southern latitude churches. Basilican churches and regional character in the North-Western region of the Mediterranean.

Climate and church design in north and south. Effect of steep roof on design in the north. The buttress and window screen. Relation of roof to plan. Theory of the column order in relation to the structural character of North and South. Symbolic character of the roof in northern climatic regions.


Climate and the southern Byzantine character. The protective expression of thick wall is unimpaired by its decorative treatment compared with Northern skeleton framework wall design. Solid character of the dome shell in relation to southern climate. Extension of the idea of thick wall to the dome roof as protection against solar heat and light.

Effect of Mediterranean climate on available building materials. Tree growth limited by moisture and thus it is more to be found in Southern Western Europe and the Mountain regions. This N.W. zone of the Mediterranean corresponds to the Romanesque style of timber roofed churches, known
also as "Med. type" to distinguish it from the Near Eastern barrel and domed designs.

In general Byzantine architecture and its vaulted covering represents the 'vernacular' of the more arid Mediterranean region East and South of the Mediterranean, corresponding to "Mediterranean climate" proper of the geographers.

Terra cotta tiled domed roof covering Balkan churches and Turkish Mosques. Byzantine rural and landscape character.

Byzantine domestic architecture. Stone character compared with mud-brick character.

Chapter six

THE RENAISSANCE AND MEDITERRANEAN CLIMATE

Renaissance architecture in Italy and the Gothic style in the North. Comparative climatic observation in Northern and Southern development of Renaissance architecture. Because the elements of ancient classical architecture were evolved in response to Mediterranean conditions of climate, their revival, continuity and development were natural and logical. Elements of Gothic design and their response to Northern winter conditions. The high pitched roof construction of the North and its architectural expression during the Renaissance in non-Mediterranean countries. The dormer window and mansard roof in the European Renaissance compared with the classical roof and balustrade of the south. Classical details in Northern climates and the need for their climatisation. Critical approach and analysis of architectural details in response to regional environment should be within the scope of active stimulated fine art studies in architectural scholarship.

Southern Renaissance in Spain and Italy. The court in northern and southern architecture. The Renaissance court with its fountain is a constructed open air lounge. Fountain the symbol of a southern climate and in a similar sense to the fireplace, a symbol of the cold north. Lofty interiors and columnar porticoes in south and north.
The Renaissance both a revival and a development. Arab influence reflected in Venetian art. Influence of stone craftsmanship and decorative art on Renaissance development. "Quattro Cento" architecture.

Baroque tendency and the Mediterranean; decorative and structural composition of baroque design moulded forms and their architectonic integrity. Arabesque excessive flat surface treatment in "Eastern Baroque" or rococo manner.

Alberti's discourse on urban and country planning. The avenue and court in Renaissance country palaces. Development in external civic composition; court in Renaissance architecture compared to that of Islamic planning. Social function of street and open spaces. Gateway entrances to streets and squares. Medieval concept of enclosed units in town planning compared with baroque excessive dramatisation.

Street shelter and the colonnaded bridge. Upper floor protocies and their social function. Regional planning devised by Alberti. Climate and the choice of a town site; effect of wind on site and topographic observation: hill sites and higher altitudes. Reflected heat on a town from rocks. Evaporation and ventilation in enclosed river or lake sites. Possible to adjust relative humidity by planning. Convenience in buildings with regard to climate. Ancient devices.


Alberti on the properties of building material. Effect of weather on stone quarrying. Various uses for timber according to type of wood and resistance to climate.

Water in civic planning. Importance of aqueducts in the life and 'climate' of a city. Mediterranean country residences and gardens of the Renaissance period reflect a notable aspect in secular grandeur in Mediterranean conditions: stone terraces, balustrades, loggias, water treatment in fountains, cascades, etc. Little change in the architecture of Mediterranean peasant communities throughout history.
ISLAMIC ARCHITECTURE

Underlying unity of artistic expression in Islamic architecture - climatic and geographical factors in the unity of the Arab-Islamic regions east and south of the Mediterranean.

Effect of penetration of brick-building tradition on Islamic and Mediterranean stone architecture. Eastern decorative carving values introduced to classical stone material.

Early Arab architectural monuments. Desert (more correct to call Badiya) palaces: Kaar Al-Mahatta. Early desert decorative art in stone carving. Qusayr Amr - prototype in stone of arid desert vernacular achievement. Lack of timber in such environment led to curvilinear roof - barrel and semi-barrel vaulting; prototype capable of being developed to a regional stylistic achievement.

Architecture of the Mosque - the court (sahn). Street gateways to the sahn enclosure. Architectural and social significance of the open space which is constructed as a central part and concourse of the mosque. Early "court temples" in the East: - discoveries of Rostovtzeff at Dura Europos; also biblical evidence. Relating the vernacular quality in Southern latitudes of house (Bayt) to mosque [Bayt Ullah Alharam meaning the Sacred House of God]; compared to a similar inter-relation of cottage and cathedral in the north.

Treatment of surrounding court enclosure by small iwans (shelter rooms) formed often in brick regions by repetition of niche bays [a half dome in vertical section over a rectangular space]. Brick traditions and associated coloured tiled fabrics in Islamic architecture. Climate, material and colour in dry weather of southern Mediterranean.

The fountain in the Sahn.

The "sanctuary" or covered floor space for indoor gatherings and prayer during periods of extreme heat and cold. Sheltered street or gallery-walk approach to the sanctuary from the bazaar. The architectural attempt to bring into a unity the sahn with the sanctuary interior. Mihrab and Mirbar (pulpit).
Minaret tower - its function and architectural expression. The Minaret in the composition of the town; its aesthetic character and physical service as a landmark. Dome and the development of mosque design. Domed Saints' Sanctuaries.

Islamic decorative arts and traditional craftsmanship. The "Minor Arts" and their significance to climatic conditions. The effect of a dry semi-arid climate on the use of colour in exterior decorative art compared with the relatively damp atmosphere of the North. An underlying climatic influence at work in the development of the use of colour in the south and moulded forms in the north. It should also be relevant to ceramic and clay work trend to colour and natural stone trend to mould.

Window design in the religious art of the south compared with the north - the pierced type of window grille and northern stained glass window. Lighting and interior colour composition. The striking transition from interior lighting to outdoor surroundings. Glare and the colour composite restful effect in the tiled surfaced exterior.

Screen partition in southern climate affects flexibility and simplicity in general planning; opposed to anti-draught planning and cosy interior in Northern planning. Latticed woodwork in Mashrabiya and partition.

Vaulted interior and domed lighting. The protective barrier of wall and roof in Islamic architecture compared with the skeleton framework and window development of northern requirements. The structural character of the dome in relation to heat and climatic conditions in northern and southern latitudes.

Islamic decorative art at its best when it bears a due relationship to the structural design. Effect of religious decorative art and representation on the general character; clear distinction of Christian and Islamic architecture.
The essential unity of Mediterranean houses throughout time and places and the Islamic variation to this theme. Early origin of the oriental type of house - discoveries at Dura Europos. Biblical and folk-lore evidence. Herzfeld's account of Abbasid houses. The central court and repetition of courts within the house to suit the seasons and social needs - haramluk [private household] and salamlik [reception quarter]. The court ensures orientation of rooms to four aspects to suit the time of day and season. The semi-open space - iwan or tarma. Effect of iwan or tarma in reflected lighting to interior rooms and generous air-circulation. Large protected window-openings in tarma. Air circulation and shight of interior. Adjusting a draught breeze in southern planning is a planning aim.

Serdab - summer cool shelter - a subterranean vaulted structure during summer afternoons; need for barrier against fierce outside heat means less mass surface exposure. Problem of lighting and ventilation in the serdab. Indirect source through stairs of upper floor grille is sufficient. Healthy dry sun-heated air and the badger method of cooling and ventilation in the serdab.


Arab garden of the southern Mediterranean. Decorative art of irrigation by channel and water display in garden. Influence of rainfall on the scale and character of gardens. Parkland of the north and the small scale character of the enclosed gardens of the south.

Arab and Eastern tradition of gardening in Spain is a rich source of study. Spanish garden art and architecture - the influence of stone geological formation on the garden art of
the Renaissance, compared with the brick and clay tradition in almost similar climatic conditions. Spanish art fuses the two, presenting a particular southern style known as "Mudejar". Transmission of Arab garden art and architecture to similar latitudes in America.

Climatic Aspects of Islamic Town Planning

Effect of gardens on the 'climate' of the town. Accounts of Arab travellers. Mustawfi's comprehensive description of the layout of a small town in relation to its surrounding region.

Masjid Al-Jami - the focal centre of the town - a religious and civic unit. Street gateways and their names. The market industrial town and the suk. Division of different industries and professions into various compartments of the suk. Covered suk galleries and their relation to open spaces. Public buildings - colleges and baths. The subterranean gymnasium [Zour-Khana].

The growth of urban towns and political power leading on to present conditions.
PART IV

Chapter eight

THE PRESENT TRANSITION AND MEDITERRANEAN CULTURE

Modern north-western civilisation penetrating to all areas of the Mediterranean region and bringing a transitional change. Modern civilisation tends to be independent of natural environment. This trend is reflected in modern architecture. Divorce of scientific thought from artistic content is the nature of the present problem.

Technics and the place of art in world unity. Regional styles helped by modern technics. Consolidation of regional character into 'national culture'. Means within present education to cultivate spirit and body towards environment if an objective Mediterranean attitude is to be realised. Importance of education in terms of environment to relate modern scientific knowledge of familiar local surroundings. Necessary to derive first-hand knowledge by such early outdoor observation. The open air theatre.

Serious lack of appreciating or understanding of rural character at present; architects to be trained to their visual environment. Effect of architectural training abroad on departmental office work. The social and political significance of regional character. Arab unity should aim to help to foster the growth of an artistic outlook in the near future.
Chapter nine

REGIONAL PLANNING

Regional planning and the Mediterranean climatic conditions. Effect of water conservation and its planned distribution on future settlements. Co-ordination of interrelated programmes in a regional scheme. Diagnosis of some causes for disease and discussion of role of regional planning for improving the general health conditions. Better climatic conditions of particular districts could be realised in a foresight co-ordinated regional planning.

Modern technical advance in discovering and utilising water sources helps to promote a stable agricultural life. Bedouin and Fellahaen (cultivators) settlement a desirable need. Improvement of cultivated cases in desert surroundings is an interesting feature problem.

Water planning and hydraulic conserved power. Link between use of power and domestic and craftsman work services. Relation of agriculture to fabric and textile art industry.

Forestation and its effect on relative humidity of a region. Two-fold effect of trees - they act as a filtering agent against the worst nuisance of dust and reinforce the loose shifting sand, thereby helping cultivation; forestation for building timber.

Prospects of high altitude zones as summer resorts. Importance of historic and archaeological sites in future planning. Landscape and civil engineering programmes. Aesthetic expression of water in the regional landscape. Quarries for building material could play a great part in preserving regional character of a district instead of importing unsuitable alien products.

Physical and Mechanical Aspects in Planning. Air-conditioning - mechanical cooling devices etc. are to be regarded as auxiliary services. Some physical adaptation to climate is to be secured, it works for better energy and health; acceptance of limitations
of new forms of conserved energy in man's physical existence in nature.

Rural Planning and the Mediterranean climate
The due recognition of the integrity of the village settlement microcosm of Southern Agricultural country planning; future prospect of its sympathetic Mediterranean architectural expression could be a conscientious development stimulated by a new responsive art scholarship.
Climate and the architectural composition of the village settlement. The compact grouped type of village.
Principles of physics related to planning for coolness. Cool ventilation in relation to village and town planning.

Arab villages and their cellular open court composition. The place of the minaret or church tower in Mediterranean villages.
Regional character and the new colonial village settlements.

Chapter ten

URBAN PLANNING

The relation of agriculture to urban development. Need to guard against present tendency for modern towns to be independent of environment. The lesson of past civilisations should be studied in this connection.
The town as a nursery of craftsmanship to serve village requirements. Interconnection of stable agriculture and local industry. Suk activities dependent on the prosperity of rural countryside.
The suk as a workshop in towns. Need for a cool summer environment in the suk. Shelter against heat means a roof covering; "to construct shade" a primary necessity of Mediterranean town planning is reflected in suk design.
Air movements between open and shady parts of urban environment. Vertical air circulation by means of "badgeer". Design of open places in towns to be thought of in terms of air movements through gateways and openings to shady parts.

Climate and the architectural character of town: closely built architectural formation as opposed to the "garden city" idea for Mediterranean conditions. One aspect of town planning is to cater for both summer and winter requirements - protection against heat and cold.

Diagnosis of the unhealthy atmospheric conditions of existing towns. Particular remedy in each case is dependent on local topography and relative moisture in the atmosphere. Effect of gardens and increased vegetation on climatic conditions in hot arid towns. Correspondingly, reduction of moisture is the problem in the local humid areas. The control of climate and atmosphere must be exercised for the public benefit.


Boggiano-Pico process. Overcoming the dilapidated appearance of towns and the dangerous effects of sub-soil water on town buildings. Social effect of associations of bad drainage on present architectural appreciation. Technical and scientific advance could help to nourish and healthily maintain the regional architectural character.

Western European town planning patterns in Mediterranean countries. Need to guard against evils of ribbon development. Town expansion could be controlled by determining an outer garden belt or agricultural zone.
The housing problem. New housing suburbs lack a regional civic expression. Traditional court design pattern versus European cottage type. Possibility of the court theme variation for the prospect of architectural composition. The classical example of the Pompeian house provides an inspiring composition capable of infinite variation. Modern methods of urban sewage should make it possible to develop the court or patio arrangement to a healthy and recreational advantage, expressive of southern volume space design.

Adjustment for winter requirements. Open air loggias facing the sun; thick walls and small windows also provide protection against winter cold. Dangers of indoor heating by means of a central brazier. Research on the ill effect of over-heated interiors. The use of a deep recessed fireplace in winter rooms [Dewa Khana]. Southern expression of the fireplace.

Relation of modern scientific advance in cooling and heating to the theory and practice of architecture.

Chapter eleven

ARCHITECTURAL DESIGN AND BUILDING MATERIAL

Right response to building material an important factor in design. Building material and civic design. Analysis of character of existing towns and villages with regard to use of and weathering of building material is a helpful and stimulating study. Architecture and the need for scientific research into the nature and properties of building material. Such research should help to prepare and cultivate the primary building material for architects and local craftsmen. Landscape and built-up environment. Practical measures to maintain the local character of a
town. The responsibilities of municipalities and local authorities.

Relating building material to the conditions of climate: heat stresses, moisture and reflective light. In research the technical efficacy of efficient resistance and the aesthetic consideration of colour and texture are to be inseparable. Technical and architectural disadvantages of reinforced concrete as a surface building material in Mediterranean climate. Effect of steel and reinforced concrete on the Mediterranean character of the wall.

Reviving arcuated and vaulted structures with the preparation of good building material and the training of building labour. The historic resources of the past provide a scope for such a study and its development.

Building materials and the weathering process. Need for climatic data and district observation, analysis of properties of building material and surrounding atmosphere is a further help. Quality of mortar in brick joint to be related to the method of rain and heat resistance. Developing brick size in relation to mortar, its tile character and the structural advantage to wall thickness and pleasing texture appearance.

Elasticity of building material in relation to temperature changes. Comparison of brick paving and marble - relative power of heat and light reflection. Intense radiation from corrugated iron roof's and partitions.

New services of reinforced concrete in the sub-soil conditions in the plains. The pile method of construction, the use of reinforced concrete can help to preserve a flourishing clay brick tradition with associated ceramic art, combining structural endurance and regional architectural character.

Stone building tradition in hilly and rocky regions. Responsibility of local authorities to preserve this tradition by controlling use of alien building material in positive solution. Helping to provide suitable building material.
The need for a good supply of timber by governmental aid to forestation. Necessity for co-ordinated research with regard to suitability of timber for various building needs.

Need to develop local vegetation for matting and furnishings that will help to effect cooler interior and suitable local character. Reed partitions instead of corrugated iron. Control of glass wall surfaces and southern wall character.