The Architecture of C.A.Doxiadis in Bangladesh : A Critical Evaluation

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On this day, 11th August, Wednesday, 1999, the undersigned hereby recommends to the Academic Council that the thesis titled **"THE ARCHITECTURE OF DOXIADIS IN BANGLADESH: A CRITICAL EVALUATION"** submitted by **Bayezid Ismail Chowdhury,** Roll No 9203, Session 1990-91-92, is acceptable in partial fulfilment of the requirements for the degree of Master of Architecture.

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Dedication

To my beloved daughter Amica Afrida Choudhury

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Abstract

Several foreign architects were commissioned in Bangladesh (erstwhile East Pakistan) during sixties and their contribution is significant in the contemporary realm of architecture. Though the architecture of this period remains controversial in terms of continuity and historic precedence gave rise to a new trend of internationalism and opened a new horizon to the future generation. Beside the work of Louis I. Kahn's Capitol Complex, other architects who contributed in the mid sixties includes Constantin Doxiadis, Richard Neutra, Stanley Tigerman, Paul Rudolf, Robert Boughy etc. The appointment of these architects seems to be rather new specially because these architects had no previous contacts of any form, political and social. Architects like Constantin A. Doxiadis from Greece and others from America were completely alien to our social, climatic and cultural context. Thus the architecture produced by the foreign architects always provides areas for inquiry.

This thesis investigate the works and the philosophy of C. A. Doxiadis, a Planner-Architect from Greece, who produced a substantial number of works in Bangladesh as well as other Third World countries. Doxiadis born in 1913, was trained as Architect-Engineer-Planner. He worked in thirty-six developing countries. Doxiadis had studied, programmed, planned and designed a great number of human and industrial settlements, power and public works, commerce and tourism, transportation and communications, housing, urban renewal projects.

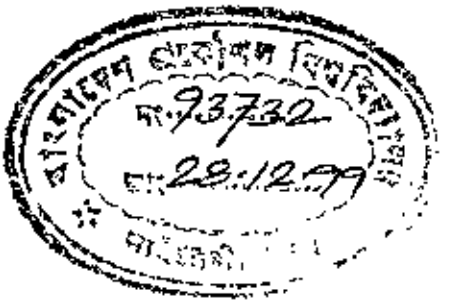
The work of this Architect-Planner-Engineer has an important impact in the architectural world of Bangladesh in terms of volume and definitely to a certain extent in terms of architectural quality . The purpose of this thesis is to explore the works of Doxiadis and relate it to his other works in Bangladesh and abroad.

Doxiadis views architecture as a science of human settlements and denotes the interrelationship of man with his environment. He perceived architecture as total building activities where professionals from different sphere will participate. The

dissertation also discusses and explains Doxiadis' philosophy, his Architectural work in Bangladesh and his global works. It concludes with a brief critical analysis of the works of Doxiadis.

A survey has also been done on the various architectural aspects of the projects and the opinion of the users have been recorded. The users reaction were in many case satisfactory and positive. A long time has passed since C.A.Doxiadis worked in this country and his work stand as significant edifices of a foreign architect.

Content



Chapter One

Introduction

1.1 Present state of the proposed research topic

Contemporary architecture in Bangladesh is the product of good number of foreign architects work. The work of these foreign architects have made reasonable impact in the architecture of Bangladesh. Few studies or academic researchs have been initiated in this field . Unfortunately many of us don't even know the background and impact of these foreign Architects. Contemporary architecture of Bangladesh includes significant contribution by Robert Boughy, Stanley Tigerman, Paul Rudolf, Louis I. Khan, Richard Nuetra , C.A.Doxiadis etc. Through commissioning of these architects in Bangladesh to design various types of buildings were probably the most important event for the architectural development in our country, but certain question also need to be resolved, as some criticise these projects as western biased, occasionally ignoring socio cultural and climatic context. Conscious effort should be made to analyse and conclude on the degree of impact these have made on the architecture of Bangladesh.

1.2 Objective of the research

a. Providing a philosophical and practical background for involvement of foreign architect in the third world countries specifically in Bangladesh.

b. To analyze the philosophy of C.A.Doxiadis and relate his philosophy to his work.

c. To analyze the architectural features in the context in terms of architectural principles, constructional system and use.

1.3 Research Methodology

In order to achieve the above mentioned objectives, this study analyse the philosophy of Doxiadis and relate the philosophy to his works in terms of architectural design and qualities, space articulation, circulation pattern etc. This involved both primary and secondary surveys. Primary survey involved preparation of drawings of projects by Doxiadis in Bangladesh, photographs and slides of these projects and interviewing of the users of these projects.

Secondary sources information collection involved collection of information from available published materials regarding the architectural works of Doxiadis in Bangladesh and abroad.

Field Survey

a. Preparing drawings for buildings in Bangladesh of the Architect.
b. Preparation of photographs and slides
c. Interviewing the user.

1.4 Expected result

Foreign Architects in this sub-continent gave rise to a new trend of internationalism in our rapidly changing architectural context. Architecture of these architects can be a source in terms of style and image of internationalism, But at the same time the process of selection and rejection should be made, by because there are also negative impact of these architecture in terms of continuity and authenticity. This study is expected to provide a basis for analyzing foreign architects works in Bangladesh within a comparative frame work. This study also expects to stir up the need to analyze the works of other foreign architects in Bangladesh in order to enquire into the above mentioned objectives,

1.5 Composition of the thesis.

In order to enquire into the above mentioned objectives, the study has been arranged in seven parts. The thesis includes seven parts. Chapter one containing the introduction explains the present state of the proposed research topic, objectives of the project, research methodology and expected result. Chapter two discusses foreign architects work in the realm of developing countries, their authenticity and appropriateness in terms of continuity and C.A.Doxiadis as first foreign architect appointed in Pakistan after British Colonial period. The philosophy and attitude of C.A. Doxiadis towards architecture is discussed in chapter three. Chapter four focuses the works of C.A.Doxiadis in Bangladesh and mainly contains analyse of architectural features, photographs of the projects and questionnaire. This chapter is completely based on field survey and analyse were drawn from own findings. A brief exposure of C.A.Doxiadis global works have been provided in chapter five and a conclusion is drawn in chapter six.

Foreign Architects work

2.1 Introduction

Architecture of this sub-continent is a conglomeration of different historic periods having their imprints on all visual elements. If we trace the history from the Vedic period we will very distinctly observe the foreign influence from that period. The Aryans were the first foreigners to be massively involved and ultimately being settled in this region. The early civilization of Mohenjodoro and Harappa (3000 B.C) was styled as Indigenous development. The stream of Aryans from mid Europe, central and northern part of Asia contributed significantly in the world of architecture in this sub-continent. Architectural features like Gopuram, Thaba, Shunchi by Aryan builders were significant contributions. With the arrival of Alexander (250 B.C) the Great in the North Western part, the area came under the rule of Greek rulers and a strong western influence of a very matured classical civilization appeared in India. In 1200 AD with the arrivals of Muslims from the Persian territories after the Mughals assumed power, architecture of this subcontinent was further enriched with association of local and foreign features.

The Mughals who settled in this region started to shape an architecture blending with local context, thus providing a rich flavor to our architectural heritage. Architectural features like dome, kiosk and planning concepts of formality and axiality of Persian origin were introduced. The colonial influence of the two hundred years of British rule is also dominating. The foreign influence of Aryans, Greeks, and Persian and to a lesser extent British, contributed to a large extent in determining the architectural scenario of this sub-continent. Except the British, others settled down and their source of architecture blended with locals, adjusting to our social and climatic context over a period of time. Even after the British colonial period the architecture of this sub-continent was shaped by some foreign architects . These works by foreign architects apparently having very little understanding of our local context thus give rise to many open ended questions.

The question of appropriateness is not sudden because these architects were drawn from the western world and had very little knowledge of our culture. Thus the responsibility for inappropriateness of these architecture, should also be shared to some extent the power structure who have employed them.

2.2 Foreign Architects work in the third world countries

"Authenticity suggests genuineness and probity – the opposite of the fake and imitation. It implies forms based on principle, forms which avoid arbitrariness and which are appropriate on a number or level. [1]"

2.2.1 Introduction

"Every people that have produced architecture have evolved its own favorite forms, as peculiar to that people as its language, its dress, or its folklore. Until the collapse of cultural frontiers in the last century, there were all over the world distinctive local shapes and details in architecture".[2]

Above mentioned statement rightly expresses that the true essence of architecture emerges from the "sense of place" and context. From David Humes philosophy concerning origin and association of ideas and Immanuel Kant's guideline concerning metaphysics, it can be summarized that the basic essence of architecture is the spirit of place, that evolves from history, culture, religion, values and way of life, material, building technique, inspiration, aspiration, desires, and beliefs of a certain place. The Roman concept of genius loci by Christian Norberg Schulz contributes to the same concept. Louis I. Khan probably meant the same thing by emphasizing his famous dictum" What it wants to be ."

Unfortunately in the post colonial era this basic essence of spirit of place has been negated, specially by the foreign architects, in the name of modernism and internationalism. Works done by foreign architects in the postcolonial phase is a subject of inquiry in terms of continuity and appropriateness. The notion of a modern

architecture is inseparable from the social and cultural milieu and the spirit of place should stem from the deeper currents of thought that emerges from the particular space, local myths and philosophy where no pastiches and clichés from present are encouraged.

Not only the critics even the general mass are today skeptical about the effects of the works by the foreign architects in this sub-continent. After passing through a significant phase of liberalization the people of this sub-continent has developed its own ideas and thoughts in different spheres of life. The invasion of western styles, which are exaggerated in different areas are being put to question. From all this it can be clearly opined that architectural imperialism has been allowed to take a parallel course with cultural, economic or political imperialism.

With industrialization modern architecture has flourished in most of the developing countries This advant of modernism made an adverse impact in terms of continuity and appropriateness. In some instances the architecture have been copied and misused. After the Second World War forms devoid of decoration and craftsmanship started to evolve and appreciated in developing countries. The reasons for such development might be, lacking in the financial ability, technical expertise and construction method of post- colonial independent countries, which in turn compelled them to look toward to the developed countries. The following quote is a proof to this statement.

"Through continuing colonization, in which case images of modernity functioned as emblem of foreign economic or political control; and through the brainwashing of post-colonial elite's (native-born but foreign-educated) with Western images and ideas which were upheld as progressive' counter-agents to an earlier era of 'backwardness and stagnation', architecture is thus transformed to fashion and transmitted at a greater speed than before."[3]

The arrival of modern architecture in the post colonial countries was also linked to modern and mechanical system of building consisting air-conditioning, and other technical equipment's in specialized building like airports, government building and

institutional buildings. Most of the Third world countries during the 1950s and 1960s were passing a stage from rural and agriculture economy to an urban and industrial one. The result was usually crude and lacking in sensitivity to context. The new mode of life, alien to users and western clichés shocked the local people and thus a process of architectural schizophrenia started to stalk the developing countries.

Architecture by the foreign architects during post -colonial period, developed as a product rather than a process. Modern building was waiting in the west as a product to be marketed in other areas of international market. The irony was that after independence from colonial rule these third world countries were under the strong grasp of colonial impact, hardly from which they could wiggle out. To quote,

'In the transaction between the developed and developing countries there was collision in the ways building was designed and put up. Modern Architecture presupposed a division of labor between architects, manufacturers, engineers and construction workers, but in many underdeveloped countries there were centuries-old traditions of craftsmanship in which methods had been evolved to handle local materials. The practical logic behind regional style was undermined, and the delicate details and intuitions of handicraft were replaced by fatty industrial building components.'[4]

2.2.2 A Summary Description from British Colonialism to Post Colonial Era

British colonization resulted in an overwhelming contact with European culture that eventually coincided with global modernization dominated by themes of science, rationalism and technology. A complete overhaul of the social, cultural, and urban system was precipitated. New "civic" institutions were introduced, along with the structure of a segregated dual city. Khalid Ashraf states that,

The new economic and administrative structure led naturally to an unprecedented level of building activities with a completely new range of buildings, railway structures, bungalows, warehouse, hospitals, colleges, etc.[5]

The architecture in this time started to transform to a hybrid character. The formation of colonial structures and even the cities are the result of contact situation between the two cultures and the value system. The result of the indigenous architecture was the product of a subsistence (agrarian and craft based) economy now started to adopt the tech-cultural (industry based) economy.

"While most buildings followed European models in some way or other, an original architectural event was the production of the bunglow as recognition of the delfaic hut."[6]

Religious structures were also sites of Europeanization. The 19th century temples were to achieve a mixed character. The plan of traditional genre mixed with eclectic exuberance of many European features. Italian arches, shuttered windows, dentils, cornice, all rendered as decorative relief in plaster.

During colonial time brick construction activity took place. For the first time effort towards professionalism was made, i.e architects and engineers were involved in place of master-builder, construction were done from proper plan and drawings. The rulers did not want to invade or consciously disturb the cultural norms but they definitely wanted to make their importance felt. They wanted to make all facilities convenient for themselves even visually with least disturbance to the local norms and culture. This gave rise to a compromise architecture. Curzon hall is a example of that, these were at best, hybrid variety of architecture-massive, useful, well executed buildings without being creative or original.

2.3 Employment of major foreign architects in post British colonial phase in this sub-continent

I don't want my house to be walled in on all sides and my windows to be stuffed. I want the cultures of all lands to be blown about my house as freely as possible but I refuse to be blown off my feet by any.[7]
(Inscription over the Entrance to the national Library at Belvedere, Calcutta)

The high architectural tradition or rather traditions- as diverse as the subcontinent itself but with many common characteristics, some embodied in ancient treatises, others originating the great invigoration that Islam and even some contribution in the public and institutional building in a hundred and fifty years or so of British rule - had withered away along with several other aspects of culture, leaving in the cultural and architectural memory of the post colonial India in a state of vacuum.[8]

The above two quotes raises question about the new group of architects of newly independent nation charged with western enigma constituted a new architectural culture of sorts, and hence initiated the debate about the right architecture for the new nation with Revivalism and Modernism as the polarities, the argument for the former generally limited to the issue of style of ancient.

In this crucial juncture in search for a language for architecture it was again the power structure who steered the decision and hence put the post colonial country in a state of cultural colonialisation. Jawaharlal Nehru, the Prime Minister of India defied Mahatma Gandhi's wisdom of ancient *and* Gandhian architecture of simplicity with many intellectual antecedents and parallels including modern architectural percepts but without modernism's formal vocabulary.

Nehru was a great admirer of the achievements of modern civilization. His futuristic view gives a new but questionable impetus to the new nation that reflects from his statement *Nevertheless the past is over, it is the future that beckons us now.* (August14, 1947). Trained and brought up in western style it was not surprising for his inclination, but there also lies a sense of political exploitation and political agenda overruling the architectural issue. Instead of addressing the inner essence of architecture, Nehru wanted to present something surprising and Titanic. Even he was aware about contradiction arising from the employment of Corbusier and said .....now I have *welcomed very greatly one great experiment in India, which you know very well – Chandigarh. Many people argue about it, some dislike it, some like it.*[9] Critics of modern time were critical of employing foreign architects. Shatish Grover once said Nehru *could have drawn talent from India itself- an individual or rather ,an*

assemblage of talents (architects, planners, sociologists etc.) To advice him on the building of a new Indian city. [10]

Satish Grover, a leading Indian architect and critic of contemporary period was also critical about minion like attitude of the government and the architects of that period. *Corbusier's weakness was his arrogance ,which was adequately fuelled by the Indian Government's subservient attitude to him-undoubtedly a hangover from British* Imperial rule. No one dared question him on implanting his western ideas of town *Planning on Indian soil. When he prepared the Master plan for the city within a week of concerted effort, there was virtually no murmur of dissent...Thereafter, he proceeded to produce his grandiose "concrete monsters" which were nothing but a vigorous* and unfettered continuation of his totally personal vision of a world of architecture.[11]

Many critics think that Corbusier's perception of architecture is based on high technology. He maintained that buildings are machines, so he didn't find it necessary to inquire into their organic relationship. His staunch follower Doshi, one of the pioneer in the modern architecture of India and who worked with Le Corbusier opined

"Chandigarh may not even be considered an Indian city because it gives us Le Corbusier's sense of future but not an Indian life." [12]

The domain of politics was so overpowering in its dictation about architectural language during Neheru's time that Jon Lang wrote *....after Nehru's death as the design professions in India become totally Indianized and thus independent.*[13]]

2.3.1 Post Independence Period of Pakistan

The political picture was far more different in Pakistan than India. After Independence in 1947, the years between 1947 and 1958 were marked by political chaos moderated by administrative power and acumen of the civil servants of Pakistan. They were also years in which the armed forces, especially the army, expanded its mission and assumed political influence alongside the civil servant. The revived Constituent Assembly promulgated Pakistan's first indigenous constitution in 1956 and reconstituted

itself as the national legislature--the Legislative Assembly--under the constitution it adopted. Pakistan became an Islamic republic. A president replaced the Governor General, but despite efforts to create regional parity between the east wing and the west wing, the regional tensions remained. Continuing regional rivalry, religious debate, and the weakening power of the Muslim League--the national party that spearheaded the country's founding--exacerbated political instability and eventually led President Iskander Mirza to disband the Legislative Assembly on October 7, 1958, and declare martial law. General Mohammad Ayub Khan Pakistan's first indigenous army commander in chief, assisted president Iskander Mirza in abrogating the constitution Ayub Khan, as Mirza's chief martial law administrator, then staged another coup also in October 1958, forced President Mirza out of power, and assumed the presidency, to the relief of large segments of the population tired of the politicians' continued machinations.

Although Ayub Khan viewed himself as a reformer, he was predisposed to the benevolent authoritarianism of the Mughal and vice regal traditions. He also relied heavily on the country's civilian bureaucrats, who formed the majority of his advisers and cabinet ministers. Ayub Khan initiated a plan for Basic Democracies, a measure to create a system of local government from the grass root level. In 1960 the Basic Democrats were asked to endorse Ayub Khan's presidency and to give him a mandate to frame a new constitution. Ayub constitution, promulgated in 1962, ended martial law, established a presidential form of government with a weak legislature (now called the National Assembly) and gave the president-augmented executive, legislative, and financial powers. Up to 1962 due to this political instability architecture could not flourish in Pakistan like that of India. India with its leadership of Nehru marked an important though controversial step in employing architect like Corbusier, Pakistan lagged behind in its show of architectural stunt.

With the beginning of Ayub Khan's rule he immediately employed Louis I. Kahn for designing the National Assembly in Dhaka . The purpose was double fold. One was to show his awareness about democracy and the other was to counter politically the employment of Le- Cobusier in India. The result is inevitably complex to reconcile the employment of the foreign architects. The Power structure by armed forces and civil

understanding with the ethos and culture of the region and hence did not hesitate to employ foreign architects.

With the Independence of Pakistan and India from British colonial rule, both the countries had to adopt a polarization. Pakistan polarized in favor of the American block, as a result of which, a number of American architects were commissioned to work in Pakistan and Bangladesh, which is not distinct in India. More over financial dependence on the western block for the development of infrastructure also compelled them to employ Architects from America, like Paul Rudolph, Stanley Tigerman, Bob Boughy, etc.

For Kahn like Le Corbusier it was a chance for artistic experimentation at the cost of a newly emerging country's hope and inspiration. As August E. Komendant, worked for Kahn as structural engineer and was project engineer for Assembly Building in Dhaka cited

"*.... Kahn's artistic approach is on trial and it is so because he had lost the foundation for his own philosophy. ....May be artists and critics will consider it great art and architecture ,I don't, because these types of building do not talk to me or stand the test of reason. ..... Kahn violates his own architectural philosophy.*"[14]

2.4 Commission of foreign architect C.A.Doxiadis

C.A. Doxiadis, a Planner-Architect-Engineer, was well known for his concept of Ekistics and Ecumenic architecture. In his concept he tried to show architecture as science of human settlement and denote interrelationship of man with his environment. Doxiadis Associates, a firm of consultants on Development, apply Ekistics and Ecumenic Architecture in five continents and thirty six countries. As an United Nations consultant on housing and planning in Indian sub-continent C.A. Doxiadis was employed in Pakistan in 1959 for designing several institutional buildings. He was the first foreign architect to be employed in the post British colonial period in Pakistan and Bangladesh and this is the prime reason for selecting him in this research. He has done quite a few projects for

Bangladesh. Besides he also compiled a comprehensive report (consist of fifteen volume) on the construction, climate, material and technology. Hence his works deserve careful study and evaluation.

Endnotes

1Curtis, William j.r. **Modern Architecture Since 1900.** Phaidon Press Limited,1982 Essay on Conclusion:modernity,tradition,authenticity.P685

2 Curtis, William j.r. **Modern Architecture Since 1900,** Phaidon Press Limited,1982 A reference from Hassan Fathey on Essay on 'modernity, ,tradition and identity in the developing world. P567

3 Ibid ., P 448

4 Ibid , P 89

5 Ashraf Khalid, **Pundranagar to Sherebanglanagar : Architecture in Bangladesh,** Chetana Sthapatya Unnoyon Society,Panbag, Ramna, Dhaka1205,Bangladesh, 'Wind ,Water and Clay' The Architecture of Bangladesh. P19.

6 ibid.,p19

7 Prashad, Sunand. A+D (Indian Architectural Journal) Vol3,no6,Sept-Oct, Essay on *Le Corbusier in India.* P 15

8 Lang, Jon Desai Madhavi ,Desai Miki **Architecture and Independence,** Oxford University Press 1997 Appendix 3 (Prime Minister Nehru on Chandigarh). p 311

10 Grover, Satish. A+D (Indian Architectural Journal) Vol3, no6, Sept-Oct An Interview with Satish Grover. P 71

11 ibid.,p71

12 Doshi,B A+D (Indian Architectural Journal) Vol3,no6,Sept-Oct. The Acrobat of Architecture. An Interview with Carmen Kagal. p58

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14 Komendent,August **18 Years with Architect Louis I. Khan** , Loray Publisher,N.J. 1975. p 87.

Chapter Three

C.A. Doxiadis Vis –a'-Vis Architecture

3.1 Doxiadis General Philosophy about Architecture

C.A.Doxiadis is well-known for his functional and technical approach towards architecture rather than any intangible concepts. He mainly stressed on basic attitude of an architect and emphasized strongly about the role of architects. His concept appeared very global and eternal in some respect. Propagated in the early sixties , some of his concept still appears contextual. His concept of Law of Expanding synthesis and Prefabrication, specially for public buildings is appropriate for all time and context. His idea of incorporating architecture with all other sphere of life is also very modern and he elevates architecture to an upper and broader level of understanding.

3.1.1 The Meaning of Architecture

According to Doxiadis' ..... *architecture is total building activity as a technique and an art taught in the universities"[1], a product of the organized technology of developing.* But he again contradicts referring to the meaning of architekton (meaning master mason or master builder) as essentially the art of building. He also propagates that architecture is not justified in concentrating one or a few exceptional buildings or groups of buildings, but should be able to cover a community, a region, a country, in short the total building activity all over the earth. This interpretation he made not only to the broader social concept of our era but also focussed the fact that it is no longer possible to differentiate between the important and the unimportant parts of a city or between its monumental and non-monumental sections.

3.1.2 Architecture, An Expression of Collective Consciousness

Doxiadis accumulates the different economic, social, political, administrative, technological and aesthetic forces in architecture. To him architecture is no longer a matter to be decided solely by the architect, but must be thought out in conjunction with many other people and co-ordinate with views from different discourses. Thus, his view is that,

.....We live in a developing world, and the only justification for architecture is its connection with the overall evolution of society. For our purposes we may define this as the expression of all the forces which influence the creation of buildings, bearing in mind that the architect is conditioned by economic as well as by aesthetic, by social as well as by technical, by political as well as by cultural considerations.[2]

According to Doxiadis, the problems that architecture is facing are of two categories. The first comprises the problems, which require an understanding of local environmental situations and the role of architecture as the soliciting and co-ordinating discipline. The second category consists of problems, which are not connected with the environment and require action at a much higher level. The problems are those which architecture faces in relation to industry, art, government and the other forces of modern expanding society. He suggests architecture must be co-ordinated geographically, that is, with its environment at the local level. The house we build must be co-ordinated with other houses, buildings, squares, open spaces and traffic, but it must also be co-ordinated at a broader level with other similar activities.

.....We must find the proper solutions for schools, for houses, for all the many kinds of buildings and functions, which constitute our total architecture. In the same way, co-ordination has to be achieved hierarchically, not only at the local, but at all levels; regional, national and sometimes even international. In this way we can view our achievement within the larger framework of the world at large to which it belongs.[3]

3.1.3 Architecture in Rapid Evolution

Constantin Apostolos Doxiadis is a philosopher with wide understanding of human settlement. He possesses a practical vision of architecture with a philosophical approach. He underscored the essence of our confusion about our present state, which he termed, as a state of transition. He propagates that our transition is a transition from old to new, from traditional to modern, from the concepts of the past to the concepts of the future and from the problems of the past to the problems of the future.

3.1.4 Architect and Context:

According to Doxiadis "*...scientists liberate themselves from their surroundings by isolating only the facts that they require, and even artists can, at any stage of their lives, avoid coming under the influence of any particular style, whether contemporary or traditional.*"[4] To him the architect is the only one who is supposed to create something better while living in, and being continuously influenced by, the work of his predecessors. The architecture being created everyday has to follow a difficult road loaded to breaking point with the weight of its habitat. This fact, namely, that both the public and the architect have to live in an environment neither created nor influenced by them, has both its good and its bad aspects. The good aspect is that the forces of inertia created by our surroundings act as defense against changes, which have not been well conceived, or well thought out and which are therefore simply not the most appropriate ones. This is at times a necessary safety device. After all, even though an outright failure need not be very costly, an architect who misleads humanity will create such an investment that large numbers of people will have to suffer for many years because of the community's inability to demolish any architectural creation. As Doxiadis said ...*It is wise to respect the architectural creation of the past and to draw from it as many useful lessons as possible.*[5]

3.1.5 The Vision of the Future

Though sometimes it appears that Doxiadis vision is very static and general, contrary to the concept he also derived some futuristic visions. He gave directions of some of tomorrow's home where the rooms will be much more pleasant than they did the present state not because of different shapes or dimensions but for the wide variation it offers. In his futuristic room he proposed for an automatic room or auto room, which can be open or enclosed just by getting instructions through pushing buttons or oral instructions by its owner. Doxiadis visualized how every person would have his own room in a society, which will recognize this basic right for every citizen. He was very sensitive in utilization of space and suggested for optimum room for a family.

3.1.6 A quantitative approach to Architecture

He advocates trying to analyze problems on the basis of the *law of cause and effect;* He sees the causes of our problems in architecture as basically similar to those of many of the problems of our epoch.

"... *Let us try to look at these problems in a quantitative manner; as a result we shall also be led to a fuller understanding of their qualitative aspects.*"[6]

3.1.7 Introvert Building.:

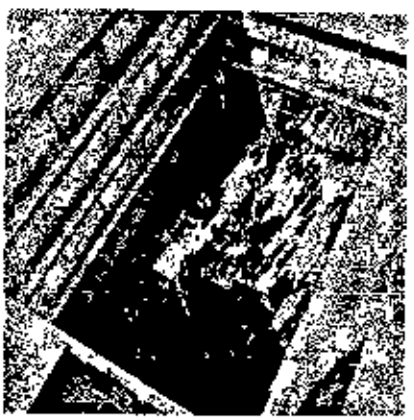

Fig 3.1 Doxiadis Associates ,Greece (Source, Doxiadis C.A ,Architecture in Transition,1963,page123)

Most of his works consist of the introvert buildings that assume a far greater importance on the frame of a human community, But in terms of the monumental building which does not require an expansion this pre-conception can be avoided. (refer to Fig. 2)

Fig 3.2 Introvert Buildings

3.2.a NAEM,Dhaka 3 2.b Home Economics College 3. 2 c Home Economics College

3.1.7 Flexibility of Internal Forces :

Thus we see that architecture can express the life within itself by growing always from the inside towards the outside. Doxiadis idea was buildings can and should follow the same rules as those apply to houses, thus he states

" *....they should not only consist of standardized parts but should be expandable and changing. This is indispensable for some and necessary for all, especially within the changing parts of a dynapolis. .....Thus we are led to the notion of a structural frame which can serve many types of changing and different functions at different periods in the life of the building. This means the development of all-purpose frames to be used as the basis for buildings of changing functions ; subsequently, this will lead to the necessity for imaginative but all-purpose syntheses, where the 'finish' could also give the building a special character."*[7]

3.1.8 From Broken Cultures to a Human Culture

To Doxiadis the cultural aspect is sometimes overlooked. It is true that many individuals try to create their own cultures in art, architecture, etc. However that is not a solution as cultures have never been created by individuals, even by very strong tyrants, but only by Anthropos. The great change Doxiadis suggests is the transition from the street of

the present to two completely different types of streets ,the human ones or hustreets, and the mechanical ones or mecstreets. Doxiadis stressed to understand the notion of street where Anthropos is completely mixed with machines has to be replaced by a system of hustreets and mecastreets .In this context Doxiadis said

"..... *we cannot drink water when we mix it with petrol and this is why we cannot remain humans when we mix with machines.* "[8]

3.1.9 About Public Buildings

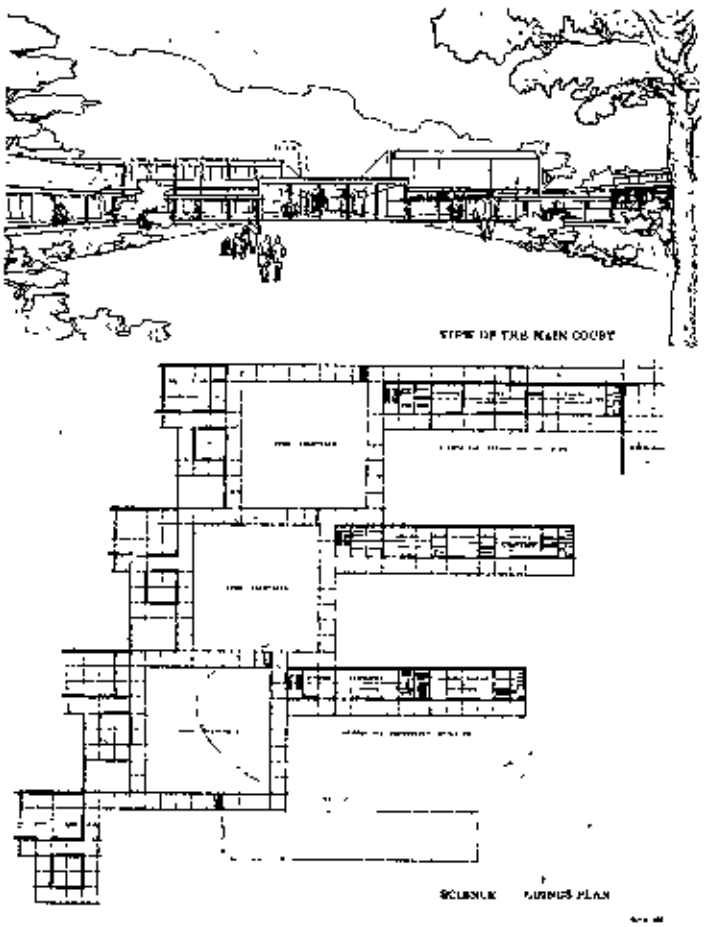

fig 3.3 Academy for village Development, an example of laws of expanding synthesis
(Source, Doxiadis Associates,works of Doxiadis,1963,page12)

His conception for public buildings were different from the residential units of houses, dwellings and flats. He felt there are certain Buildings, which needed expansion, such as a school, a college, a factory or a hospital. Buildings start at a certain size but very

soon have additional needs; either because of an expansion of the same needs through an increase in the number of people served by the building, or because the same people develop new kinds of needs. A school, may acquire either a larger number of children or additional needs for laboratories. Therefore he thought the plan of our buildings should be such that it allows for growth of all kinds, and a different approach to the notion of synthesis is thus forced on our minds. This, together with the necessity for handling so many building projects with the small task force of architects at our disposal, compels us first to design such buildings with standardized elements, a standardization not only of material but even of whole segments of classrooms, laboratories, etc., and to proceed only then to a synthesis according to the requirements of each specific case.

3.1.10 Color:

Doxiadis propagates that architecture will have to use all the elements it can find, including color, for color can come back into our synthesis too. Referring to Vincent van Gogh, Doxiadis said that the painter of the future would be a colorist as he never was before. This will also be true for architecture which, evolving on a major scale, will need more and more color in all its expressions.

..Factors such as prefabrication lead easily to uniformity, and its weaknesses can frequently be avoided by proper handling of color..... so that the use of intense coloring for large surfaces becomes much more important than ever before.[9]

3.1.11 Layering

Doxiadis *said .....one thing I have added and that is what I call the double-skin; the canopy which can be moved up or down, thus guaranteeing to the real skin or external surface of the house all the coolness it requires during the hot season.*[10]

(refer to Fig. 15,16)

3.1.12 Against Specific Style or Ism.

Doxadis was against copying any form or fashion, or on copying the trends of either modernism or any other style. He also insisted on avoiding architecture into exhibitionism or formalism and suggested creating something which, contemporary and willfully adjusted to all our needs, and so remains as eternal as the ancient or perhaps as eternal as the future architecture.

3.1.13 The Synthesis of Form

The future synthesis, as he thinks will be the synthesis of an urban landscape that is not to be based on shells.....*What we shall look forward to is the construction of large buildings and the greatest part of our cities on the basis of repetition of the horizontal and verticals. .....our future synthesis will demand the use of both horizontal and vertical lines and shell.*[11]

3.1.14 Skyline

From the analysis of his complexes the most significant feature, that become apparent is his disposition of the low house repeated over large areas , together with the multi-story building in conjunction with domes and shells for exceptional building.

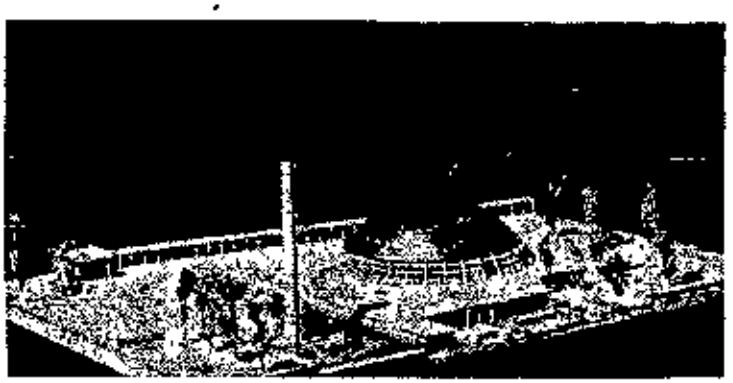

Fig 3.4Doxiadis sky line with shell and vertical elements
(Source, Doxiadis C.A ,Architecture In Transition,1963,page130)

3.1.15 Form and Massing, Synthesis of Oblong Elements

Most of the forms derived by Doxiadis are oblong.He used to avoid cylindrical or spherical forms. This concept -derives from the thought that man lives and moves in spaces in certain straight lines and not in a circle and almost all elements within a house, such as beds, cupboards, arm chair, sofas, etc. are oblong

..... *it seems impossible to create an economically feasible synthesis of oblong elements within a circle or an ellipse.*[12]

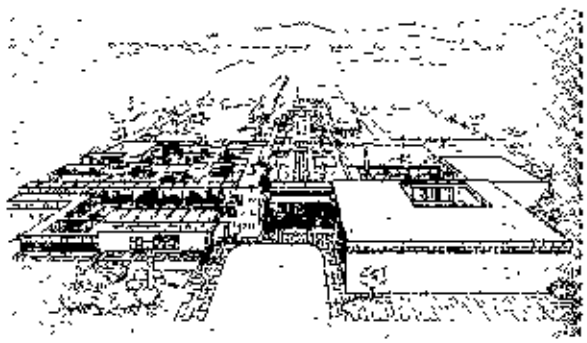

Fig 3.5 Academy for Village Development Buildings Heights are kept low to achieve a scale human
(Source, Doxiadis Associates,works of Doxiadis,1963,page15)

3.1.16 The Effect of form according to building height

Doxiadis buildings are generally rectilinear in pattern, relatively lower in height and for which he feels for a functional derivation of form "...*We cannot turn back the pages of history. We can continue the evolution of architectural species, but not reverse it.*[13]

Fig 3.6 Academy for Village Development.
Expression of human scale in is one of the major concept of Doxiadis which is achieved by keeping the low height of building
(Source, Doxiadis Associates,works of Doxiadis,1963,page17)

3.1.17 Expression of Elements in Doxiadis Architecture

(a) Human scale in practical and aesthetic terms

(b) Economy in the utilization of space

(c) Best possible microclimate

(d) Economy in function and maintenance.

By achieving the proper density he answered the most important demand of urban architecture-to create a proper space to live in.

3.1.18 Double Skin /Sun –Breaker

Perforated screens, which covered whole buildings like a skin, are perceived as inhuman and artificial and, to him ,it does not lead to proper human Architecture.
Thus using the surfaces of the sun-breakers that can be handled so as to avoid completely the reflection of light or the collection of dust, as has been demonstrated in almost all types of his buildings . (refer to Fig. 19,20)

3.1.19 Similarity in Design Approach

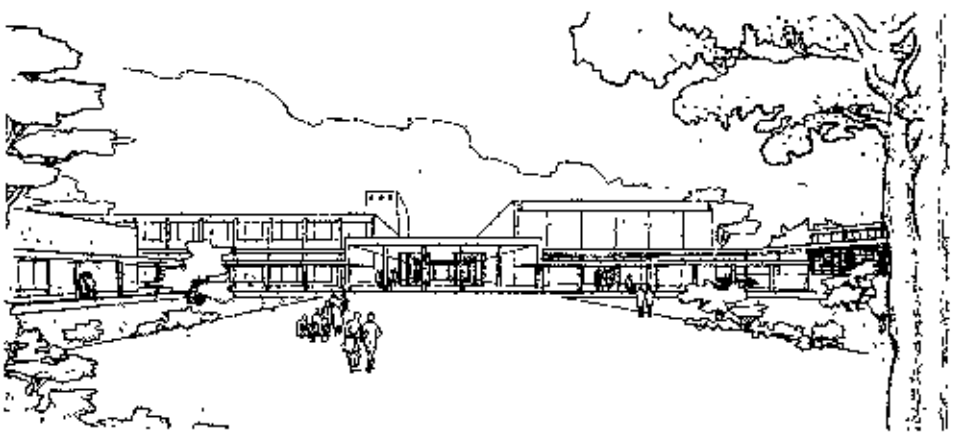

Fig 3.7 Almost similar appearance in the treatment of each block
(Source, Doxiadis Associates,works of Doxiadis,1963,page13)

"..... *When I was confronted by this situation I had to answer an important question. I said to myself: I frequently tend to adopt similar solutions. Should I consciously try to be different I came to the conclusion that I had no right to be different where the conditions themselves compelled me to remain the same. We should not be afraid to express ourselves in the same way and repeat something that is good.*[14] In support to his argument he metaphorically stated that the doctor is not afraid to prescribe a medicine simply because it has been used before. Architect build walls using identical bricks,... *We can equally easily build beautiful or ugly walls with the very same bricks- the important thing is the kind of bricks we use and how we use them*[15].

3.1.20 Repetition

Doxiadis feels that repetition need not be avoided ,because it is rational. He has also drawn that nor need we avoid buildings whole cities on the basis of one and the same modulus; a modulus which should remain is to underline the town plan, the layout plan, the plan of the plot ,the formation of the building itself

..... *Do we not write our music on certain scales? It is not necessarily either good or bad music just because of that. Whether it is good or bad depends entirely on the synthesis we achieve.*[16]

He stresses for a logical pattern of rhythmical repetition. Such a repetition is necessary for the rational formation of many arts of such buildings as schools, hotels, hospitals and private houses. It is also necessary for the improvement and standardization of construction, as well as for prefabrication. Finally, it is also necessary, although not indispensable, from an aesthetic point of view.

.....*The fact that we are led towards similar solutions should not frighten us but should rather challenge us to create an architecture with its own character.*[17]

3.1.21 Monumental Buildings

The proper road is to start from the utilitarian buildings and be concerned only with them, to develop a utilitarian architecture and let it gradually grow into a monumental one. No reasonable effort towards architectural creation in the future can begin unless it is based on utilitarian buildings. They are the buildings that everybody is concerned about. It is to them that the treaties forces of industry, of government and of individuals should be allocated, and it is at this level that we can create an architecture which may some day find its monumental expression in some few buildings of extraordinary importance, if our culture creates a content and a meaning for them.

3.1.22 A Four Dimensional Synthesis

According to Doxiadis, time is expressed as fourth dimension. The other three are height , width and depth. In architecture mainly as movement. Doxiadis explains that the notion of time is an indispensable dimension of any architectural synthesis for the following reasons:

(a) In any case, time is required for an architectural experience. Since, with the abstraction of time, architecture becomes painting or sculpture.

(b) Rate of change, architectural experience and expression have become more and more static in our day. This is due to false conceptions of academician and monumentality in every architectural synthesis and to the stagnation of creative forces.

3.1.23 Doxiadis and Ekistician (The planner of Human Settlement)

Doxiadis sees the architect's role as different from that of the ekistician, the planner of human settlements; while the architect is building for a maximum of say three generations, the ekistician, who deals with human settlements as a whole, is planning for the future. Although some of the buildings of the architect will survive the era in which they were built, they still constitute short- lived manifestations of the present. On the contrary, the ekistician should have his gaze on the future while, at the same time, not forget that his work should also correspond to the actual needs and possibilities of the present.

3.2 Architects Role and Failure suggested by Doxiadis.

According to C.A.Doxiadis philosophy an architect should ,

(a) Resume his traditional role of master builder, as co-ordinator of all forces leading to the creation of the building, without limiting himself to the designing aspect of the creation.

(b)The organization of a city into sectors is, of course, not purely an architect's Job; but the architect can certainly contribute, along with the traffic engineer, the economist or the urban geographer, to the understanding of the nature of the landscape, the synthesis of the city's one-directional axis, etc. It is within the sector, however, that the architect can create the proper architectural space and devise the proper architectural synthesis. And it is within the sector that we have to deal with the aesthetics not of the machine but of man. The machine, the car ,will be confined to the highways where it belongs. What is more, we should not erect imposing buildings along our highways. Where they can attract the attention of drivers.

3.2.1 The Basic Principle of an Architect should be as Doxiadis Suggested

The basic principle of an architect should be as Doxiadis suggested

(a) create a human scale .

(b) serve best by machines and cars, and

(c) have the proper balance of all types of families within the same area, so as to allow all types of policy in ownership and avoid segregating of certain types of families.

The responsibility of the Architect is to appraise the rising tide around him with an expert's eye and to try to regulate it, in order to help humanity as well as he can on the road it is taking. There are forces beyond the expert, perhaps beyond man himself. The architect's role is in fact to foresee the broad trends of the evolution which humanity is following and to try to create the best architecture for the present generation, and generations to come. His role is to understand the future, to foresee it as far as possible, to create the best human habitat for the types of people and for the types of situation that are developing.

3.2.2 Architect's Failure

According to Doxiadis ,the reasons for failure are:

1. In qualitative terms a very large part of very low quality is either because of the forces of inertia or because of a misunderstanding of the architect's role.

2 Worthwhile architectural achievement is limited to some few good buildings. These do not form public architectural space within the human settlement. Doxiadis stated in an instance , *one does not have to have any academic qualification to become an architect.* In this context he mentioned the role of architects like Le Corbusier , Walter Gropius and Miles Ven der Rohe.

He stressed not to fix the role of architects within the wall of presenting good facade to streets but to creation of a better environment, a better habitat as a whole. In a similar approach of Rudolph that any fool can design building.

3.3 Principle of Laws of Expanding Synthesis

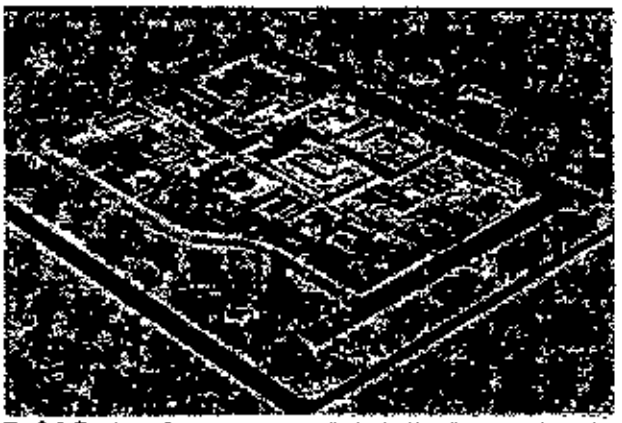

Fig 3.8 Centers of a new community for half million people in Korangi, Pakistan
(Source, Doxiadis C.A ,Architecture in Transition,1963,page129)

He developed a theory on law of expanding synthesis. They result in much more rational and logical building complexes, which are extrovert and not monumental or introvert and so necessarily static. In his vocabulary based on interconnected buildings he explains that we should always plan our buildings separately and within the same compound or enclosure . But this does not usually give us a synthesis, since it creates

negative space and wasted movement. it is only when we bring our buildings very close together and then make them expand as one building compels that we can be sure of an appropriate synthesis.

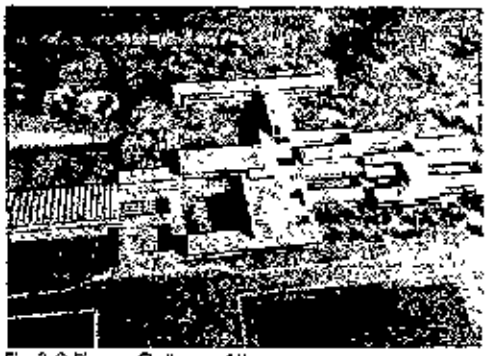

Fig 3.9 Pierce College, Athens
(Source. Doxiadis C.A ,Architecture in Transition,1963,page51)

In this way he tries to achieve not only positive buildings, but also positive syntheses of buildings, by the creation of open spaces having positive and not negative character.

.....*We return basically to the idea of buildings grouped around certain open spaces, spaces that are interconnected and they become part of the synthesis* . This centuries-old principle is a very sound one, and was lost only because as he thinks *architects tended to take an academic interest in the external appearance of their buildings, and not in the creation of positive architectural space.*[18]
On the basis of the principles as Doxiadis outlined, he created even larger syntheses, like that of the University of Panjab, where a human sector has been created which started from a core and expanded in all directions, while keeping the hierarchy of functions and retaining all the potential of a living organism for expansion within the synthesis. (refer to Fig 3.8,3.9,3.10)

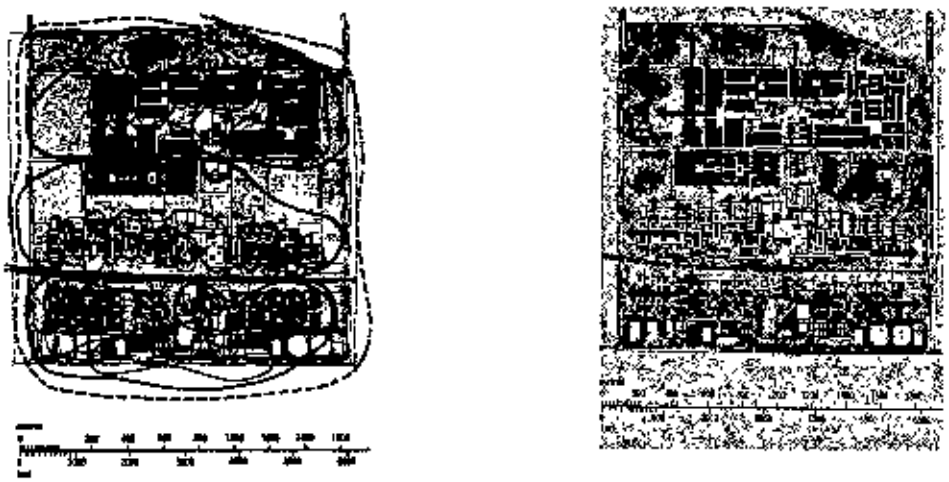

Fig3.10 Example of laws of expanding synthesis.
(Source, Doxiadis C.A ,Architecture in Transition,1963,page126,127)

The problems of public buildings are related to the growth of the community, the growth of the demands of the community and the ability of the community to pay for a public building. Providing an example of an elementary school in a community, Doxiadis explains that the community will grow and the school building will have to expand, adding more rooms for its increasing numbers of children, until it reaches the maximum possible number of rooms, each of which will correspond to one class. In this respect, according to his suggestion, the creation of an architecture to serve a school or any other type of public building is much more difficult, and in the same way the architecture of public buildings of all kinds is a more demanding task. The architect must have the imagination and ability to add to a school later even if this cannot be financed from the beginning -but he should also be able to foresee the case clearly. This will result from the changing conception of the needs for educational buildings which is natural in a society that is changing its views about its whole civilization.

He stressed the need to consider our notions of particular community buildings that have changed over the past years. he stressed the need to appreciate that what is valid for a school building today is not going to be valid for future. He summarises that, the growth of architectural development should be proportionate to growth of general mass .

3.4 Doxiadis and Ecumenical Architecture (Architecture for Mass People)

With the breaking of cultural boundaries we are being drawn together towards a common culture and as Doxiadis feels, architecture must serve the broadest classes of people everywhere. He feels that people are basically the same, so we are gradually moving towards an ecumenical expression through trying to create our architecture in the simplest possible way, in order to be able to serve everybody. The idea of the creation of an ecumenical architecture poses yet another basic question. He put forward the question, if man ever possessed an ecumenical style in the past? Referring to examples of houses in Asia, Africa or in the Mediterranean, Doxiadis tried to show that they are indistinguishable even to the expert eye .

".....We must first remind ourselves that architecture is the discipline not of designing houses or buildings, much less of designing monuments, but of building the human habitat. As such it consists of a science, a technique and an art."[19]

(refer to Fig 19-21)

3.5 Total Architecture and Real Architecture.

180. Malden, Mass., U.S.A.

Fig 3.11 An Example of Total Architecture

(Source. Doxiadis C.A ,Between Dystopia and Utopia,1966,page155)

Doxiadis insisted to look at the things totally as he termed it a total architecture. This means a change in the scale of creation. He stressed not to limit us to single buildings, and our idea and ambition should no longer be to create some monuments through which their surroundings are influenced. He stressed the need to create a total architecture inside which we shall re-create our whole living space architecturaly.In the past, until the new forces created confusion in our minds, architecture was always total in every settlement. Then, architecture was broken into processes and limited to a few islands of the past and examples of the future.He proclaims that,

..... We have to return to the earlier phase, that of total architecture, the only one which is natural and consistent. In normal periods of evolution architecture was always total. We can and must return to a total architecture whose geographic extent is going to be even larger than in the past as settlements grow from the small city towards the metropolis and the megalopolis, and tend towards the ecumenopolis or universal city which covers whole regions and spreads its complex network all over the earth.[20]

3.5.2 A Real Architecture:

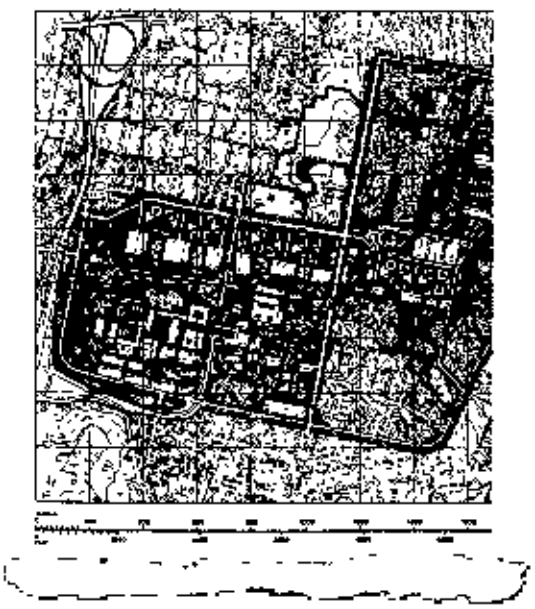

Fig 3.12 The Rensselaer Polltechnic Institute, Troy, NY , USA
(Source, Doxiadis C.A ,Between Dystopia and Utopia,1966,page153)

".....By expanding enormously and conquering space, architecture will no longer be limited to a few buildings as such, but will become a real architecture, inspired neither by painting nor by sculpture; it will utilize these arts, but will not copy them"[21]

Doxiadis explained that painting cannot become architecture by creating architectural depth; and sculpture, in its turn, is equally unable to become architecture but must necessarily remain static in three dimensions (mobiles are an elementary move of sculpture towards the conquest of the fourth dimension); so in the same way architecture must fulfill itself and be a four-dimensional complex serving the actual needs of the people in a dynamic, not a static, synthesis.

According to Doxiadis, achitecture will again use all its elements. It will need all its dimensions, the basic, traditional three: height, length and depth, together with the fourth dimension of time which, although as old as the other three, is gaining a much greater importance in this era, will utilize time by drawing people into, and allowing people to move about in, its creations.

3.6 Architecture and Science

According to Doxiadis if architecture is seen from a scientific standpoint, architecture is less advanced than any other field of activity. He thinks that architectural research is very limited and he thinks that very limited work is done regarding the proper conception of architectural space inside and outside buildings or the relation of man to his living -space in terms of physiology, micro-climate or aesthetics. Also he found that architecture lags behind in constructional techniques, where its contribution is still elementary in contrast to revolutionary element elsewhere, he feels that architecture covering the total field of building activity reminds us of the root of architecture. He thinks that architecture was really created at the bottom level of the cone of total building activity, then gradually refined as it went to a higher level until at length it found its monumental expression at the top of the cone.

As Doxiadis explained

"..his way be called the total building activity with its monumental expression at the top. Thus several people in several eras took the top of the pyramid as a whole and defined that architecture as only the technique and art of monumental buildings."[22]

3.7 The Concept of Standardization ,Prefabrication

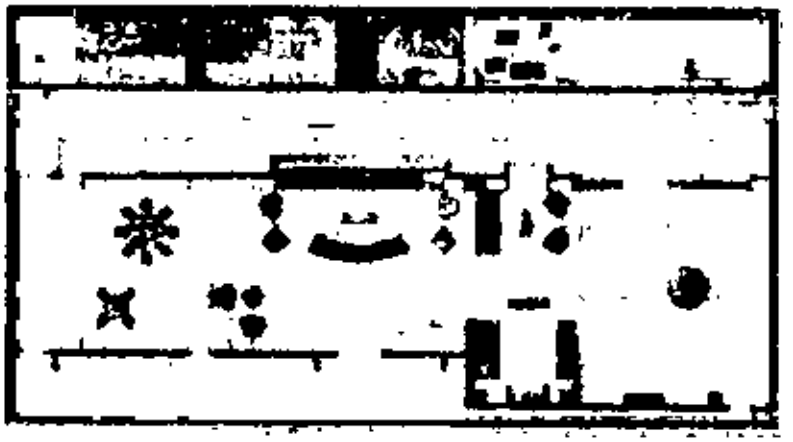

Fig 3.13 application of module within the building
(Source. Doxiadis C.A ,Architecture in transition,1963,page134.)

According to his philosophy two theories came upon into conflict. The first, arising out of *mechanization and standardization*, led to a similarity of solutions. The other opposed it, on the ground that these solutions were being imposed without regard to climatic and local considerations. Standardized units are necessary for the creation of broader complexes of houses and buildings. Standardization, according to Doxiadis should not be limited to types of houses or major parts of houses and other buildings, but must extend to the very elements of construction. The need for standardization was always present in minor parts of construction, as for example in bricks and tiles, and there was always a tendency to build certain types of houses, schools, etc. In this era a changing economy and technology, as well as a greater demand for quality, make it more necessary than ever before to standardize all elements of construction which are amenable to prefabrication, and thus to less expensive production. Moreover, both these tendencies towards standardization, which start from the smallest parts of

architectural creation (bricks) and the largest (house, school building units, etc.) necessarily lead towards a standardization of major constructional parts such as doors, windows, panels, walls and even complete rooms, multi-rooms, parts of buildings, etc.

Fig 3.14 Standardization in Housing
(Source, Doxiadis C.A ,Architecture in Transition,1963,page129)

The forces resulting in this phenomenon of overall standardization are many. Apart from economics and technology, it is a fact that we are changing over more and more from the heavy materials of the part to the new light materials, and it is equally true that wherever we make this change we seem to revert to a natural standardization. This has been happening in Japan for centuries, as well as in other countries, which produce light materials for local types of construction, such as materials in Bengal, etc. Heavy materials did not lend themselves to such types of construction, but we are now entering an age during which new, light materials are gaining more and gaining more ground.

Doxiadis was a propagator of prefabricated elements and thinks that prefabricated elements can serve many purposes and perhaps solve many of our problems. According to Doxiadis.... *we can use them to create either the skin of our building or its internal parts; we can make them take the weight of construction, or simply constitute its surfaces, inside and outside the buildings; we can even use them for our basic furniture.* [23]

His notions of standardization inevitably lead to the use of a modulus in all types of construction.

As Doxiadis explained

.... used by a person like me who looks on himself as a mason, such a modulus could be nothing but a modulus repeated in an arithmetical way. The best unit I could find for the creation of buildings on such a basis was a human unit. [24]

Standardization is an age-old demand, which has now become imperative. With this in mind we can now conceive architecture, which is the total of a larger number of different combinations of a greater variety of standardized elements than before. This is true for all sizes of architectural creation, from complete buildings to structural elements. Not only are more and more of the latter going to be prefabricated, but the process will move to larger and larger, units, progressing from the ready-made door to the ready-made house, or other minor type of building.

3.8 Modular Co-ordination

Modular Co-Ordination is a system by which achievement of dimensional co-ordination is achieved by means of a module. The general purpose of the module is to provide a basis for the interrelated sizing of all building components, furniture and equipment, so that in respect of dimensions all components, within the modular range and may be assembled in all possible ways to achieve the desired result in a systematic, orderly and combination with minimum modification of the standard components and limited deviation from the modular order. The function of module is to serve as the basic first, or nominal size, in the modular range, and also as the co-efficient of the range of the modular size. Doxiadis proposed module was 40" or 1 meter. The proposed module has become popular and been adopted throughout the world. It can both cope with the metric and British system of measurements used in the different parts of the world. Multiple of 40 " module have been found to be economically convenient for room sizes ranging from small spaces like toilets to larger ones like halls and theatres. For Schools, especially, the spaces like classrooms, storage rooms, walkways, patios,

lecture rooms, special rooms and toilets, etc., need such particular dimensioning so that a co-ordinated assembling of one space with the other can be achieved with the highest degree of economy of space, and without allowing for more than, nor falling short of, the required individual sizes.

Picture of layering

Doxiadis used double layer mainly for climatic protection of buildings.

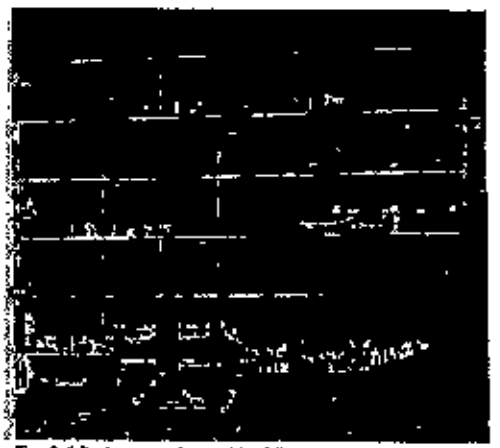

Fig 3.15 An apartment in Athence. A double skin elevation of a house.
(Source, Doxiadis C.A ,Architecture in Transition,1963,page150)

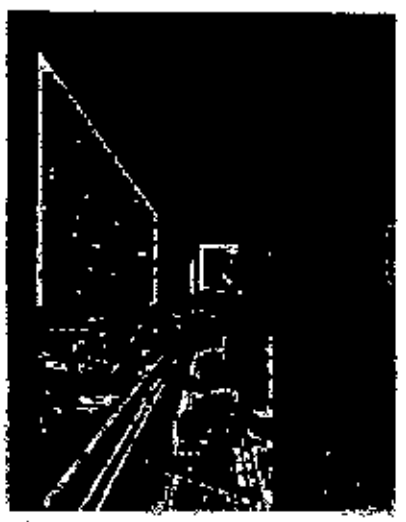

Fig 16 Verandah created within the double skin
(Source, Doxiadis C.A ,Architecture in Transition,1963,page 151)

3.9 Skyline of an urban fabric proposed by Doxiadis

Doxiadis suggests about the elements of a logical urban synthesis as a combination of the rectilinear buildings with some shells in between , as seen in Teachers Student Centre , Home Economics College, etc.

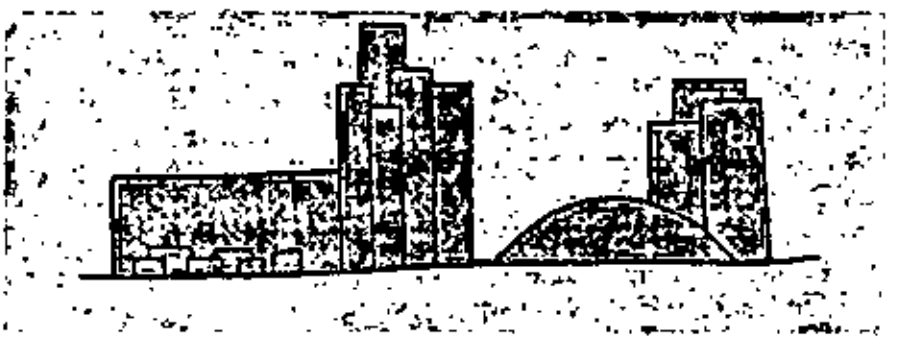

Fig 3.17 Out line of a city skyline
(Source. Doxiadis C.A ,Architecture in Transition,1963,page 156)

The Alts of Olympia : an age old example of a synthesis of many rectalinear building, With only a single circular one. A plan that might have inspired him working with rectilinear building and hemispherical form.

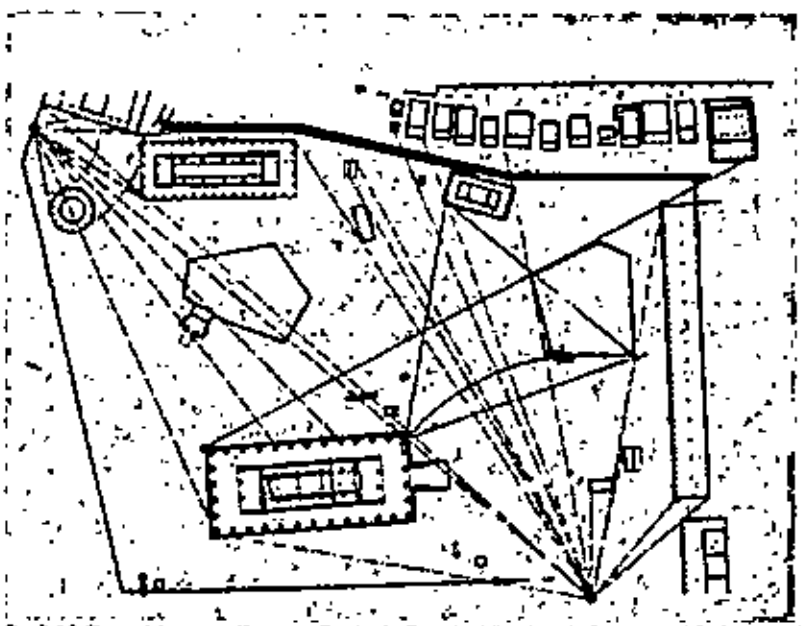

Fig 3.18 Plan of Agora (Source. Doxiadis C.A ,Architecture in Transition,1963,page 156)
(Source. Doxiadis C.A ,Architecture in Transition,1963,page 156)

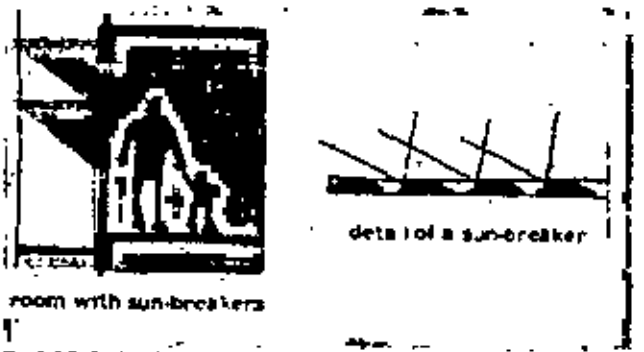

Fig 3.19 Protection of a building in Marrakech by using double-skin
(Source, Doxiadis C.A. Architecture in Transition,1963,page 159)

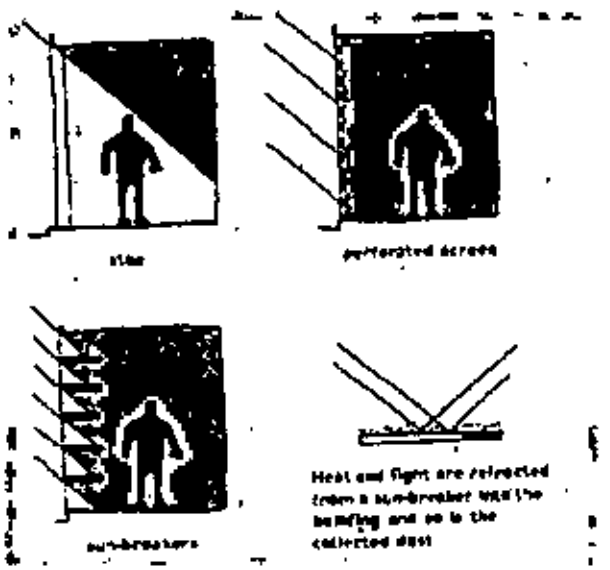

Fig 3.2 Heat and light reflected from a sun breaker into the building and so is the collected dust
(Source. Doxiadis C.A. Architecture in Transition,1963,page 158)

Picture Ecumenic Architecture

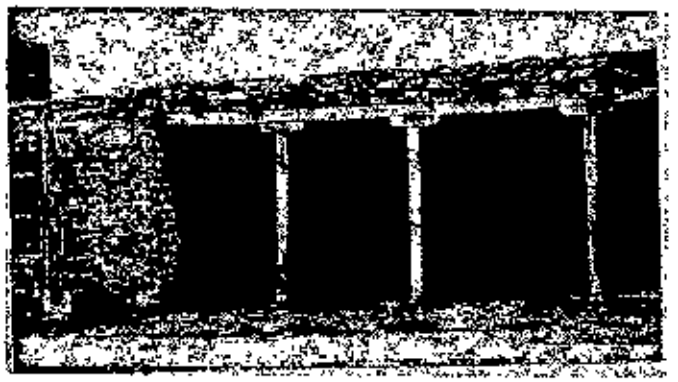

Fig 3.19 A house under the Himalayas has many similarities with the greek houses which led to the formation of The Ancient Greek Style.
(Source, Doxiadis C.A ,Architecture in Transition,1963,page 168)

Doxiadis finds similarity between a house on the hills of Ghana, a house of Northern Greece and in the plain of Acropolis in Greece.

Fig 20,21 Example of Ecumenic Architecture (Source, Doxiadis C.A ,Architecture in Transition,1963,page 158)
Fig. 21 House in Northern Greece.

Fig22 A house in Ghana.

End notes

1 Doxiadis, C A **Architecture in Transition** Hutchinson & Co Ltd., London and Oxford Universitypress,1963, p
2 ibid, page 88
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6 ibid, page 142
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8 Doxiadis C A Between **Dystopia and Utopia** Trinityb College Press, Hatfort, Connecticut,1969 page 80
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21 Doxiadis C.A **Building Entopia** Athence Publishing Centre, Athence, 1975
22 Doxiadis, C.A **Architecture in Transition** Hutchinson & Co Ltd., London and Oxford University press,1963, p 80
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Chapter Four
Architectural Works in Bangladesh

Chapter Four

Architectural Works in Bangladesh

4.1 Introduction

C.A.Doxiadis , Consultant to the United Nations for Housing and Settlements issues in Third World countries was appointed as Ford foundation consultant for the four projects in Bangladesh, There are Teachers Student Center, Home Economics College, Bangladesh Academy for Rural Development, National Academy of Education Management. Besides implementing these projects, C.A.Doxiadis prepared guideline for designing school buildings in East Pakistan (now Bangladesh). A total number of fourteen volumes was prepared under different head namely, Survey, Dimensional Co-Ordination, Material and Cost, consideration of policies, Implementation etc. From these volumes we can summaries the requirements of building design to be built in East Pakistan for schools and general buildings. A very description of some of the elements are given in the following sections.

Building design should thus includes,

4.1.1 Construction Technique

4.1.1.1 Foundation

Foundation shall be in brickwork in cement mortar (1:3) and shall be continuous under all walls of brick construction. The width of the foundation varies according to the bearing capacity of the soil. Foundation of the three alternative widths has been prepared for each of three types of foundations. The upper part of the foundation walls, at floor level, is finished with a tie beam of R.C.C.

4.1.1.2 Plinth

The height of the ground floor from the ground level has not been indicated. This will depend on the conditions of the site. This height shall be as low as is functionally possible.

4.1.1.3 Walls

Doxiadis suggested use of 0'-10" brick wall in the periphery and 5'-10" brick partition wall in the interior.

4.1.1.4 Roof

a. Roof consisting of timber trusses and other timber framework covered with galvanized corrugated iron sheets.
b. Roof consisting of an R.C.C slab with or without R.C.C beams.
c.The 20'-0" roof span is suggested as the most economic solution from the standpoint of construction, while also serving functionally the aforementioned spaces.

4.1.1.5 Doors and windows

a. Doors and windows are to be of wood and of a quality suitable for this purpose and preferably of local origin. He suggested using the best local hardwoods. A module of 3'-4" was suggested for using basic doors and window panels. The method of constructing and finishing the doors and windows shall depend on the skilled labor available locally and on local practice.

4.1.1.6 Staircases
R.C.C type of staircases is suggested which will be supported by brick bearing wall.

4.1.2 Dimensional Co-Ordination

The adoption of a system of combination of moduli, depending upon the need and materials of construction, is decisive and is used in all designs of schools and related buildings produced by C.A. Doxiadis.

The combination range is as follows

a. 0'-4"	or	100mm
b.3'-4"	or	1000mm
c. 10'-0"	or	3000mm

All details of furniture's, equipment, building components, structure and planning work have been done either by combining all these 3 module or by using at a time only one of Them.

4.1.3 Landscaping

Requires following detail

a. Retaining wall.
b. Paths.
c. Fences
d. Plantations
e. Water tanks, swimming pool.
f. Drinking fountains.
g. Flower pots.

4.1.4 Standardization

C.A.Doxiadis suggested for standardization of building and connected structures and standardization of plans and document needed to construct the buildings. For example ,Doxiadis suggested 500 sift for each classroom, 6000 sift for assembly building, 2000 sft for Principal's quarters for higher secondary schools.

4.1.5 Flexibility and Growth

The layout of the buildings as suggested by Doxiadis should not be rigid and suggested for designing space so that the building should allow for flexibility and growth.

Flexibility can be obtained in two ways

a. By using movable partition walls of light and cheap material to facilitate alterations and different arrangements as required.

b. The classroom groups mainly and laboratory groups to a lesser extent should have one end free for future expansion.

This study will now investigate weather Doxiadis has been able to apply the above mentioned design principles and philosophy in the case studies that follows.

Case Study 1

4.2 National Academy of Education Management

Fig. 4.1 National Academy of Education Management

National Academy of Education Management originally established in 1959 as Education Extension Center aims to improve the quality of instruction and to enrich the educational programs in secondary schools. The objectives of the project is given below because these constitutes the program of the building. No square foot requirements were given as such. The designer was to determine the brief. This is probably an ideal practice and has only been done because the architect is from a foreign country and have the backing of the donar organization of the project.

The objectives of this institute are,

* To provide both pre-service and in-service training facilities for personnel engaged in all aspects of educational administration, management and planning.
* To improve the administration of education by carrying out action research into various aspects of the education.
* To co-operate with institutions and agencies both at national and international levels engaged in the study of administration, management and planning and Education.
* To participate in appropriate national and international conferences, seminars, workshops etc.

4.2.1 Architectural Features of National Academy of Education Management

4.2.1.1 Standardization

A module of 3' is used in designing the classroom area. Class rooms are 400sft which is in accordance with the given standard for schools. Doxiadis suggestion of economic roof span of 20' is not maintained uniformly. Doors and windows are made of wooden panels of 4-6mm thickness, A module of 3' was used as basic doors and window panels. Roof consisting of 6" slab with 12'x2" r.c.c beams. Roof span varies from 11'-0"x11'-4", 11'-4"x11'-4",20'-0"x20'-o" and 11'-0"x9'-0" depending upon size of spaces. Roof height of class room is 12'-3" and administrative block is 10'-6". Free standing circular and 'U' shaped stair with 5' width is used.

4.2.1.2 Construction Technique

Foundation consists of R.C.C footing under the columns connected by grade beam. Frame structure with 5-10" brickwork as internal and peripheral partition. R.C.C type of staircases with 4'-0" width and 6" riser is used. One of the interesting feature was mosque and the height of the central space is 16'-3", 3-0" and 2'-0" height high windows are placed in the mosque. The parabolic roof structure stands on the columns of the periphery.

4.2.1.3 Landscaping

Strong indoor and outdoor relationship is evident in this project. Open spaces are always integrated with circulation . Series of court yard is used in the academic wing. Larger courts are provided in the administrative section. Lush green space located by the promenade provides a place to interact .

4.2.1.4 Flexibility and Growth

Provisions are kept for future growth and expansion for class room area.

4.2.1.5 Color

White color was applied in almost all the building. White appears very strong in contrast with the green setting. The use of white color represents Doxiadis image of his native buildings. In Greece and Spain white color is profusely used in buildings. In a country of bright sunshine white is the most probable color because it absorbs minimum amount of heat.

4.2.1.6 Special Features

An over bridge connects the two parts of administrative building. Use of Chajja extended up to 3' on the both side of administrative building is another important feature.

4.2.2 Analysis of the project based on basic architectural principal

Following figure demonstrate the overall basic design principal of complex in terms of circulation pattern, balance, location and placement of entry, served and service spaces, skyline and services. The complex in terms of planning arrangement appears compact and apparently balanced in terms of symmetricity. This symmetricity is achieved in the classroom section , which are symmetric around an axis. The two blocks of three storied academic section is linked with class room without any proper balance or order.(refer to Fig 6.2 2.1)

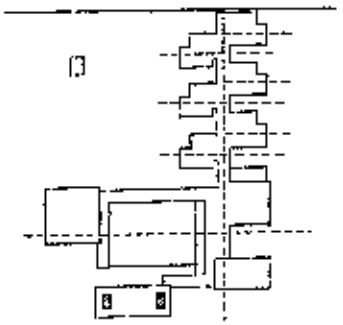


Fig 6 2.2.1 Balance and Order

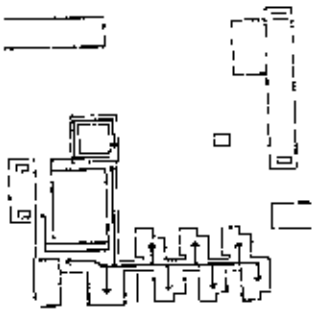


Fig 6.2.2 1 Circulation Pattern

The circulation pattern is always through corridor and it runs in different direction . Circulation pattern sometime creates loops and sometime terminate nowhere,thus creating a mix character. (refer to Fig 6.2.2.1)

The Entry is not defined or articulated. It does not give a sense of security and control. The entry is very poorly placed as the main circulation doesnot terminate here.(refer to Fig 6 2.2.3)

Services are placed incidentally. The served area is inadequate and these are not wel defined. (refer to Fig 6.2.2 1)

Fig 6.2.2.1 Services are placed incidentally

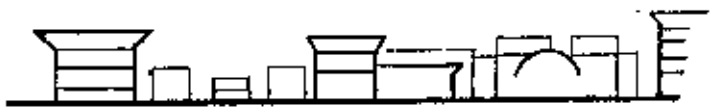


Fig 6 2.2 2 Sky line of NAEM

Use of angular projecting roofs with hemispherical roof creates a variety in the skyline. (refer to Fig 6.2.2.2)

The complex is mainly columnar and different module is used in different spaces. Usually ordered, and coincident with formal organization, on various occasions are used as for space defining elements. (refer to Fig 6 2.2.4)

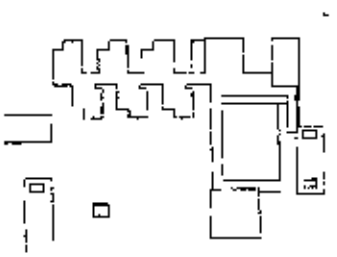


Fig 6 2 2.3 Entry of NAEM

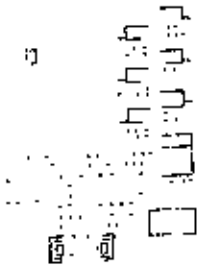


Fig 6.2.2.4 structural expression of the complex

4.2.3 Plans and Architectural Details of National Academy of Education Management.

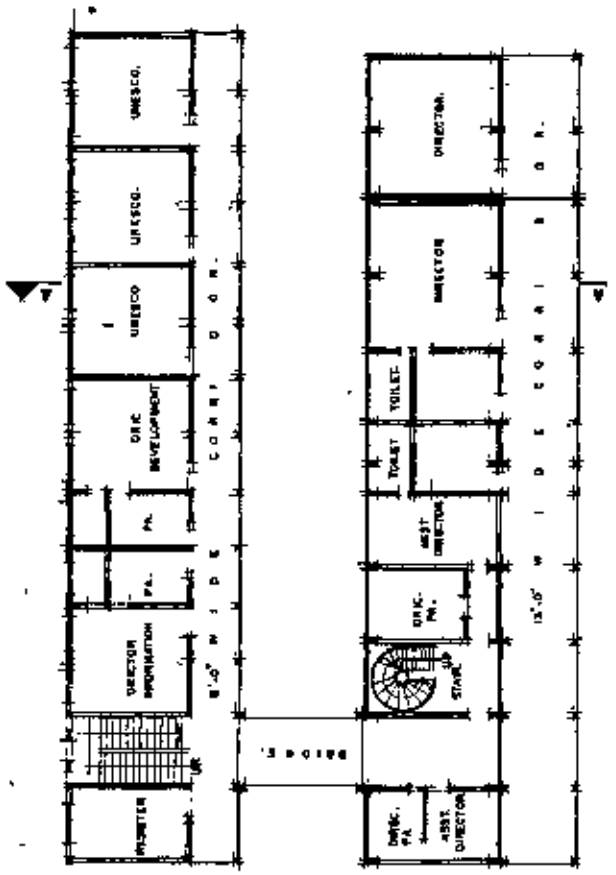


Fig 4.2.2.1 First Floor plan of Administrative Block

The administrative block located on the north part of the complex is organized by a single loaded corridor. The upper part is connected by a bridge. The corridor width is inconsistent, one is 8'-0" wide the other is13' wide. The arrangement of room is simple and straightforward.

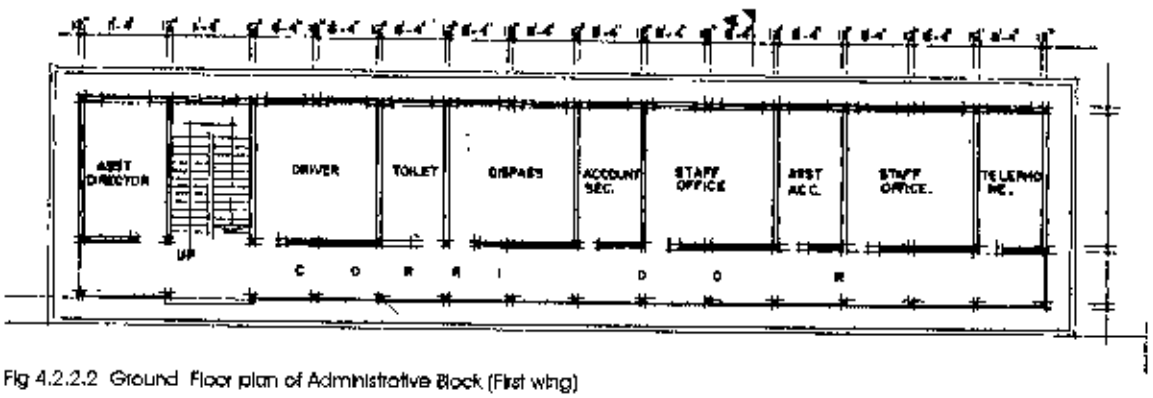


Fig 4.2.2.2 Ground Floor plan of Administrative Block (First wing)

Columns are arbitrarily arranged and spans varies accordingly. Spans of 8"-4" to 11'-4" are designed. Different type of staircases is placed for two different blocks. Different functions such as conference , seminar and classrooms are arranged By multiplying the module only.

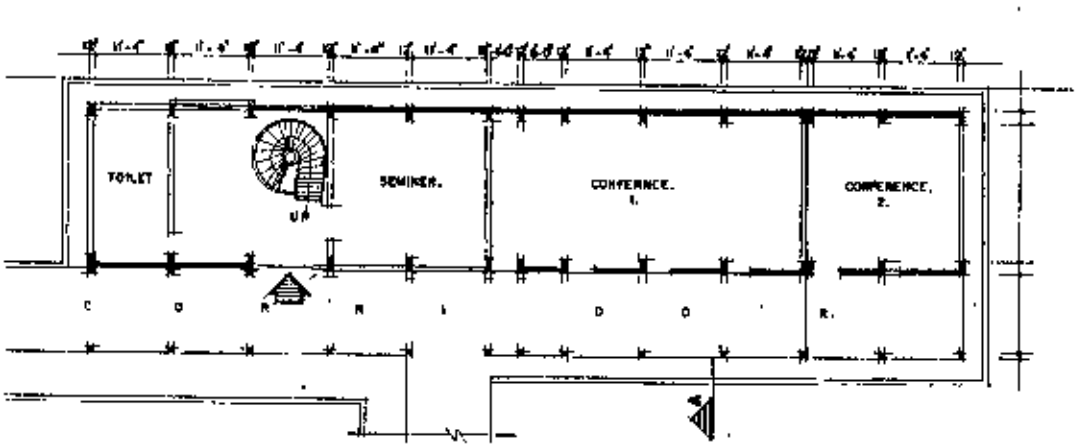


Fig 4 2 2 3 Ground Floor plan of Administrative Block, Second Wing

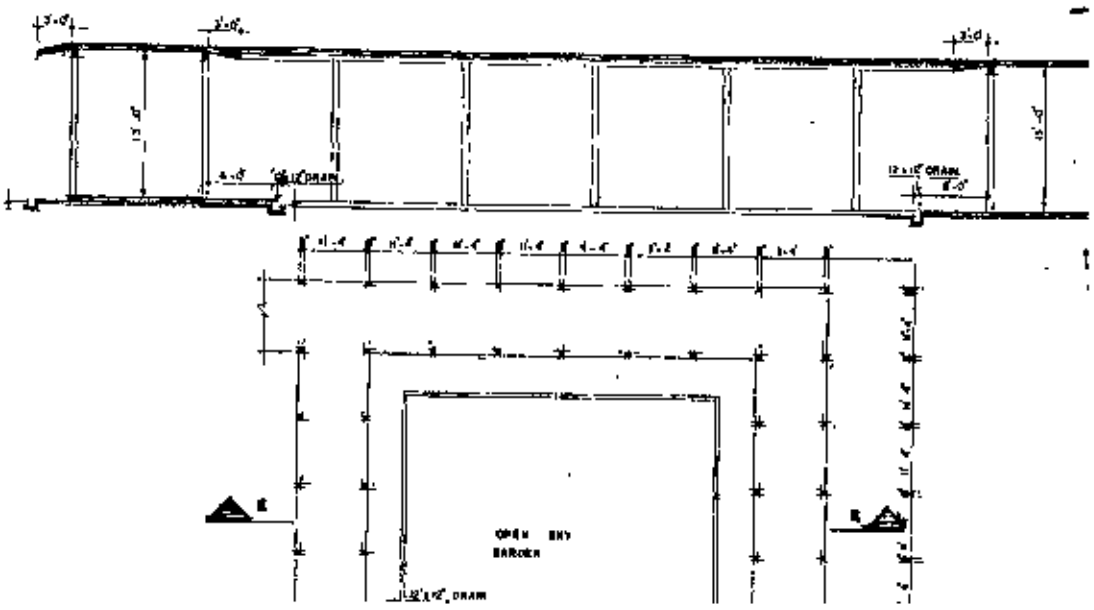


Fig 4.2.2.4 Section and Floor plan of Promenade
(Source : Self Prepared)

The Six feet wide circulation around the open court creates an exciting experience. The Library space is open free flowing space. Columns are not arranged in an order.

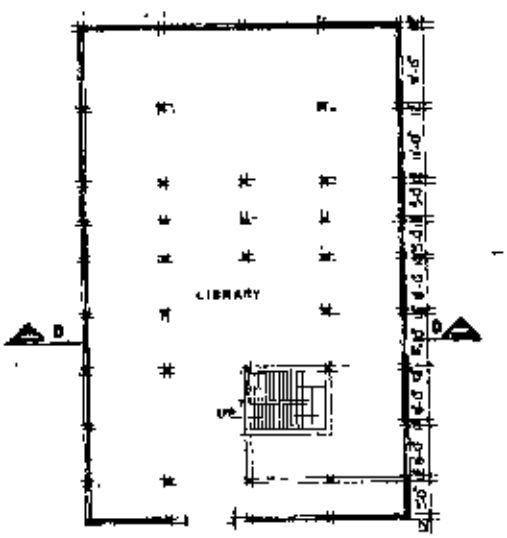


Fig 4 2 2 5 Floor plan of Library Block.

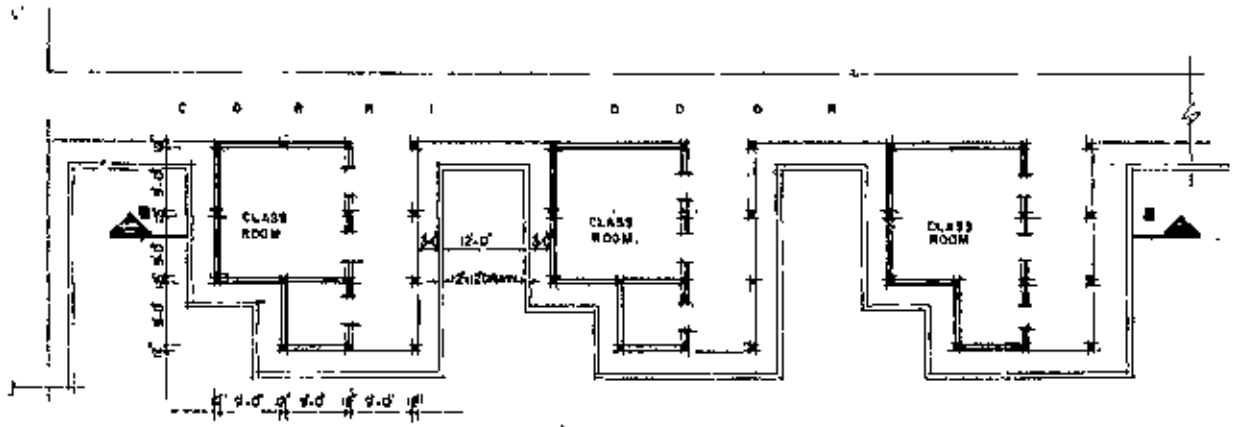


Fig 4.2.2.6 Floor plan of class rooms

Class rooms are supported by ante room. Height of the class room is 12'-3".The circulation space is 9'-0" wide. Adequate light is provided in the class room area.

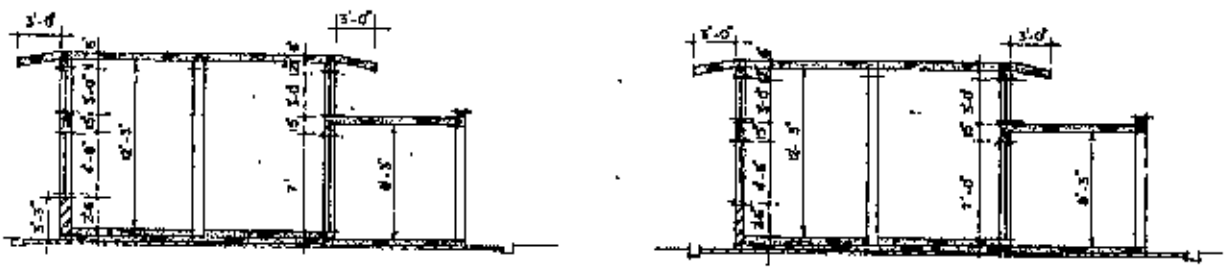


Fig 4.2.2.7 Section of class rooms

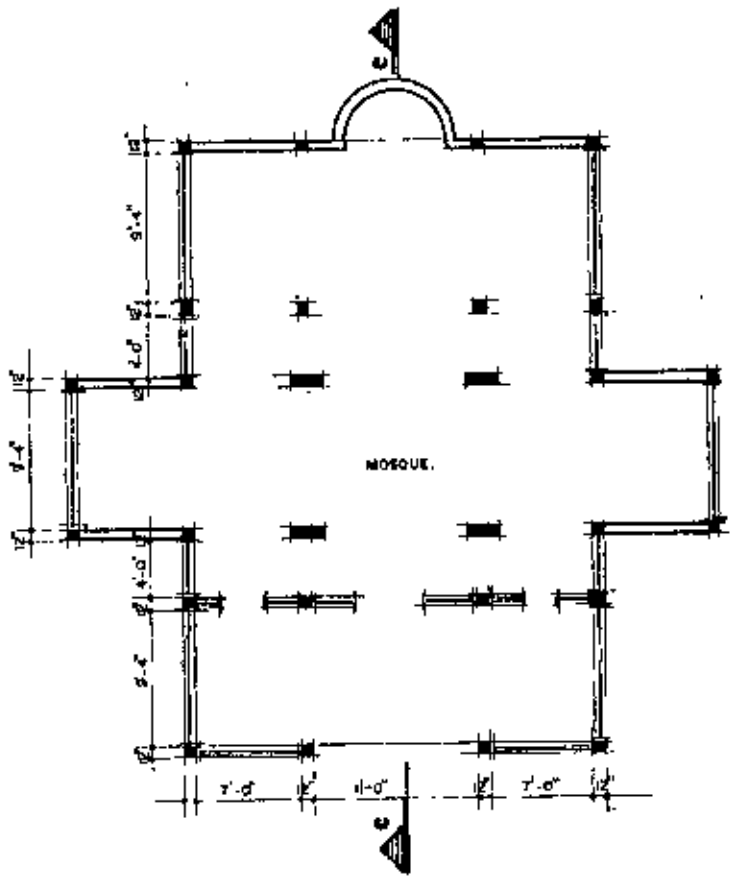


Fig 4.2.2.8 Plan of Mosque

One of the most important architectural building of this complex is its mosque. The roof is transformed from the Bangla Chala. The prayer space is disturbed by four central columns, which elevate the central space. The space is lofted to bring light within.

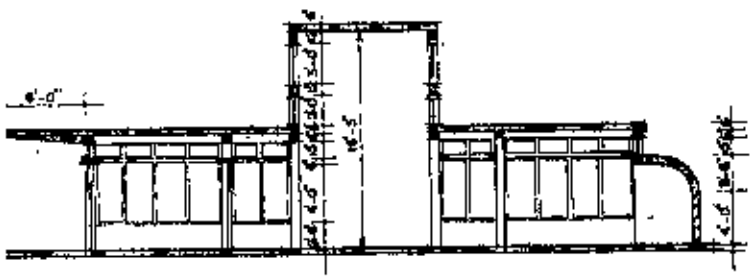


Fig 4.2.2.9 Section of Mosque

Case Study 2

4.3 Home Economics College

Fig. 4.1 Auditorium building of Home Economics College

The College of Home Economics which was established in 1961 is the first of its kind in Bangladesh and is a purely government professional institution for women. This is a constituent college of the Dhaka University and is recognized as the department of home economics of the university with the principal as the chairman of the department.

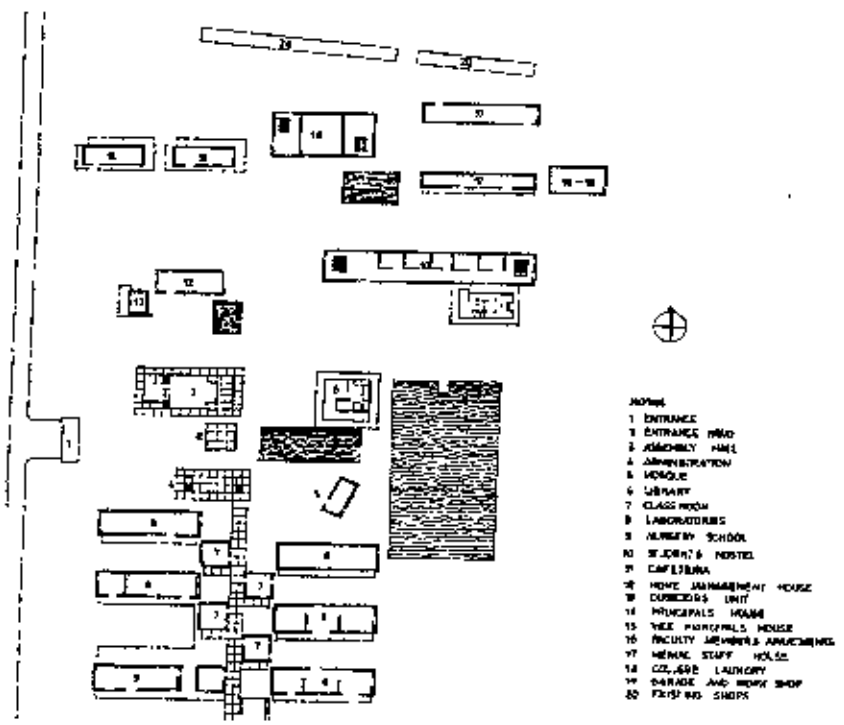


Fig 4.1 Plan

Home Economics College

(Source, Doxiadis Associates,works of Doxiadis,,page25)

Fig 4.2 Mixing of nature and structure is one of Doxiadis synthesis of design.

Fig 4 3 The elements of a logical urban synthesis will be the rectilinear buildings with some shells between them'

Modular Plan generates the whole giving a sense of order and providing an easy construction methods. What Doxiadis termed as *modulas in practice* was employed in every part of building.

Masses are disposed following the principle of hierarchy in forms. Flat roofs, parabolic roofs, angular edge of roofs , double layered roof all contributing to a varied skyline. The roofs represent a reflection of motley character.

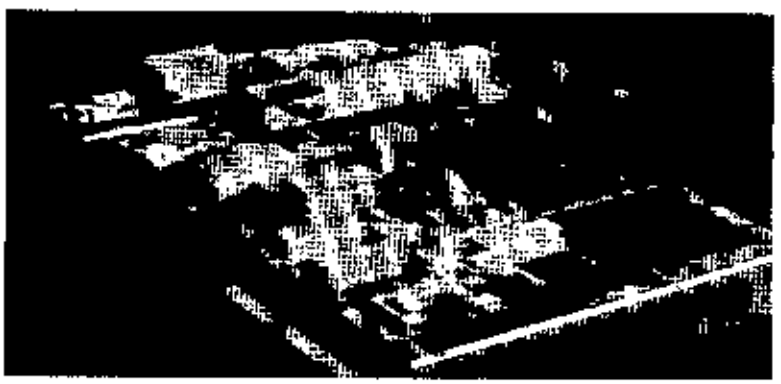


Fig 4 4 Birds eye view of Home Economics College

(Source, Doxiadis Associates,works of Doxiadis,,page25)

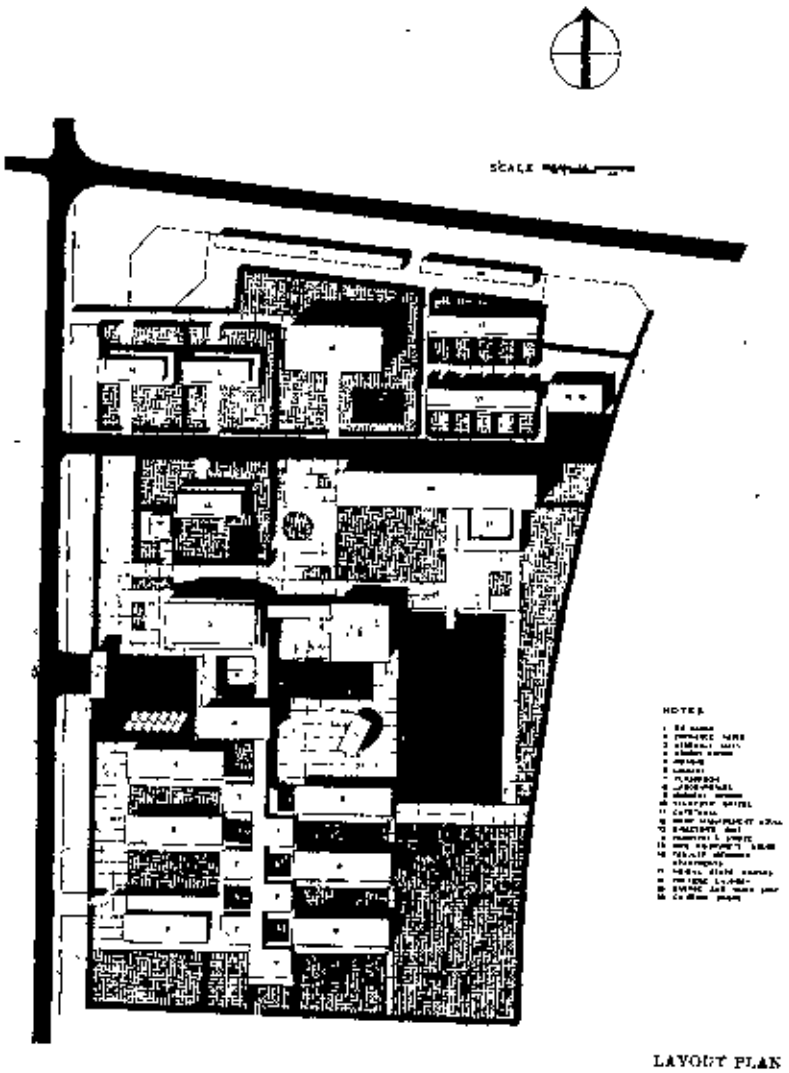


Fig 4.5 Site Plan

(Source, Doxiadis Associates,works of Doxiadis,page 25)

...First to design such buildings with standardized elements standardization not only of material but even the whole segments of classrooms, laboratories etc. And to proceed only to a synthesis according to the requirements of each specific case. C.A.Doxiadis

4.3.1 Architectural Features.

4.3.1.1 Standardization

A module of 3' is used in designing the classroom area. Class rooms are 400sft which is in accordance with the given standard for schools. Frame structure is used in the auditorium block. A span of 30' is used for auditorium building. Doors and windows are made of wooden panels of 4-6mm thickness, A module of 3' was used as basic doors and window panels. Roof consisting of 6" r.c.c slab with 12"x24" r.c.c beams. Roof span varies from 11'-0"x11'-4", 23'-0"x11'-4",20'-0'x20"-o" and 11'-0"x9'-0" depending upon spaces. 3' height high window is used in auditorium block. Roof height of class room is 12'-6" and administrative block is 13'. Free standing circular and U shaped stair with 5' width is used.

4.3.1.2 Construction Technique

Foundation consists of R.C.C footing under the columns connected by grade beam. Frame structure with 5-10" brickwork as internal and peripheral partition. R.C.C type of staircases with 4'-0" width and 6" riser is used.

4.3.1.3 Landscaping

Strong indoor and outdoor relationship is also maintained here. Open spaces are always integrated with circulation. Series of court yards are used in the academic wing. Lush green space located by the promenade provides a place to interact .

Following elements were used for landscaping

a. Court-yards

b. Paths.

c. Plantations

d. Flower pots

4.3.1.4 Flexibility and Growth

Provisions are kept for future growth and expansion of class rooms.

4.3.1.5 Color

White color was applied in almost all the building. White appears very strong in contrast with the green setting.

4.3.1.6 Special Features

Use of parabolic chala over auditorium and library building is important feature.

4.3.2 Analysis of project based on basic architectural principal

The overall planning of Home Economics College appears disordered andIsintegrated. Only the class room blocks are arranged in an order. Classrooms are arranged alternately. Thus providing privacy to each class room, No specific reference can be traced in order to judge the overall balance or order of the complex. (refer to Fig 4.3.2.1)

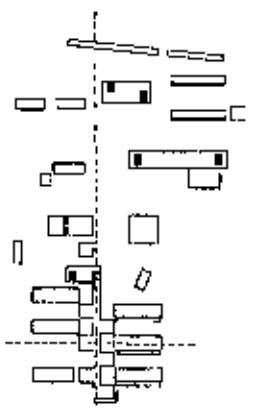


Fig. 4.3.2.1 Lack of by axial symmetricity

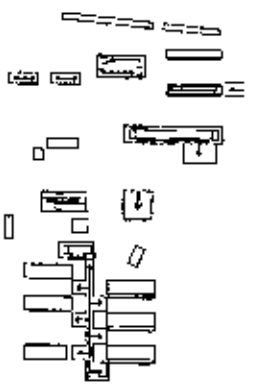


Fig. 4.3.2.2 Circulation pattern

Circulation in Home Economics College is through corridors. Secondary circulations are generated from primary spine. Comparatively less loop circulation is created. (refer to Fig 4 3 2 2)

Entry is not treated property as it lacks in expression. Centrally located in the main mass designed by creating apperture in the surfaces sometimes through corridor space. The main entry of the complex is through corridor space that links the administrative and auditorium complex.

Services are placed without any order, usually placed at the end of masses. Service Space is not expressed formally and there is lack of space articulation in the service area. (refer to Fig 4 3 2.3)

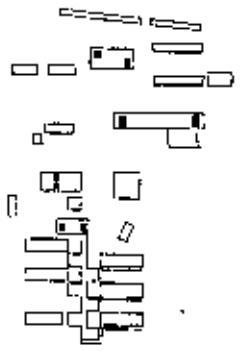


Fig. 4.3.2.3 Location of services

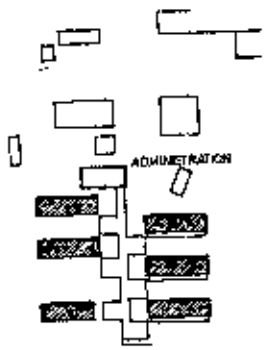


Fig. 4.3.2.4 repetition of unit and Hierarchy of administration block.

Mostly columnar and partially load bearing structural system is applied in this complex. Mostly 12"x12" column size is used. 4'-6" slab is used in the roof.

Administrative building in the center has been given the hierarchy by its placement and by expressing its volume with double roof.

4.3.3 Plans and Architectural Details of Home Economics College.

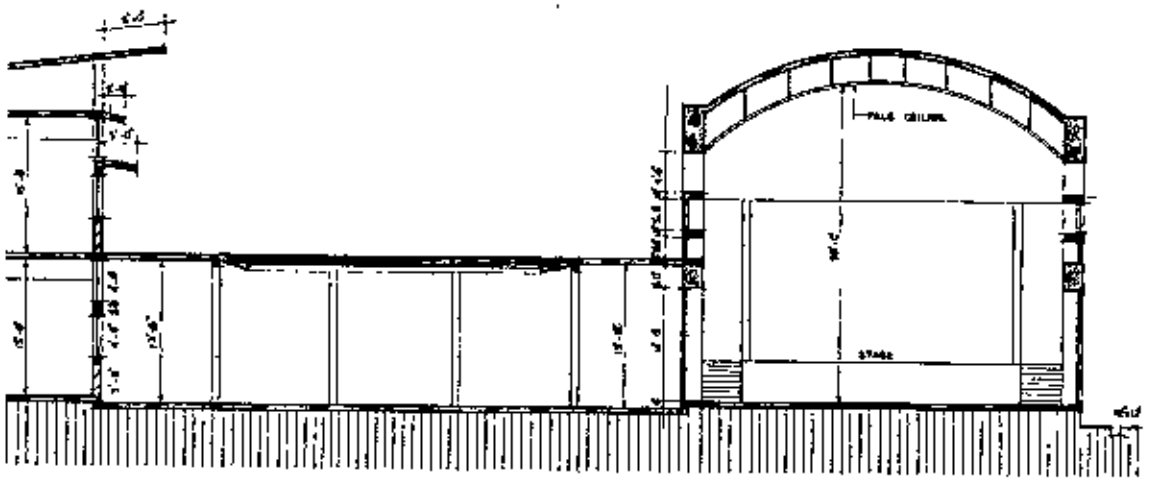


Fig 4.3.3.1 Cross section through Administrative block and auditorium

The connection between the auditorium and administrative block serves as the main entry of the complex. The upper part of double roof is extended 6' from the wall. The upper part of double roof is placed at a height of 4'-6"from the lower roof.

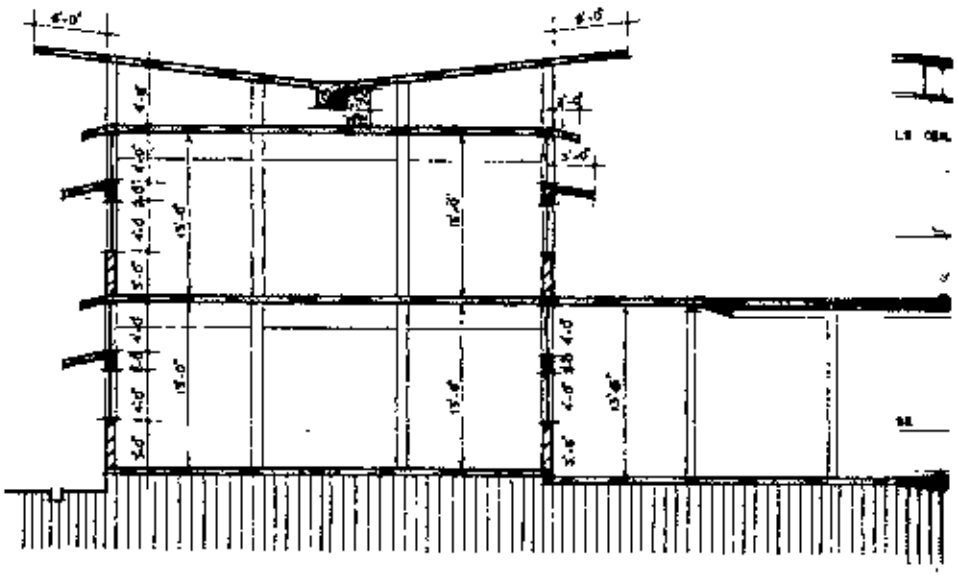


Fig 4.3.3.2 Cross section of Administrative block

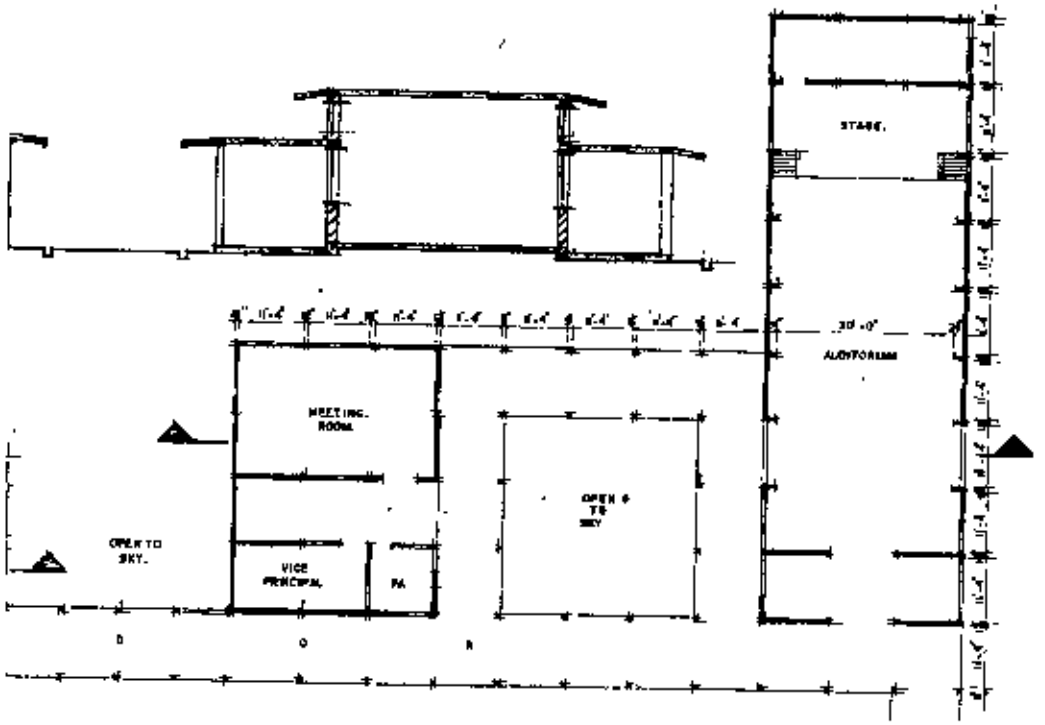


Fig 4.3.3.3 Plan of auditorium and administrative block

A circumambulatory space is created through the use of circulation. Circulation space also used as tying element of different blocks. 9" height circulation space is attached with 12'-6" height classroom space.

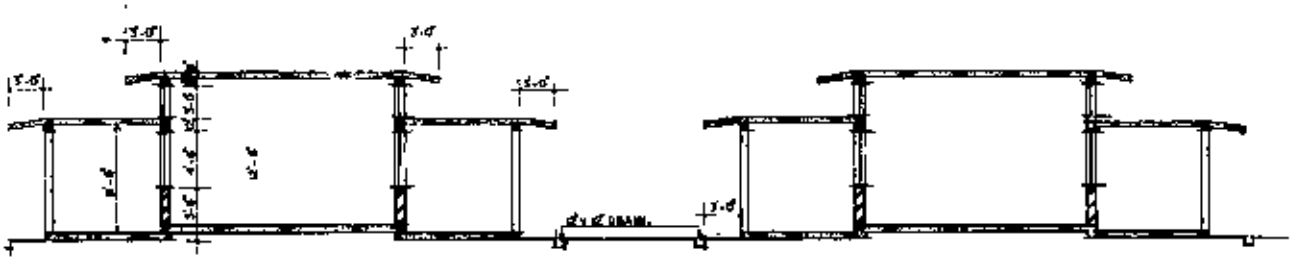


Fig 4.3.3.4 Cross section of class room.

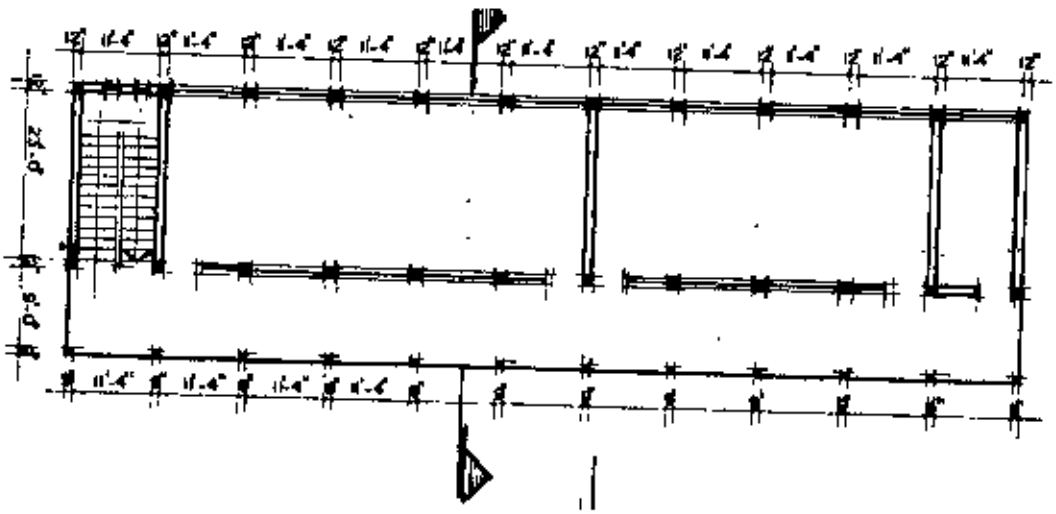


Fig 4.3.3.5 Plan of a class room.

Multilevel class room of Home Economics College is an exception among all the projects of Doxiadis.

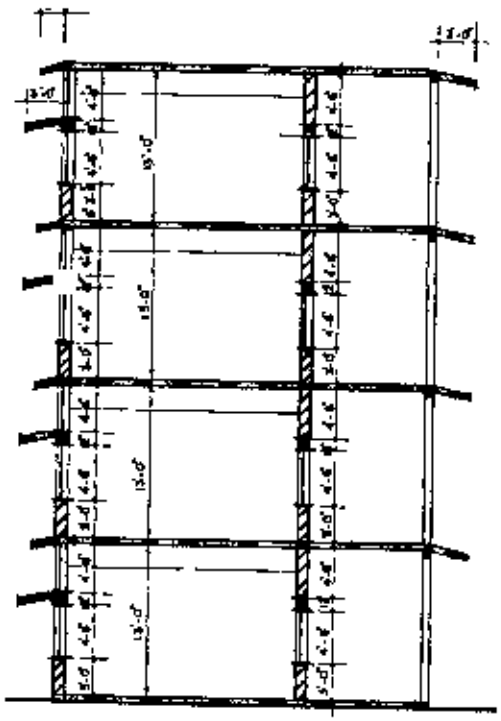


Fig 4.3 3.6 Section of class room.

Case Study 3

4.4 Bangladesh Academy for Rural Development Comilla , Kotbari

Fig. 4.4 1 The geometric and formal entry is opposite to the simple blocks of interiors.

Bangladesh Academy of Rural Development (BARD) located at Kotbari, Comilla was established in 1959 as a Training Institute to train government officials and representatives of village organisations on subjects related to rural development. Now besides training, the Academy conducts research and pilot experiments. To evolve models suitable for rural development. Mutually supportive relationship exists among the three functions : training ,research and pilot experiment. Members of the faculty drawn from various branches of social and agricultural sciences are engaged in these functions.

The Academy realised the importance of research on rural development since its inception. Unless the socio-economic conditions of the villagers are known to the faculty it would be difficult to orient the trainees on rural development. Thus the members of the faculty started visiting the rural areas, discussing with villagers, Observing their situation and the functions of rural cooperatives, Union Parishads, Thana officials, etc.

Fig. 4 4.2 long corridors provide a sense of monotony to the users

Along with the field observation, different categories of villagers co-operators, school teachers, farmers youth etc. were called in camps and conference at the Academy to get their views on the problems of rural development and probable solutions. Such observations and discussions provided valuable insight to the village situation. Gradually intensive observation and survey research were initiated for better and deeper understanding. It was also felt that unless the problems are solved or the mechanism of solving the problems are evolved there will be limitations in the knowledge to be imparted to the trainees.

Types of Research ,

The academy is involved in three types of research , which are :

1. Observation research: observing the village situation and functions of village institution for rural development.
2. Survey research : collecting and analysing data on land ownership, production, credits, marketing, costs and returns of new innovations, diffusion process, attitude towards new ideas, leadership pattern, organization and management of rural institutions
3. Evaluation research : finding out the effect and impact of development programmes and to understand the different aspects of a problem or problems to evolve better methods of organizations through systematic records and analysis.

Fig. 4.4.2 Birds eye view of Bangladesh Academy for Rural Development.
(Source .Doxiadis Associates,works of Doxiadis,,page25)

The planning of Bangladesh Academy for rural development is apparently dispersed building blocks connected by long corridors,evokes a sense of monotony. Use of court-yard spaces is a general feature like other works. Linear arrangement of rooms and architecture of connection is another important part of this project.

Fig. 4.4.3 Parabolic Roof Auditorium Building

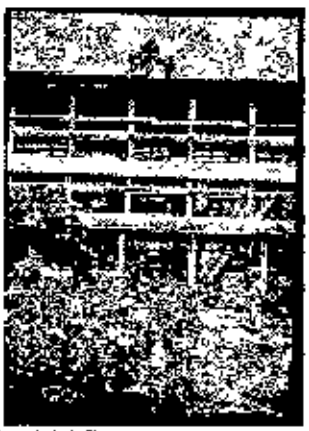


Fig 4.4.4 The Administrative Block with its typical double roof of Doxiadis provides a sense of grandness.

Fig. 4.4.5 The outdoor environment is surrounded by thick vegetation and courts are consist of trees .

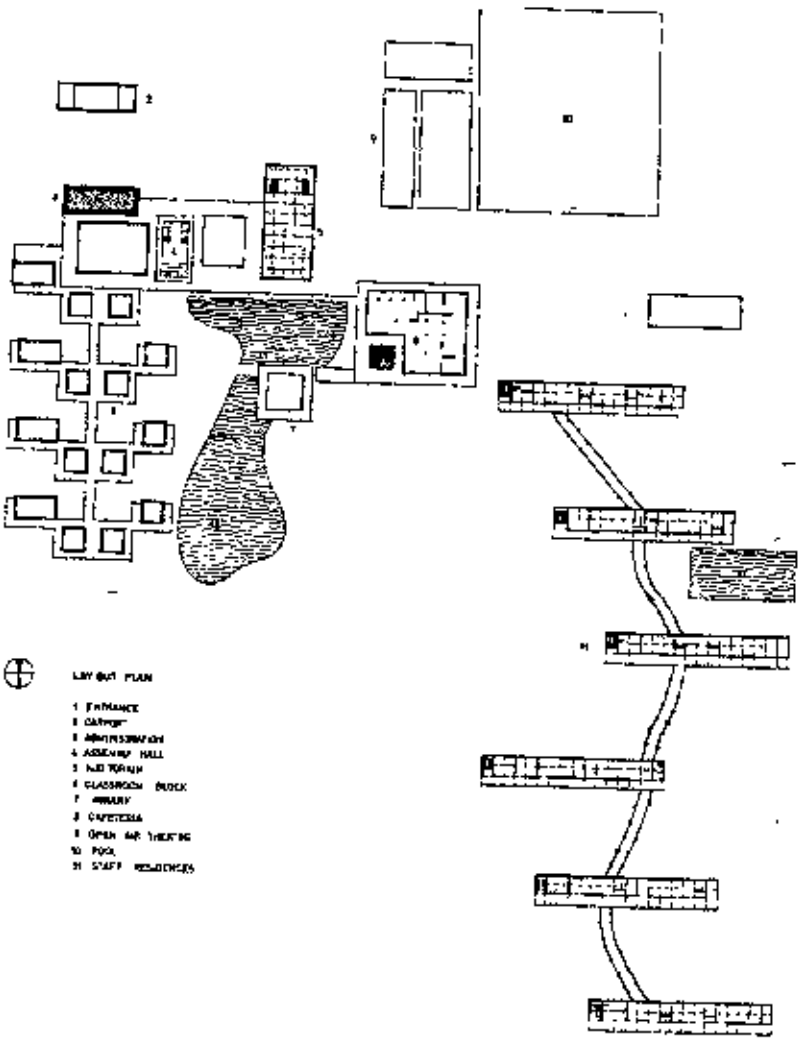


Fig. 4.4.6 Layout Plan

(Source, Doxiadis Associates, works of Doxiadis, ,page27)

4.5.1 Architectural feature

Bangladesh Academy for Rural Development is the largest project of Doxiadis in Bangladesh. A distinct difference is apparent with other project in terms of circulation length and pattern. The long circulation pattern with change of level is a distinct feature of this complex.

4.5.1.1 Standardization

Doxiadis proposed module of 3-'4" is not applied here in doors, window panels, and staircases. His suggested economic roof span of 20'-0"• is not maintained uniformly. Doors and windows are made of wooden panels with 4-6mm, A module of 3' was used as basic doors and window panels. Roof consisting of 6" r.c.c slab. Column span varies from 11'-0", 11'-4"-, depending upon spaces.

4.5.1.2 Construction Technique

Foundation consists of R.C.C footing under the columns connected by grade beam. Frame structure with 5-10" brickwork as internal and peripheral partition. R.C.C type of staircases with 5'-0" width and 6" riser is used.

4.5.1.3 Landscaping

Landscaping plays a vital part in the overall integration of this complex. Open spaces are always integrated with circulation. Courts are created by use of circumambulation path. The monotony of long corridor is broken by the change of level.

Following elements were used for landscaping

a. Retaining wall.

a. Paths.

b. Plantations

4.5.1.4 Flexibility and Growth

Bangladesh Academy for Rural Development was designed mainly keeping in mind the provision of future expansion. Provision of expansion is provided on the south part of the complex for both academic and cultural wing.

4.5.1.5. Color

Mainly white color is applied in all the major surfaces.

4.4.2 Analysis of the project based on basic architectural principal.

Bangladesh Academy for rural development is largest among all the complex of C.A.Doxiadis in Bangladesh. The planning is considered keeping the scope of future expansion for both academic and residential section. Thus the project seems incomplete and overall order is missing.

Like previous complex the entry is created by making aperture in the building blocks and Through circulation spaces. As the extent of the project is great it is very difficult to express the hierarchy of the total complex. The centrally located library and cafeteria gets the hierarchy by its placement.

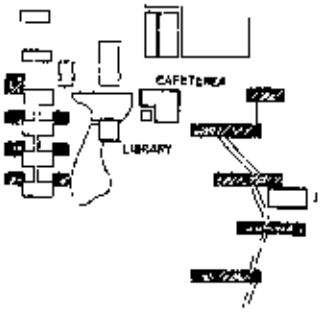


Fig. 4.4.2.1 Hierarchy of form

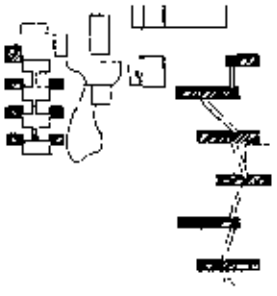


Fig. 4.4.2.2 Repetition of form

Use of repetitive units are very distinct in this project. The classroom blocks and the residential units are arranged in a repetitive way. Columnar Structure is used in the most part.

A Relatively flat skyline in comparison with other structures of Doxiadis.

Fig. 4.4.2.3 Relatively flat skyline of Bangladesh Academy for Rural Development.

4.4.3 Plans and Architectural Details.

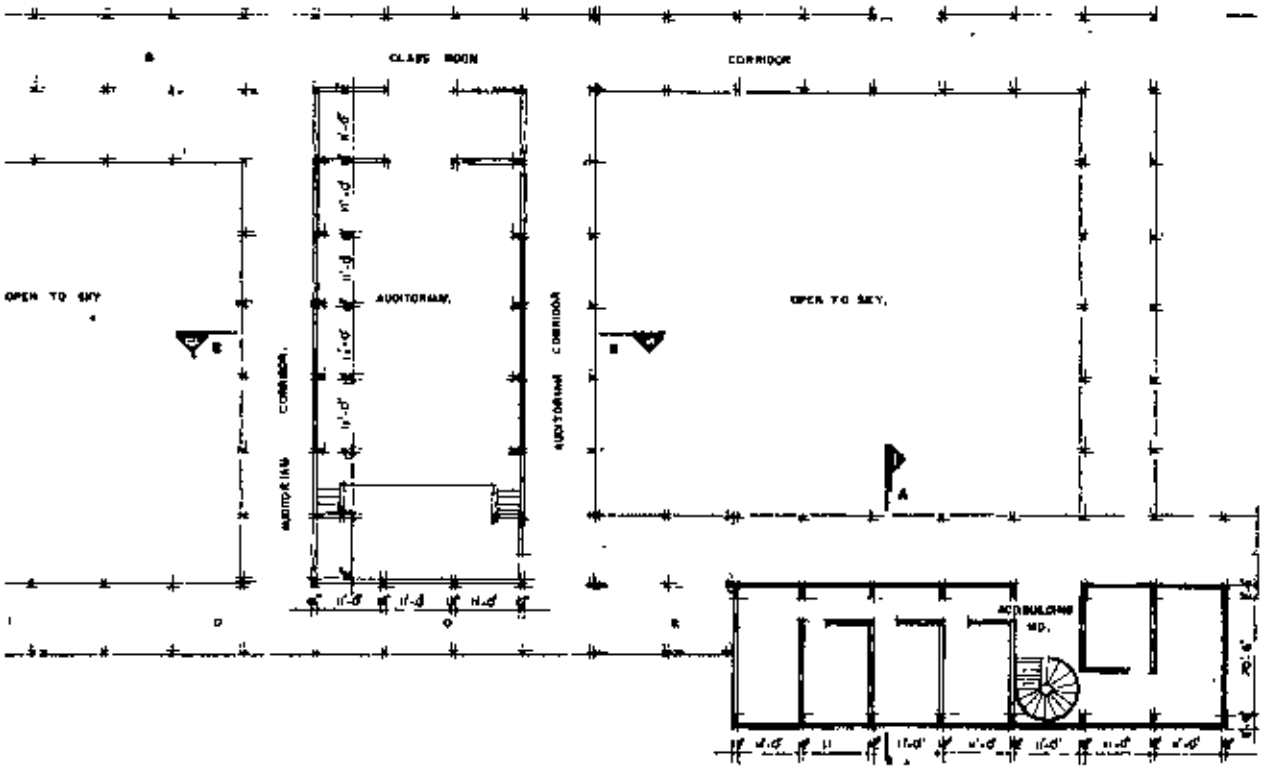


Fig 4.4.3.1 Partial plan of circulation system.

Bangladesh Academy for Rural Development is a perfect example of law of expanding synthesis. This technique of expansion is achieved by keeping extensive provision of circulation corridors. As the complex is located in a contour the built forms are dispersely arranged and generates long corridors. Corridor width changes from 11'-0" to 22'-0".

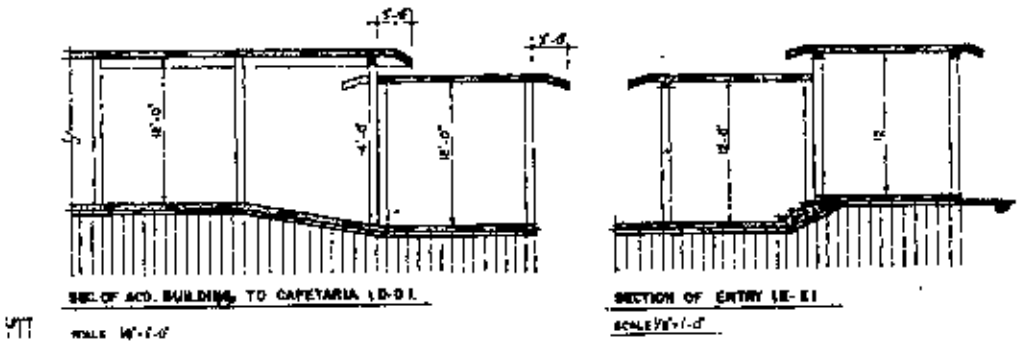


Fig 4.4 3.2 Section showing the changing level of circulation.

The circulation height remain same throughout. One roof overlaps with other where the height changes.The Auditorium with its parabolic shell roof attains a height of 30' supported by a peripheral beam of 3" width.

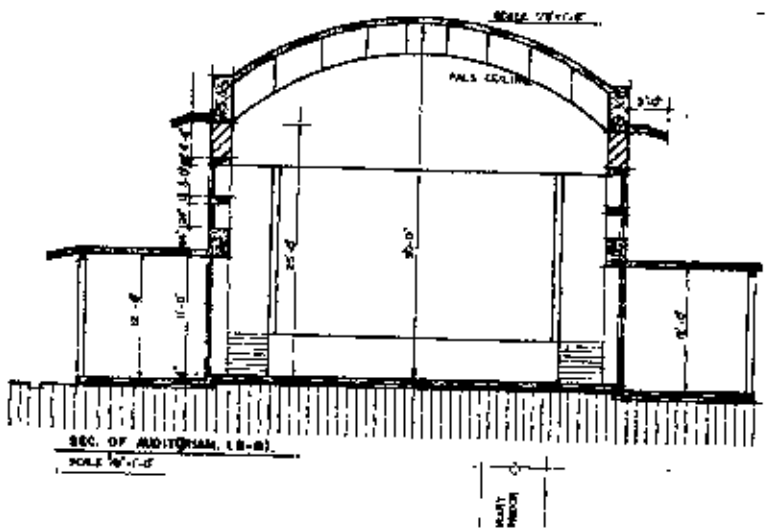


Fig 4.4 3.3 Section of auditorium

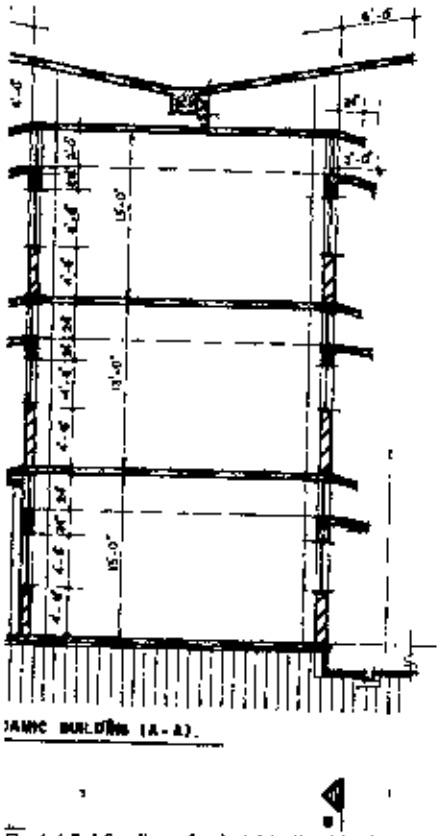


Fig 4.4.3.4 Section of administrative block.

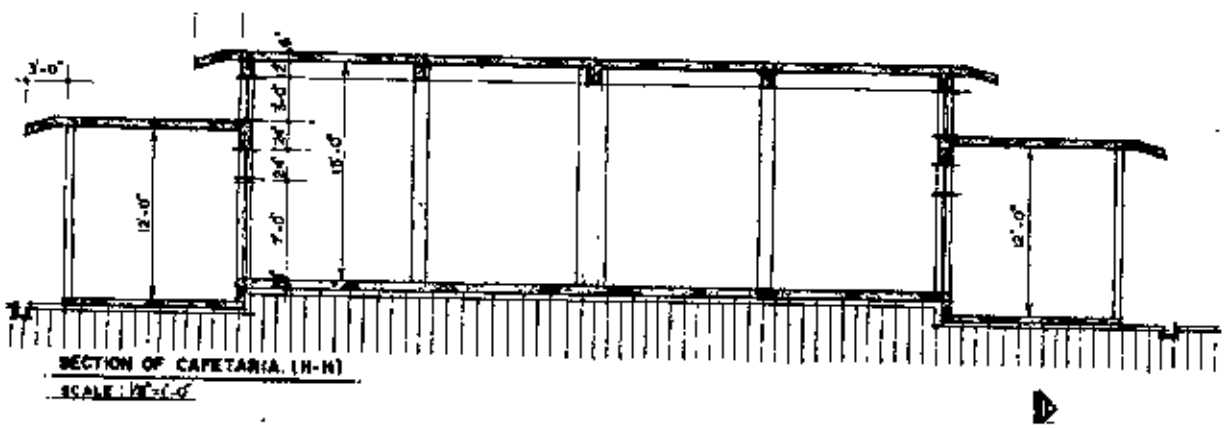


Fig 4.4.3.5 Section of cafeteria.

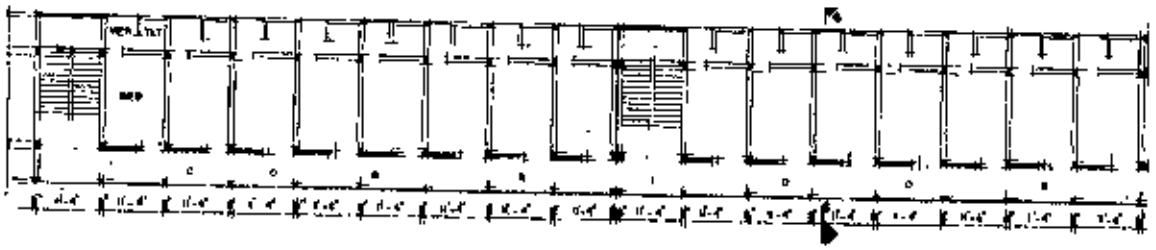


Fig 4 4 3 6 Plan of hostel.

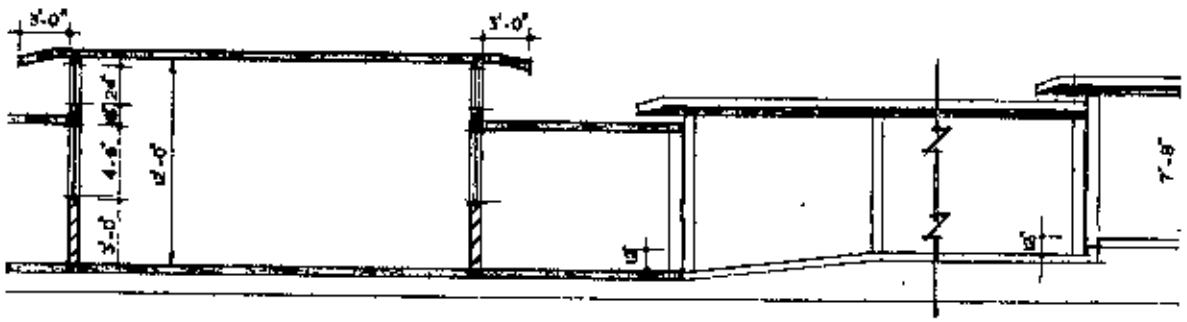


Fig 4 4.3 7 Section of Corridor.

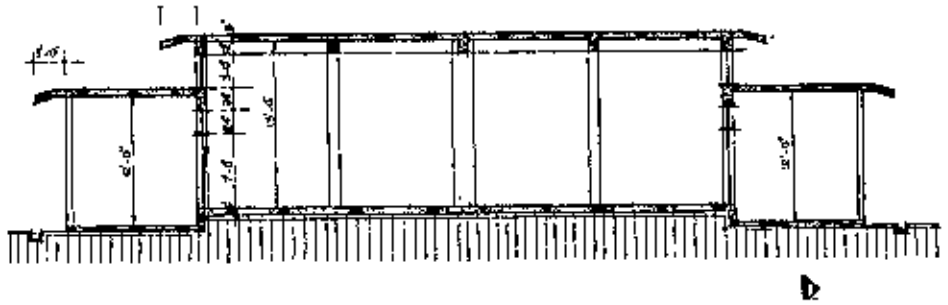


Fig 4.4.3 8 Section of Cafeteria

The rooms of hostel are arranged side by side within a 11'-4" grid, along with a long narrow corridor.The arrangement is straight forward and simple. Though north – south oriented , the cross ventilation is inadequate due to northern obstruction by services.

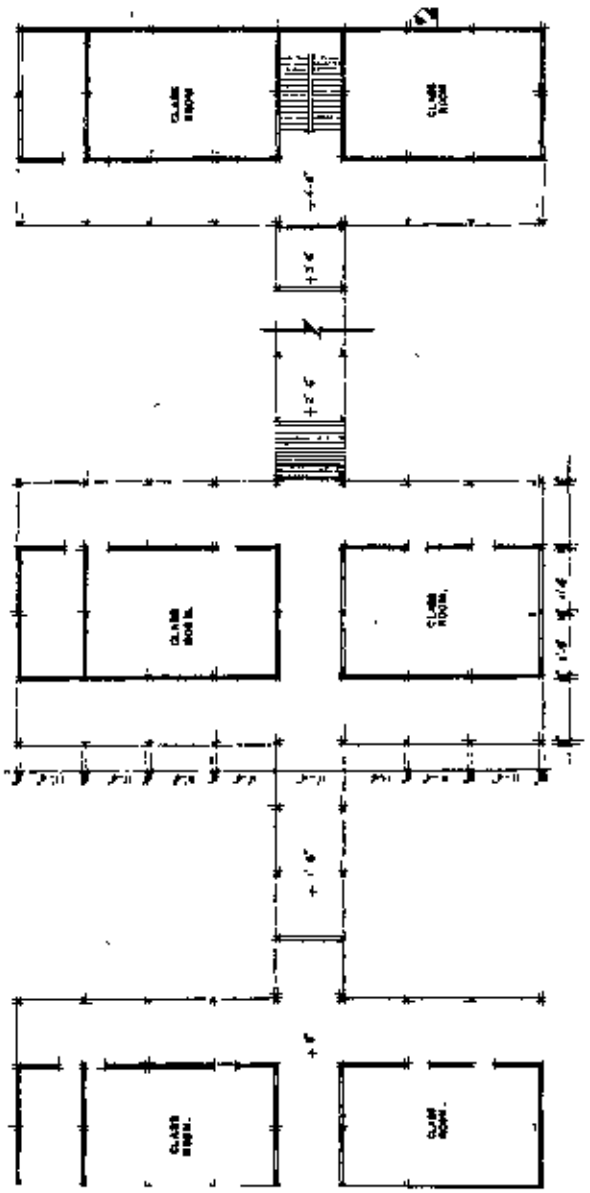


Fig 4.4.3 9 Plan of a class room

Class rooms are arranged in groups of two with flanked by circulation in three sides. Size of class room are 35'x25". Adequate ventilation and lighting is provided in the class room. Class rooms are arranged in different levels also.

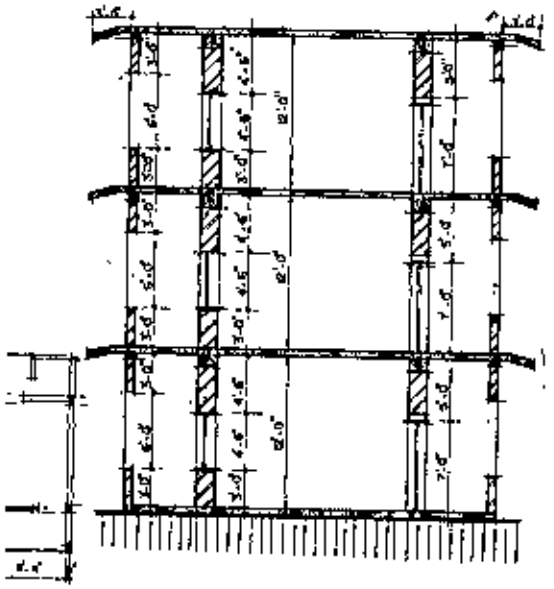


Fig 4 4. 3.10 Section of hostel block,

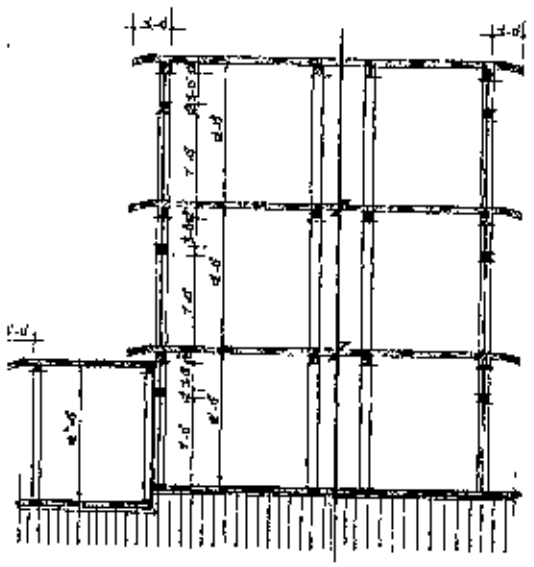


Fig 4.4. 3.11.5Section of Library

Sections are simple and straight forward. sill is 3' high, with a 6'-0"height of window.

Case Study 4

4.5 Teachers Student Centre ,Dhaka University ,Dhaka

Fig 4.5.1 Original impression of Teachers Student Centre

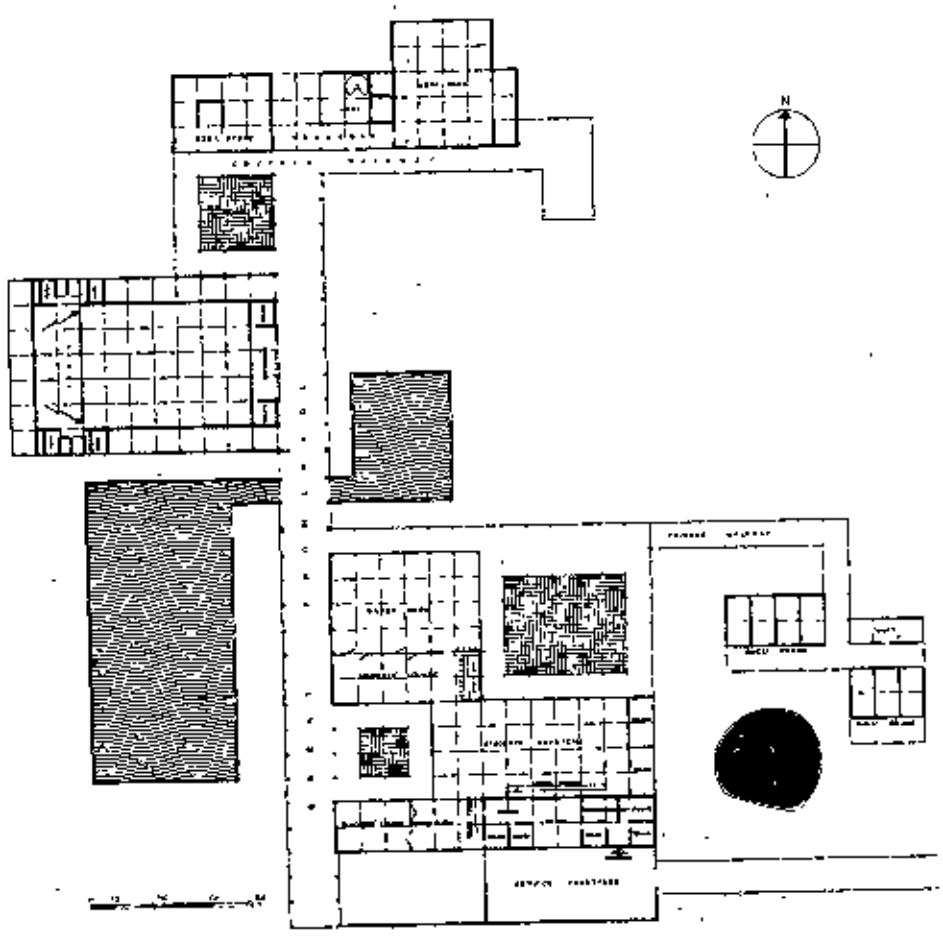


Fig 4.5 2 Original plan of Teacher's Student Centre
(Source, Doxiadis Associates,works of Doxiadis,1963)

Fig 4.5.3 a. The great promenade b. Inside-outside, light-shade c. steel column on circulation

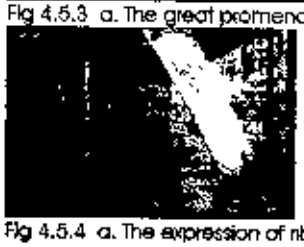


Fig 4.5.4 a. The expression of ribs, in Auditorium

b.Expression of horizontality-verticality

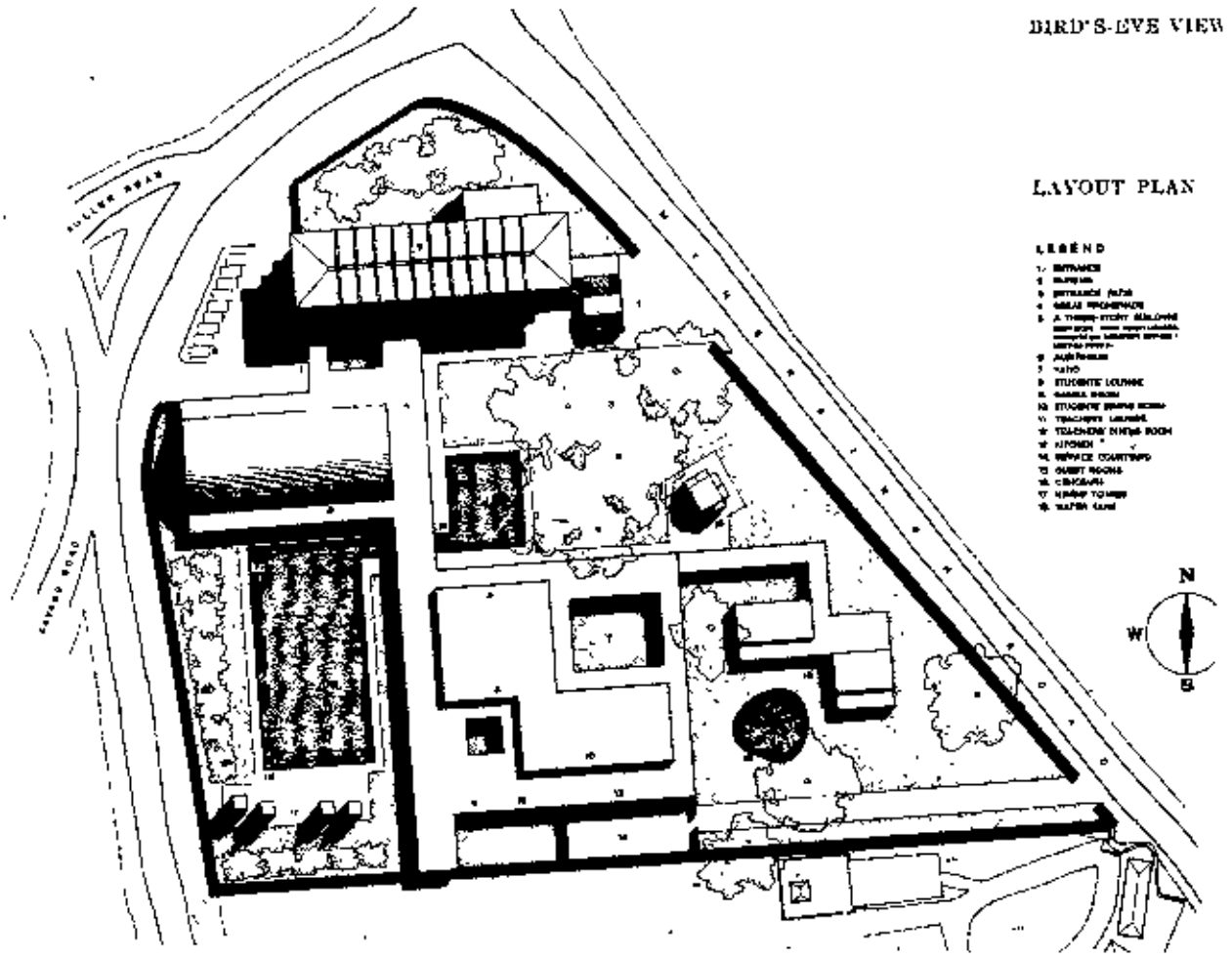


Fig 4.5.4 Site Plan
Source (Source, Doxiadis Associates, ,works of Doxiadis,1963)

Teacher's student center was build for 5000 students which now serves around 28,000 student of Dhaka University. The purpose of T.S.C is to evoke a sense of fellow feeling

and fraternity among the students as well as teachers of Dhaka University. It facilitates the social, cultural, and recreational activities of both teachers and students of the University. The main purpose is to strengthen the relationship between the teachers and students through participation in different co-curricular activities.

The center has five main buildings consisting

1.Students Union Building, consisting three floors (36'x306'), accommodating club and rehearsal room.
2.Auditorium, a rectangular building with a hyperbolic shell roof
3.Cafeteria, the space is provided for 300-350 person.
4.Games Room to provide indoor games.
5.Guest House, consist of only six rooms for university guest only.

Fig 4.5.5 View from Students Union block.

Fig 4.5.6 Staircase and Jalis

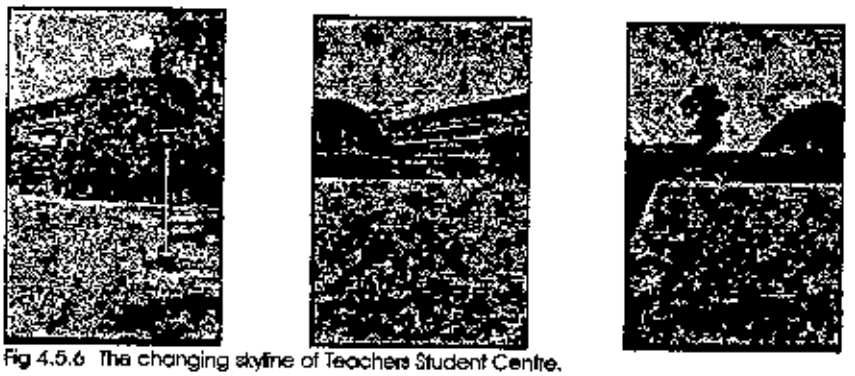
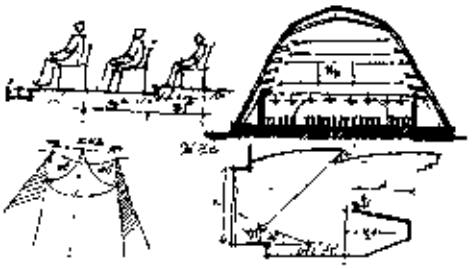


Fig 4.5.6 The changing skyline of Teachers Student Centre.



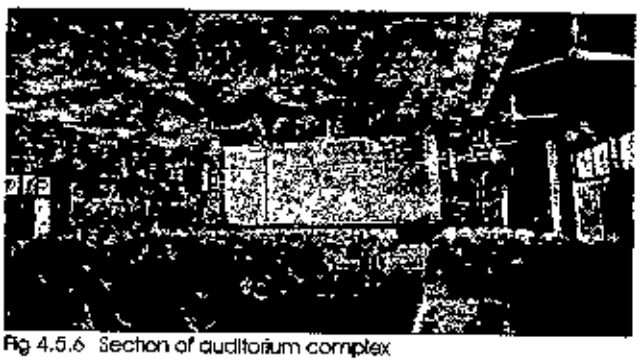


Fig 4.5.6 Section of auditorium complex

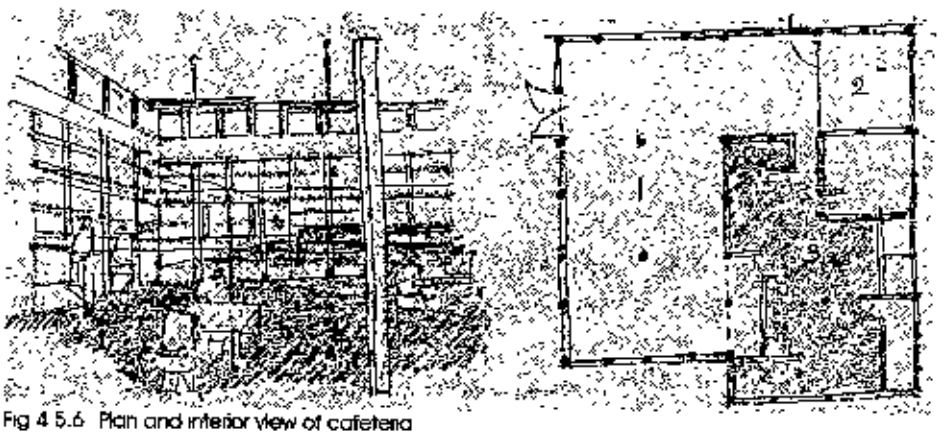


Fig 4.5.6 Plan and interior view of cafeteria

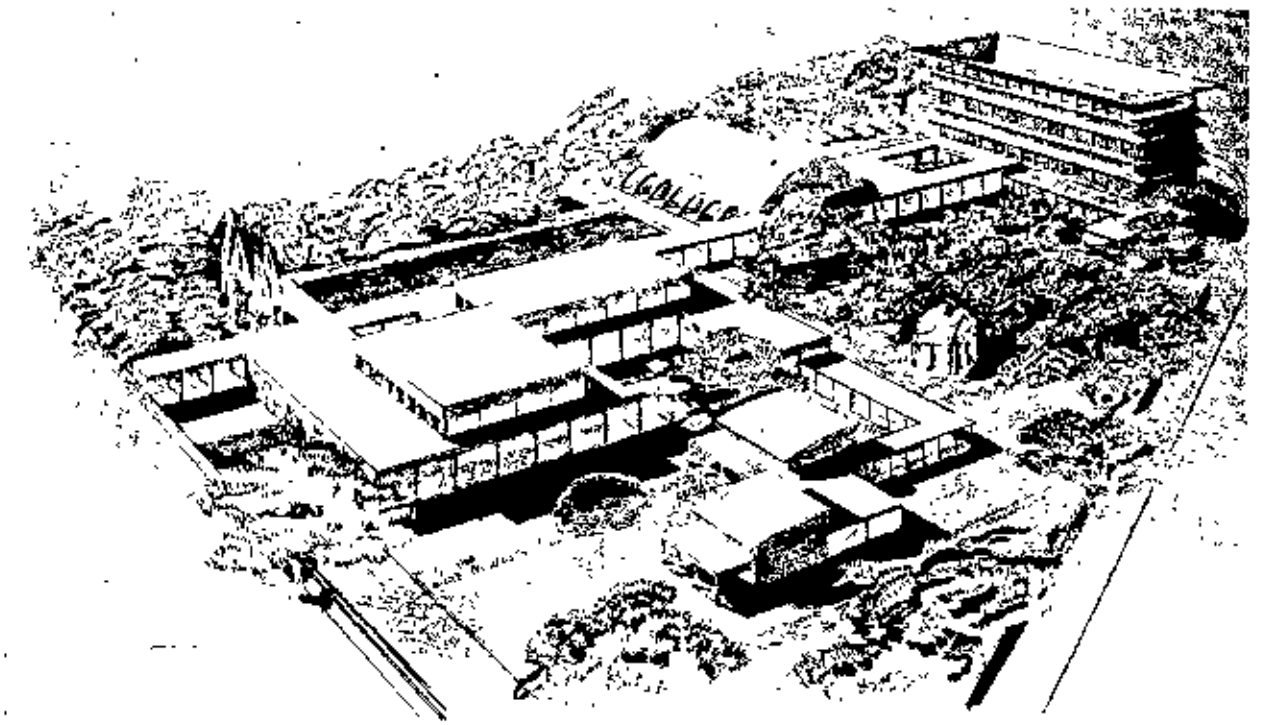


Fig 4 5.7 Teachers.Students Centre - an artist impression
(Source, Doxiadis Associates,works of Doxiadis,1963,page15)

T.S.C is an example of a natural, extrovert, expanding, non-monumental synthesis. The synthesis is based on interconnected buildings. The buildings are planned separately within the same compound and enclosure. According to Doxiadis here a human sector has been created which started from a core and expanded in all direction , while keeping the functions and retaining all potential of a living organism from expansion within synthesis.

4.5.1 Architectural feature

Teacher's student Center located at Dhaka University is the only project of Doxiadis in Bangladesh that is accessible to almost everyone and this is why the project is highly focused. We find reflection of different philosophical approach of Dioxides in this project. Also inconsistencies are apparent in some approaches, especially in the use of modules. Special architectural features that are to be critically discussed as follows,

1. Standardization

His proposed module of 3'4" is not applied here in doors, window panels, and staircases. His suggested economic roof span of 20' is not maintained uniformly. Doors and windows are made of wooden panels with 4-6mm. A module of 3' was used as basic doors and window panels. Roof consisting of 6" r.c.c slab with 12'x27" r.c.c beams. Roof span varies from 11'-0", 20'-0" and 23'-5". depending upon spaces.

2. Construction Technique

Foundation consists of R.C.C footing under the columns connected by grade beam. Frame structure with 5'-10" brickwork as internal and peripheral partition. R.C.C type of staircases with 5'-0" width and 6" riser is used.

3. Landscaping

A unique blend of nature and built- environment is seen here. Open spaces are always integrated with circulation except the student's union building. Lush green space located by the promenade provides a place to interact. Present use of that space reflects the success of this place. Plinth of promenade is also intuitively designed to be used as sitting space. By providing series of courts near games room gives also integrate the built and open space.

Following elements were used for landscaping

a. Retaining wall.
b. Paths.
c. Plantations
e. swimming pool.
f. Flower pots.

4. Flexibility and Growth

One of the major principal of Doxiadis was law of expanding synthesis in designing building complexes. T.S.C is one of the exceptional building which appears complete and provision for future expansion is limited .

5. Color

Extensive use of color is applied in different surfaces, specially the red brick in east and west elevation and red tiles on the floor. Some colored tiles are also used on the north and south elevation of Students Union Building.

4.5.3 Plan and Architectural Details

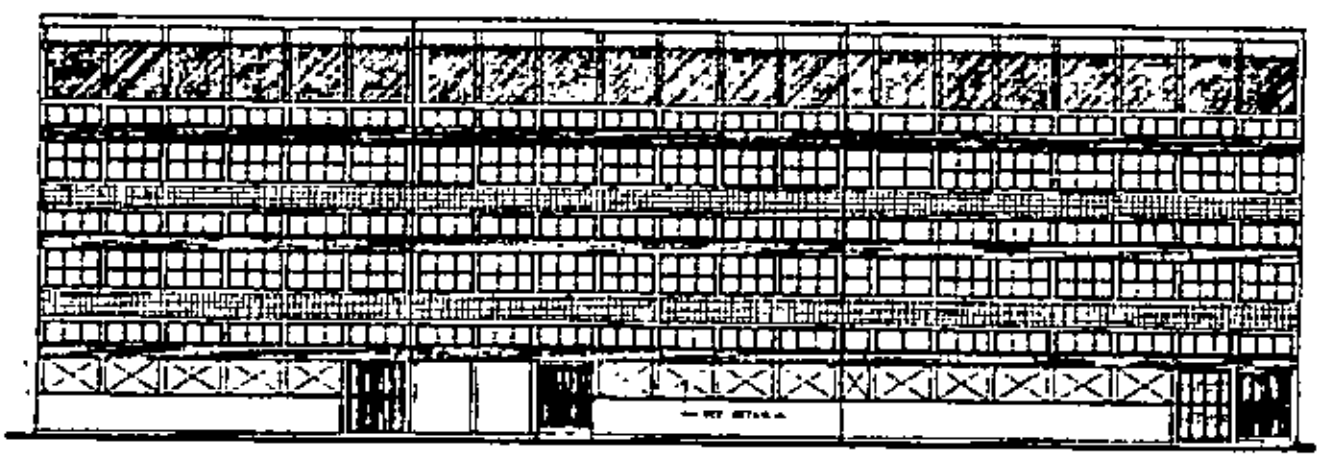


Fig. 4.5.3.1 Front elevation of Teachers Student Centre, Dhaka.

Students Union Building is a good example of standardization. The column spacing is 11'-0" and 10'-9".Consists of twenty columns in liner arrangement and three columns in

wider side. The proportion of the building is very linear and the internal arrangement do not express the clear appearance of external elevation. 6"x6" Blue color tiles are used in horizontal band.

The original plan was limited within bays of columns. Seven grids were later added and. An expansion joint was provided after 70'. Internal columns are sometimes free standing and sometimes remain within wall.

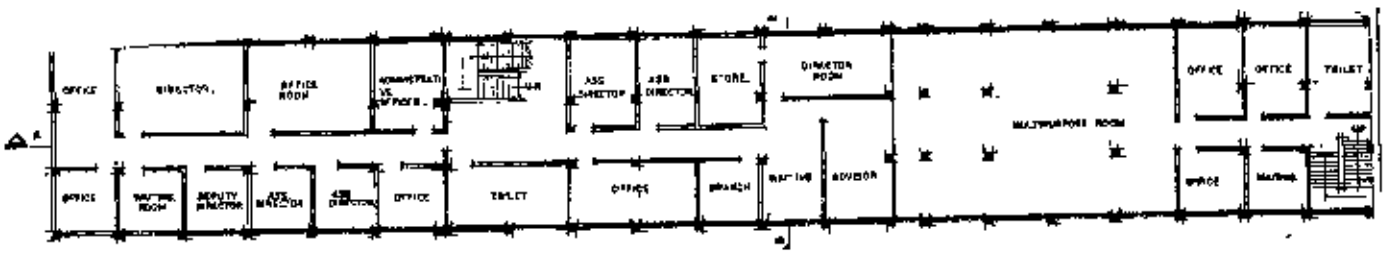


Fig. 4.5.3.2 Second floor plan of Students Union Building

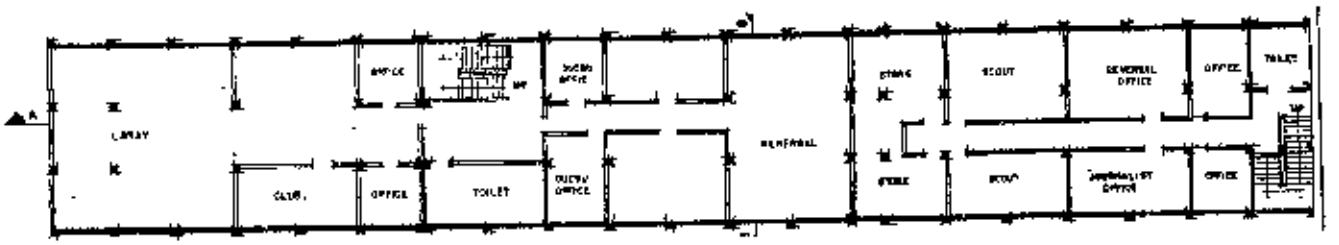


Fig 4.5.3.3 First floor plan of Students Union Building

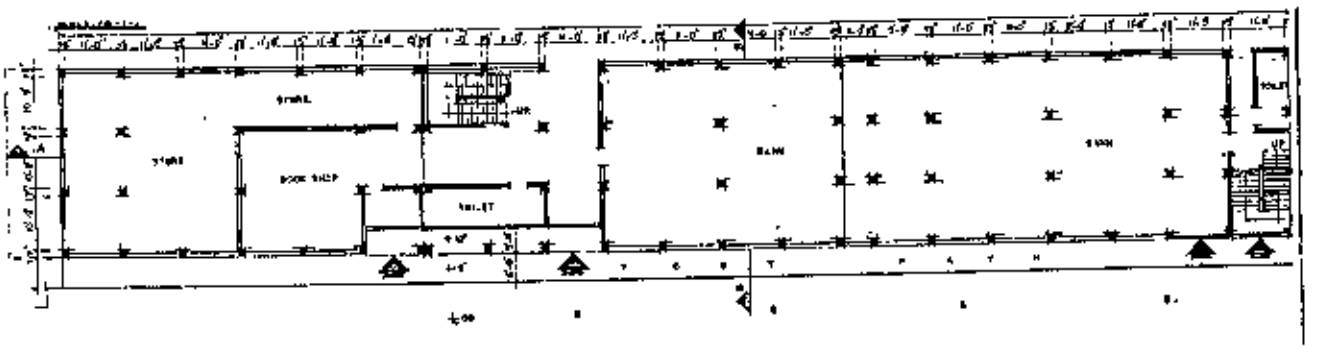


Fig. 4 5.3.4 Ground floor plan of Students Union Building

The weak part of this building is its internal arrangement. Each floor has different plans and inconsistent to each other. The Entry is not properly defined and appears as secondary entry. Lobby is not adequately lighted.

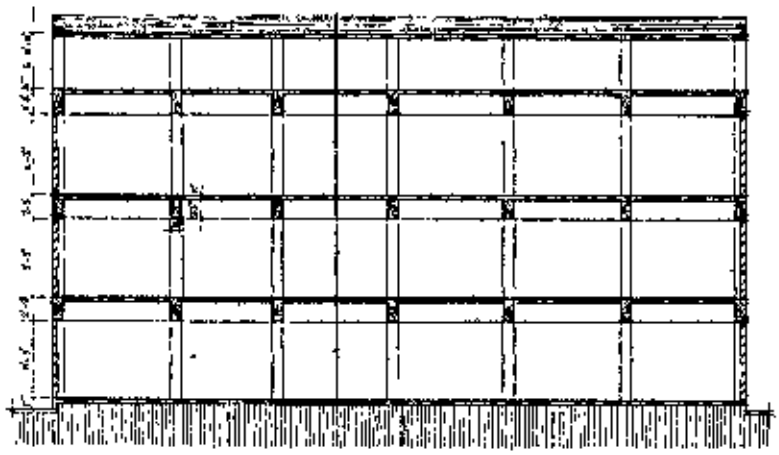


Fig 4.5.3.5 Longitudinal section of Students Union Block.

Cafeteria and Games room situated side by side with the promenade. The main promenade terminates to another circulation spine. Series of courts creates an exciting experience between cafeteria and Games Room.

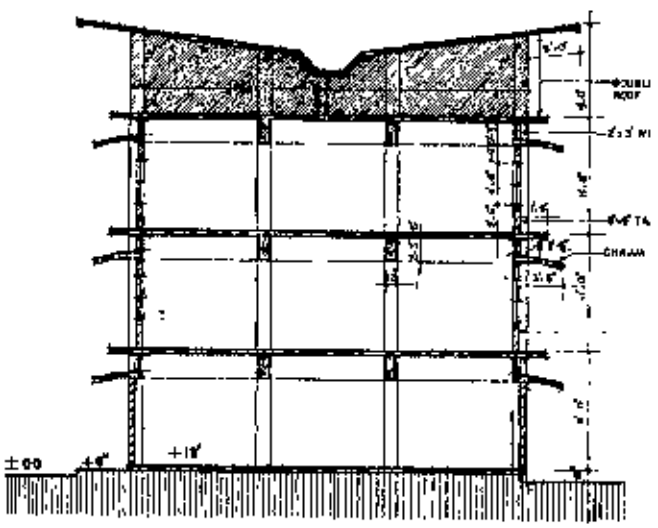


Fig 4.5.3.9 Cross section of Students Union Block.

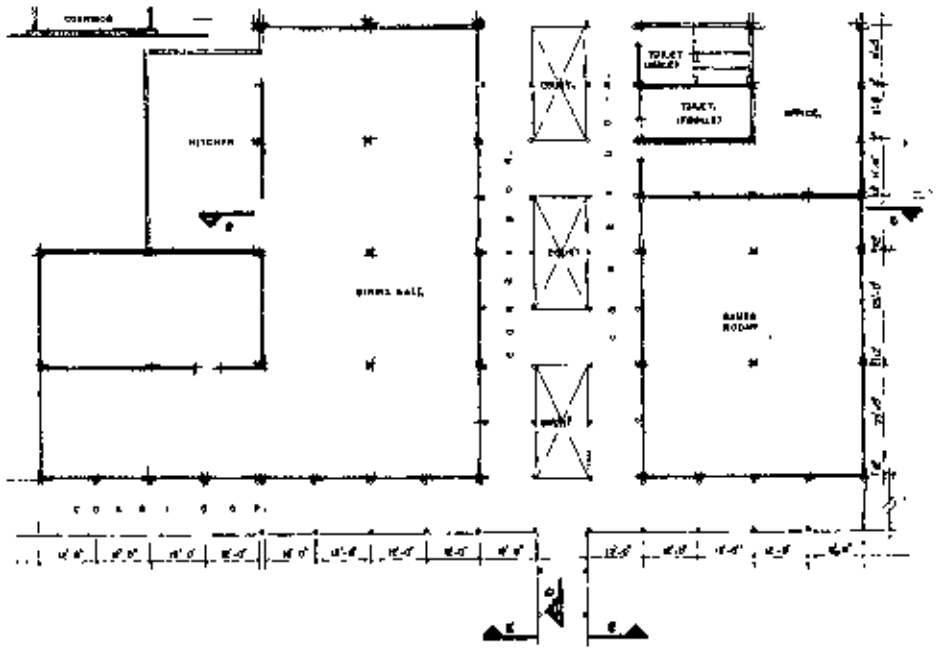


Fig 4.5.3.6 Partial plan of cafeteria and games room.

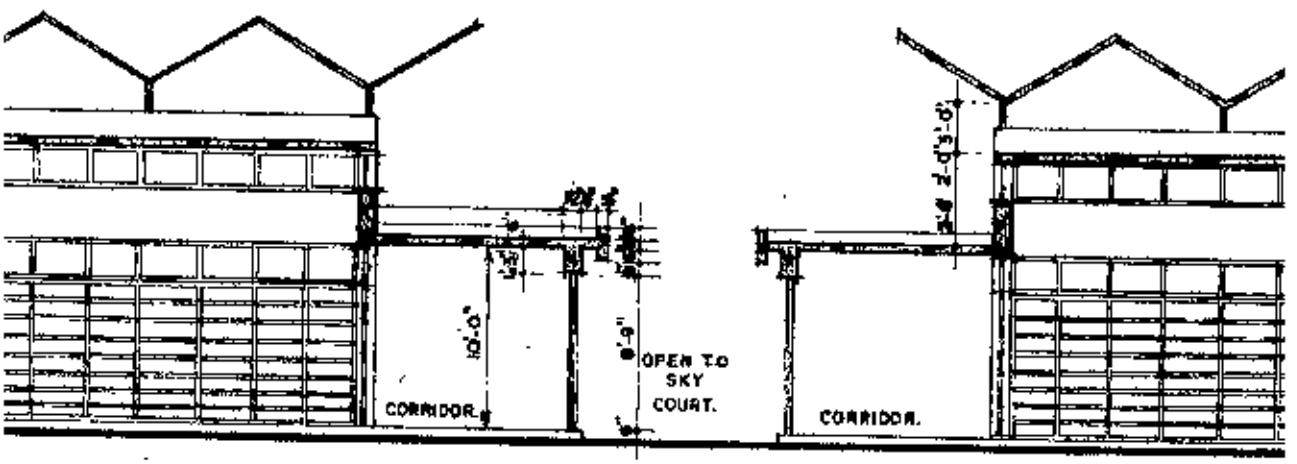


Fig 4.5.3.7 Section through Games room and Cafeteria

Cafeteria and Games room are skinned with wooden panel and glass. The folded plate roof helps to extend the span but limiting the height.

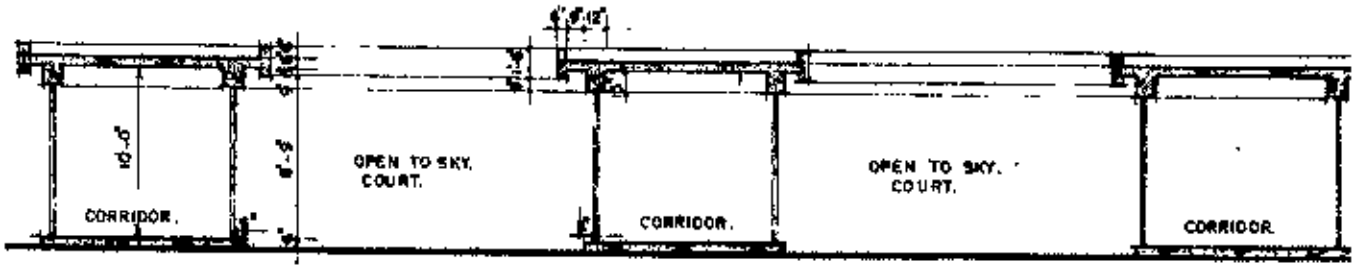


Fig 4.5.3.5 Section through corridors

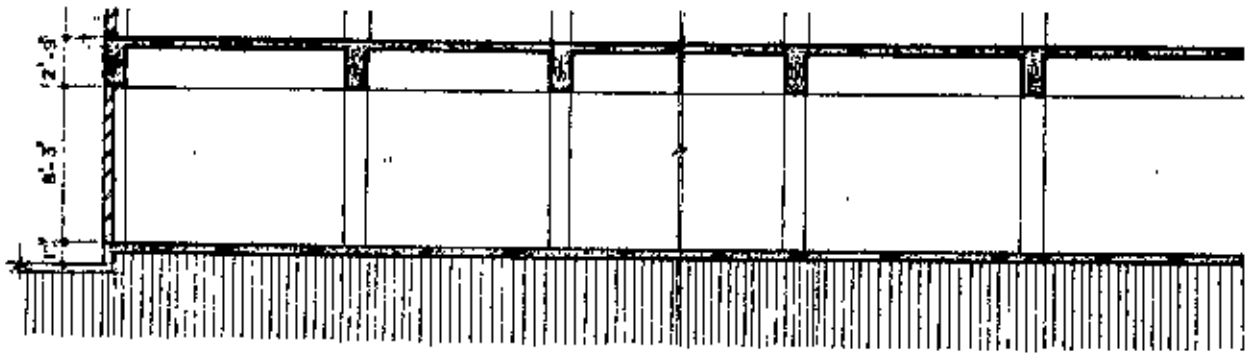


Fig 4.5 3.8 Longitudinal section through promenade
Long promenade creates an exciting.

Double roof of Students Union Building expresses the significance of the function. It also serves climatically. Wall section consist of a window, Chajja, a high window. The awning window obstructs wind flow and restricts the natural light.

4.6 Questionnaire Summary

A questionnaire survey was carried out in order to find the users reaction in terms of quality of spaces, scale, proportion, experience, environmental factors (natural lighting, ventilation and thermal condition ,functional convenience, control and security level etc.

The samples were drawn from students, staffs, administrators and visitors. The samples were very enthusiastic in answering the questions and even provide intuitive comments and criticism about individual project.

The result of the questionnaire were as follows.

4.6.1 Teachers Student Center

The samples were mostly students. The outcome of the questionnaire survey are as follow.

Q1	a	b	c	d 100 %	
Q2	the existing is perfect 100%				
Q3	more colorful 20% less colorful 10% the existing is perfect 70%				
Q4	corridor 100%				
Q5	Lighting				
				Adequate	not adequate
a. Students Union Building				40%	60%
b. Auditorium				50%	50%
C . Games room				100%	
d. Cafeteria				100%	
E Kitchen				100% of the users	
F. Guest room				100%	

Ventilation

	Adequate	not adequate
a. Students Union Building	50%	50%
b. Auditorium	40%	60%
c.Games room	100%	
d. Cafeteria	100%	
E Kitchen	50% of the users	50%
F.Guest room	100%	

Thermal condition

	Adequate	hot in summer cold in winter
a. Students Union Building	70%	30%
b. Auditorium	50%	50%
C.Games room	100%	
d. Cafeteria	100%	
E Kitchen	50% of the users	
F.Guest room	100%	

Q6. architectural qualities

	Successful/good/attractive	average	not successful/not good
Space quality			
Indoor	50%	30%	20%
Outdoor	100%		
Circulation			
Indoor		70%	
Outdoor			30%
View from			
Inside	50%	50%	
Outside	80%	20%	
Functional Arrangements			
Within Building	40%	40%	20%
Outside Building	50%	50%	

Control and security			
Complex		70%	30%
Individual blocks		70%	30%
Maintenance level			
Building	10%	40%	50%
Outdoor spaces	50%	30%	20%

4.6.2 Bangladesh Academy for Rural Development

Q1	a	b	c	d 100 %	
Q2	the existing is perfect	50%	closer	50%	
Q3	more colorful 20%	less colorful 10%	the existing is perfect 70%		
Q4	corridor	60%	outside	40%	
Q5	Lighting				

	Adequate	not adequate
a. Administration	40%	60%
b. Auditorium	40%	60%
C. Games room	90%	10%
d. Cafeteria	100%	
E Kitchen	100% of the users	
F. Guest room	100%	

Ventilation

	Adequate	not adequate
a. Administration	60%	40%
b. Auditorium	50%	50%
c. Games room	100%	
d. Cafeteria	100%	
E kitchen	50% of the users	50%
F.Guest room	90%	10%

Thermal condition

	Adequate	hot in summer cold in winter
a. Students Union Building	80%	20%
b. Auditorium	50%	50%
C. Games room	90%	10%
d. Cafeteria	100%	
E Kitchen	50% of the users	
F. Guest room	100%	

Q6. Architectural Qualities

Successful/good/attracting average/ not successful/not good

Space quality			
Indoor	40%	40%	20%
Outdoor	100%		
Circulation			
Indoor		70%	30%
Outdoor		30%	70%
View from			
Inside	50%	50%	
Outside	80%	20%	
Functional Arrangements			
Within Building	40%	40%	20%
Outside Building	10%	50%	40%
Control and security			
Complex		70%	30%
Individual blocks		70%	30%

Maintenance level

Building	10%	40%	50%
Outdoor spaces	50%	30%	20%

4.6.3 Home Economics College

The samples are mostly from students. The summary of answers as follows.

Q1	a	b	c	d 100 %	
Q2	the existing is perfect 100%				
Q3	more colorful 20% less colorful 10% the existing is perfect 70%				
Q4	corridor			100%	

Q5. Natural lighting

	adequate	not adequate
a. Auditorium	80%	20%
B. Games room	80%	20%
c. Cafeteria	80%	20%
d. Teachers lounge	50%	50%
e. Class rooms	50%	50%
f. Administration	50%	50%
g. Library	20%	80%
h. Gallery	50%	50%
I. Student hostel	70%	30%
j Residences	50%	50%

5.Natural Ventilation

	Adequate	not adequate
a. Auditorium	60%	40%
b. Games room	50%	50%
c. Cafeteria	50%	50%
d. Teachers lounge	40%	60%

e. Class rooms	20%	80%
f. Administration	20%	80%
g .Library	30%	70%
h. Gallery	40%	60%
i. Student hostel	40%	60%
j Residences	50%	50%

5. How Do you feel the thermal condition in the following spaces.

	Adequate	hot in summer	cold in winter
a. Auditorium	50%	50%	-
b.. Games room	50%	50%	-
c. Cafeteria	60%	40%	-
d. Teachers lounge	60%	40%	-
e. Class rooms	70%	30%	-
f. Administration	70%	30%	-
g. Library	60%	40%	-
h. Gallery	60%	40%	-
i. Student hostel	60%	40%	-
j Residences	60%	40%	-

6.Your comments on other architectural qualities

	successful/good/attracting	average	not successful/not good
Space quality			
Indoor		70%	30%
Outdoor	50%	30%	20%
Circulation			
Indoor		70%	30%
Outdoor	60%	40%	
View from			
Inside	30%	30%	40% views are obstructed
Outside		50%	50%

Functional Arrangements			
Within Building	30%	50%	20%
Outside Building	40%	60%	
Control and security			
Complex	20%	40%	40%
Individual blocks	20%	30%	50%
Maintenance level			
Building		20%	80%
Outdoor spaces		20%	80%

4.6.4 National academy for Educational Management NAEM

Q1	a	b	c	d 100 %
Q2	The existing is perfect 100%			
Q3	more colourful 40%	less colourful 00%	the existing is perfect 60%	
Q4	corridor	100%		

Q5. Natural lighting condition

	Adequate	not adequete
a. Auditorium	60%	40%
b. Cafeteria	70%	30%
c Teachers lounge	60%	40%
d. Class rooms	70%	30%
e. Guest room	70%	30%
f. Administration	70%	30%
g. library	50%	50%
h. Gallery	70%	30%
i. Student hostel	70%	30%
j V.I.P hostel	70%	30%
k. Mosque	100%	00
l Residences	70%	30%

5. How Do you feel the condition of natural ventilation in the following spaces.

	Adequate	Not adequate
a. Auditorium	40%	60%
b. Cafeteria	60%	40%
c. Teachers lounge	30%	70%
d. Class rooms	30%	70%
e. Guest room	50%	50%
f. Administration	20%	80%
g. Library	30%	70%
h. Gallery	40%	60%
i. Student hostel	40%	60%
j V.I.P hostel	40%	60%
k. Mosque	100%	
l. Residences	40%	60%

5. How Do you feel the thermal condition in the following spaces.

	Adequate	hot in summer	cold in winter
a. Auditorium	60%	40%	-
b. Games room	80%	20%	-
c. Cafeteria	80%	10%	10%
d. Teachers lounge	60%	40%	
e. Class rooms mainly)	40%	60% (for wrong orientation	
f. Guest room	60%	40%	-
g. Administration	50%	50%	-
h. Library	60%	40%	-
i. Gallery	70%	30%	-
j. Student hostel	60%	40%	-
k V.I.P hostel	60%	40%	-
l. Mosque	70%	30%	-
m Residences	70%	30%	-

6 Architectural Qualities

	successful/good/attractive	average /	not successful/not good
Space quality			
Indoor	70%	30%	-
Outdoor	100%	-	-
Circulation			
Indoor	70%	30%	-
Outdoor	100%	-	-
View from			
Inside	60%	30%	10%
Outside	60%	40%	-
Functional Arrangements			
Within Building	70%	30%	-
Outside Building	70%	30%	-
Control and security			
Complex	40%	30%	30%
Individual blocks	40%	40%	20%
Maintenance level			
Building	-	50%	50%
Outdoor spaces	30%	50%	20%

4.6.5.1 SUMMARY

Teachers student center, essentially a public institute in terms of use and participation. The only meeting and cultural center for around 28,000 student of the Dhaka University. It is apparent from the questionnaire survey that the acceptability in terms of quality of use, scale and as an experiential space is enormous. A stark contrast is clear in terms of ventilation and internal space arrangement between the student's union building and the rest. The student's union building is very much congested in terms of planning and hence the ventilation and lighting quality is very poor . From the survey we find an average level of outdoor and poor indoor maintenance. Security is not actually the major concern of the general students because it is used almost throughout the day. When asked about overall image most of the students identify the complex as a sense of pride and think it as one of the important architecture in Dhaka University.

4.6.5.2 Home Economics College

The Home Economics College is for female students. The reaction about quality of spaces, scale, proportion, experience, environmental factors (natural lighting, ventilation and thermal condition), functional convenience, control and security level is mixed and it appears that the designer did not give enough attention especially in terms of ventilation and lighting. Though enough openings were provided but unfortunately use of window type (awning type) is the main reason of obstruction of air. Accumulation of dusts make difficult to control the sashes. The complex do not impressive due to poor maintenance. But the corridor spaces and indoor-outdoor relationship quite impressive.

4.6.5.3 National Institute of Education Management.

The National Institute of Education Management, the erstwhile Education Extension Center is a pioneering institution and one of the ideal in its type. The users group is

very educated and comments made by them about this complex reflect their sensitivity. From the users perspective the whole complex would have been unique if the problem of ventilation was solved. Again like Home Economics Complex awning type of operable window obstructs the ventilation. According to one director of the Institute, which provides training to the teachers and principals coming from periphery, imprint a permanent image in their life as a sweet memory. Each and every permanent member of the Institute feel pride for the architecture, quality and essence of space and feel it as a symbol of pride.

4.6.5.4 Bangladesh Academy for Rural development

Bangladesh Academy for Rural Development is another outstanding example of C.A. Doxiadis' work . It is a research based academy on rural development and a training institute. The academy comprises a very scholastic atmosphere. The sample of the questions are from staffs and the trainees of the academy. Every user highly praised the overall space qualities specially outdoor spaces but the disperse functional arrangements and use of long corridors for circulation spaces creates discomfort and monotony for the permanent residents of the Academy. The over all planning of the complex is also very much dispersed , for providing provision of future expansion. Other features such as ventilation, thermal condition, lighting , internal space quality are quite acceptable to the users of BARD.

Summary Chart of Questionnaire Survey

Institute	Spaces	Natural lighting		Natural ventilation		Space Quality	
Teachers Student Centre		Good	Bad	Good	Bad	Good	Bad
	Auditorium				*	*	
	Students Union Bldg.		*	*			*
	Gamesroom	*		*		*	
	Cafeteria	*		*		*	
	Guest Rm	*		*		*	
National Academy of Education Management							
	Auditorium		*		*	*	
	Cafeteria	*		*		*	
	Class room	*		*		*	
	Guest room	*			*	*	
	Library		*		*		*
	Mosque	*		*		*	
	Hostel	*			*		*
Bangladesh Academy for Rural Development							
	Administration	*		*			*
	Auditorium		*		*	*	
	Gamesroom	*		*		*	
	Cafeteria	*		*		*	
	Guest room	*			*		*
Home Economics College							
	Auditorium		*	*		*	
	Games room	*		*		*	
	Cafeteria	*		*		*	
	Class room	*			*		*
	Library		*		*		*
	Students Hostel	*			*		*

Note : Positive response from more than 60% is taken as good and less than 40% is bad.

Chapter Five

Example of C.A.Doxiadis Global work

5.1 Introduction

C.A Doxiadis worked extensively in thirty-six countries in five continents. His works includes wide variety of uses,. such as from housing, commercial center, civic center, institutional, recreational buildings etc. Doxiadis aimed at a very broad, preferably total solution, which he summed up under the heading Ekistics. Ekistics aimed at showing connection between nature, man, society, shells (building) and networks. His aim was to propagate his program throughout the world by creating structure all over. To carry out this gigantic program Doxiadis founded a special institute in his hometown Athens, and every year during an Ekistics month, he tried to assemble representatives of all kinds of progressive sciences to take part in seminars. This seminar gave him opportunity to interact with personalities from all over the country and helped him to participate in works of those countries. The principal participants, apart from Doxiadis himself, have been the world famous Margaret Mead, Arnold Tybee, Barbara Ward, Charles Abraham, Buckminister Fuller. With all of them he used to cruise on an air-conditioned ship, between the Greek islands and discussed topic about strategy for development and other aspects of the third world country. Thus he was able to propagate his ideas globally and the normal activities at the Head office of Doxiadis associates demonstrate a similar global activity.

5.2 Institution Buildings

Doxiadis has worked extensively in institutional buildings all over the world. His major works includes The University of Punjab, Academy for Rural Development in East Pakistan and West Pakistan, Politechnic Institute, Rawalpindi, West Pakistan, Education Extension Center, Rawalpindi, Rural Teachers Training Home, Syria.

5.2.1 Academy for Village Development, Rawalpindi.

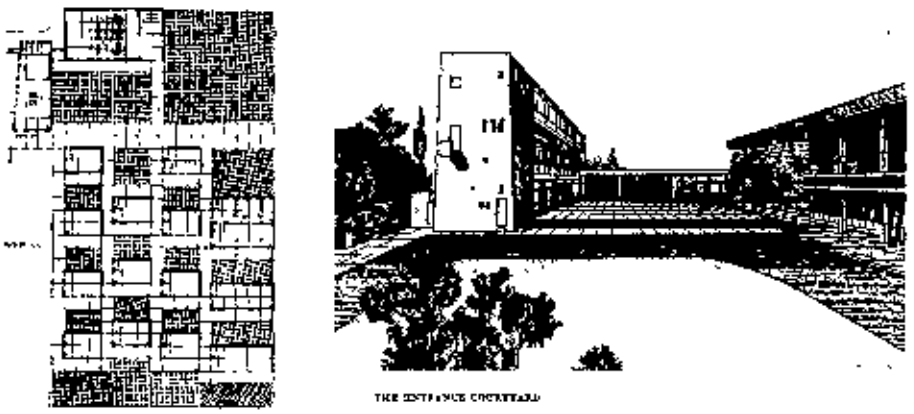


Fig. 5.1 Plan and Entrance view of Administrative block.
(Source, Doxiadis Associates, Works of Doxiadis,1963,page16)

The design of the Academy for village Development, Rawalpindi gives a sense of order with varied approach in design treatment. All the design principles such as laws of expanding synthesis, creating human scale, modulas in practice etc, are applied here. Unlike other complexes the Skyline does not create an interest.

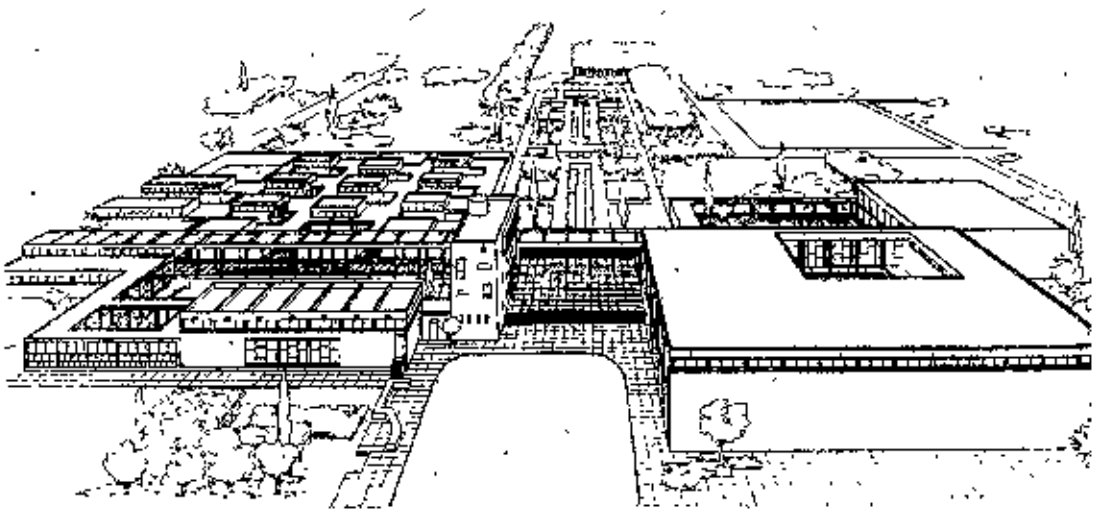


Fig. 5.2 Birds eye view of Academy for Village Development
(Source, Doxiadis Associates, Works of Doxiadis,1963,page16)

5.2.2 University of Punjab

Fig. 5.3 Perspective view of Administrative Block .
(Source, Doxiadis Associates, Works of Doxiadis,1963,page17)

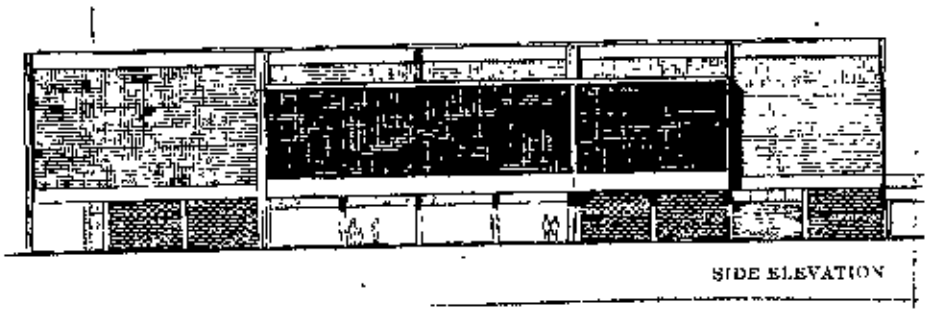


Fig. 5.4 Elevation of Institute of Education, Punjab University
(Source, Doxiadis Associates, Works of Doxiadis,1963,page17)

University of Punjab in Pakistan is an extensive work, which comprises overall planning as well as detail design. The project is based focused to create a larger synthesis Which starts from the core and expanded in all directions, while keeping the hierarchy of functions and retaining all the potential of a living organism. The overall planning is composed as a development of human community from the core of accommodation. The complex is composed of rooms connected by covered walkways with shifting axes. The skyline is broken with series of vaults.

Fig. 5.5 Areal View of Academic buildings, Administrative and cultural center.
(Source, Doxiadis Associates, Works of Doxiadis,1963,page18)

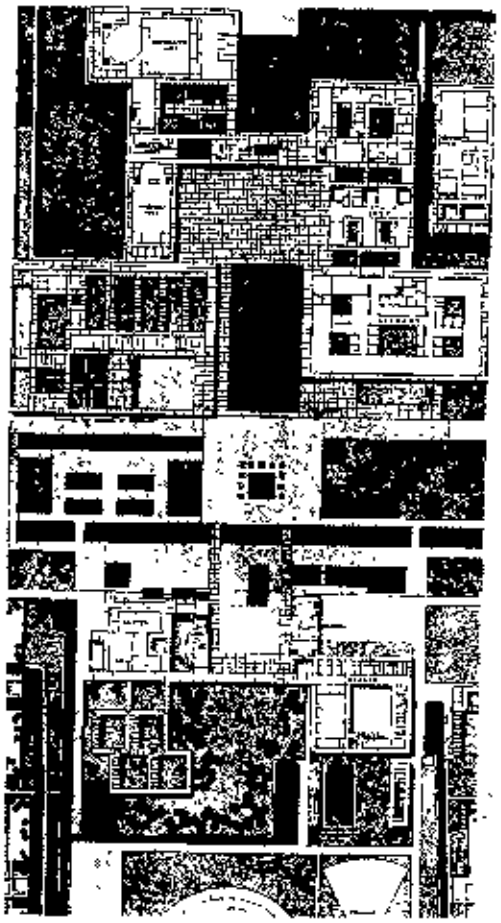


Fig. 5.6 Master Plan of Academic and Cultural wing
(Source, Doxiadis Associates, Works of Doxiadis,1963,page18)

5.3 Office Building

Fig. 5.7 Interior view of Doxiadis Associates building. (Source, Doxiadis Associates, Works of Doxiadis,1963,page20)

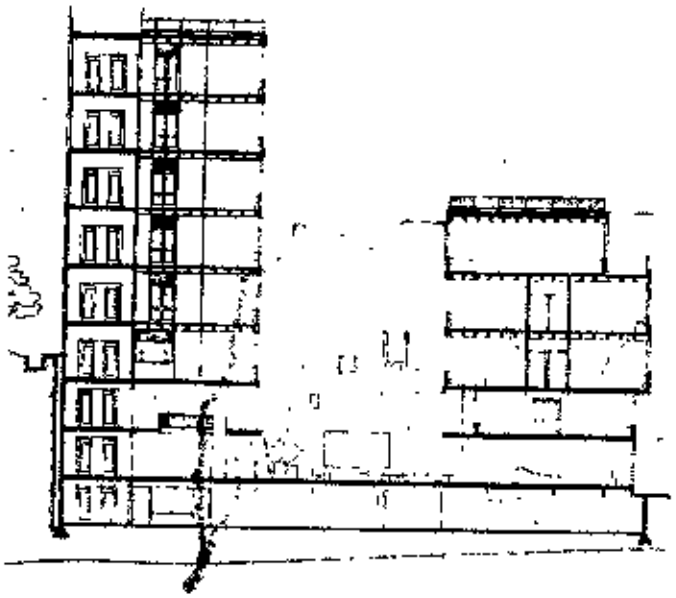


Fig 5.8 Cross section of Doxiadis Associates building.
(Source. Doxiadis Associates. Works of Doxiadis,page15)

Among office buildings, Office of Dioxides Associates is one of the most mentionable building of C.A.Doxiadis. A shift of his own design principle is seen in this project in terms of approach. It consists of two rectangular mass around a court the approach seems very much modern. The ground floor occupies mainly parking and services. Locate at the foot of Acropolis; this building creates a unique setting with the surrounding. The taller block consists of studio and other block accommodates cafeteria, library and lecture hall. The fenestration is composed of glass, wooden frame and wooden jalis with a clear expression of standardization.

Fig. 5.9 Entrance Patio of Doxiadis Associates
Source (Source. Doxiadis Associates. Works of Doxiadis,page15)

The 95-meter long rectangular office building consists of eight lifts and three staircases. The ground floor is elevated on circular columns giving an impression of Corbusier's approach in Marseilles. The Total building gives a rectangular glass box effect thus generating a solid effect. The monotony is broken by delicate treatment at the upper floor. Surface parking is provided instead of basement parking.

5.4 Cultural Building

5.4.1 Open air Theatre, Athens, Greece

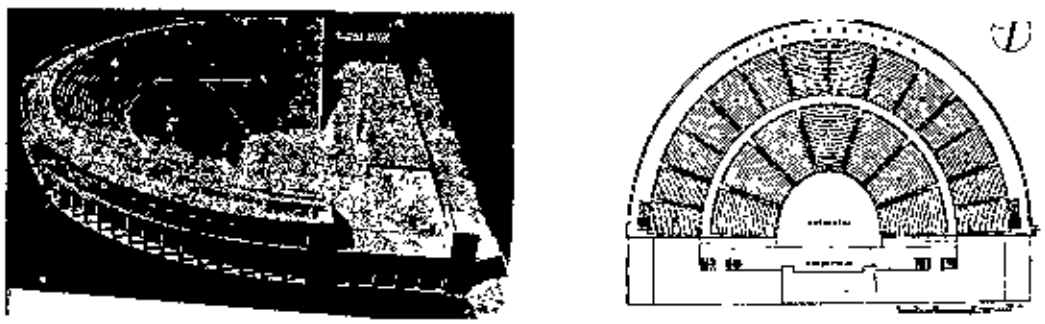


Fig.5.10 Plan and three dimensional view of Open air Theatre.
Source (Source, Doxiadis Associates, Works of Doxiadis.page15)

Inspired by ancient amphitheatre, the theater in Athens is one of his modern creation. The sitting arrangement is composed with two parts of rows. The first part consists of six sectors, while the second is composed of twelve sectors. Within the sectors steps are given for circulation.

5.5 Religious Building

5.5.1 The New Cathedral Axum, Ethiopia

The Cathedral building is one example, which gives a sense of monumentality. This project highlights Dioxides capability of dealing with pure form and geometry. A sensitive skyline is created with a semicircular shell structure and vertical obelisk. Geometric floor pattern is produced within nine squares. Influence of mosque architecture is distinct here.

Fig. 5.11 Elevation of the cathedral.
(Source, Doxiadis Associates, works of Doxiadis,1963,page15)

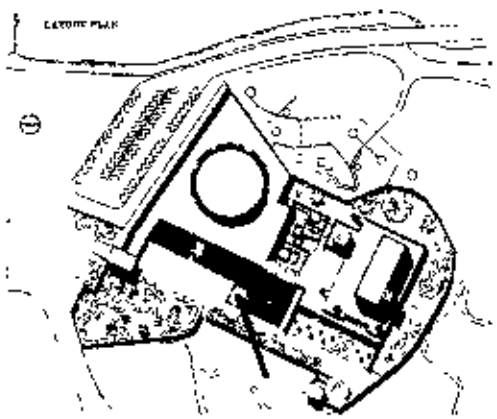


Fig. 5.12 Layout plan of the cathedral
Source (Source, Doxiadis Associates ,Works of Doxiadis,1963,page25)

5.6 Community Space

Shops at Rawalpindi

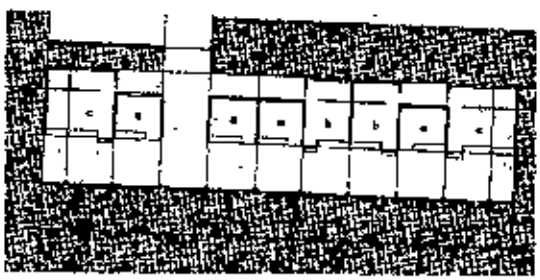


Fig. 5.13 Plan of Shops.
Source (Source,

Fig. 5.14 Section showing loading area and service area.
(Source, Doxiadis Associates,community building for GC,Gov. of Pakistan,1961.)

Dioxides designed three types of Shops. Consists of 10'x10' open on one side,10x15' with store on the back and show window in front,15'x15' with show window and store at the back. Pedestrians circulate through 10' wide galleries in front of the shops, whereas the shops are served by car from the back

Fig. 5.15 Elevation of shop
(Source, Doxiadis Associates,community building for GC,Gov. of Pakistan,1961.)

5.7 Master Plan

Master Plan at Korangi

The Korangi Master plan is situated as an independent ekistics area incorporated with the whole plan and trends of development of Karachi region. The size of Korangi area allows for the easy settlement within it about half a million of people, this number represents one- fourth of actual population of the Karachi. wider region. The scope of Korangi zonal plan includes functions providing employment to the inhabitants, in order to facilitate the easy and rational solution of the social, economic and transport problems arising from the continuous movement of people between the places of residence and work.

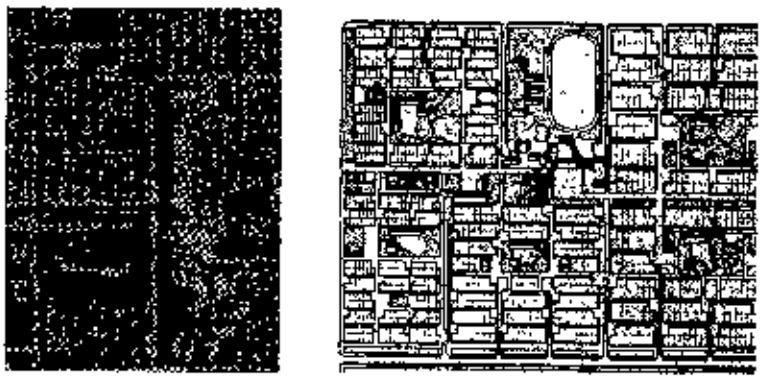


Fig. 5 16 Master Plan of Korangi
(Source. Doxiadis C.A ,Architecture in Transition,1963,page 129)

The zoning of the area provides spaces for all the functions, which are required to serve the residential population. The plan covers an area of 94.5 million square yards with residential occupying 36.5%, Civic, commercial, business areas 6%, green areas with special buildings 6.5%, Special building and Institutes 4.0%, Irrigated lands and cultivations 25.4%, light Industries, workshop 6.0%, air force base installations 4.0%, Besides large parcels of Land are reserved for the creation for the expansion of the existing land industrial Estate. Korangi major roads and parkways 11.5%. Korangi consists of six integrated residential communities each one having all community building required i.e., educational, health, administration, building, shops etc.

5.8 Residential buildings and Housing

5.8.1 Apartment House Athens Greece

This six storied apartment block reflects most of Dioxides design principles such as standardization, use of double skin and sun breaker, repetition etc. Basically a frame structure the plan contains free and flowing spaces. The double skin elevation is applied based on canopies, which have been treated as architectural elements. The narrow verandah as seen by the architect is a place that protects the house from heat and light and allows its adjustment to season and hours of day, without blocking the view.

Fig. 5.17 Three dimensional view and interior of apartment block.
(Source, Doxiadis Associates, Works of Doxiadis,page26)

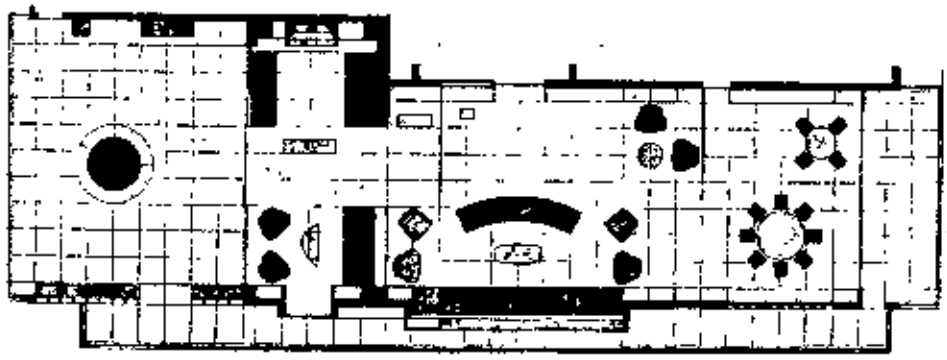


Fig. 5.18 Plan showing modulas in practice of apartment block.
(Source, Doxiadis Associates, Works of Doxiadis,page27)

5.8.2 Groups of Houses in Baghdad

Groups houses in Baghdad mainly based on the concept of changing organism and law of expanding synthesis. The policy of expansion in residential scale was first introduced in Greece, where 200,000 houses were constructed, was later used in other national housing programmes also. The groups of houses in Baghdad are two storied residential building, made of burnt brick. The height is kept low to keep the scale human.

Fig. 5.19 Areal view of the master plan of housing in Baghdad
Source (Source, , Doxiadis C.A ,Architecture in Transition,1963,page 129)

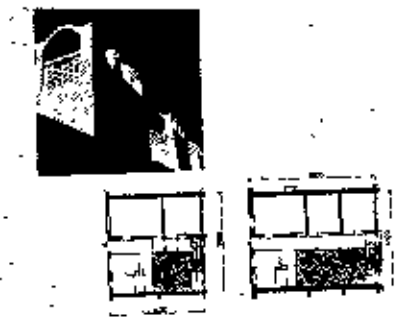


Fig. 5.20 Plans of an unit.
(Source, Doxiadis Associates ,Works of Doxiadis,page29)

5.9 Commercial centers

5.9.1 Food Market at Korangi Township

Food Market at Korangi Township consists of several sections, which includes fruit, vegetable, meat, fish etc. The basic module of market IS 9'x9.' The size of each Plinth is 18'x18', surrounded by four columns, which support like an umbrella.

Fig. 5.21 Picture showing an unit of market.
Source, (Doxiadis Associates, Works of Doxiadis,)

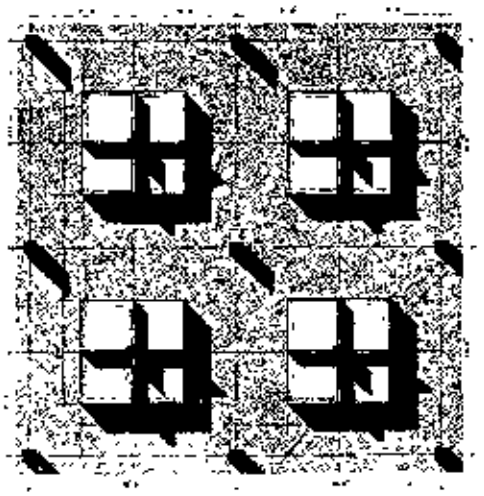


Fig. 5.21 Plan of an unit.
Source, Doxiadis Associates, Works of Doxiadis,page35)

5.10 Conclusion

The reason for presenting the above projects is to comprehend Doxiadis approach in design globally. From the above discussions it is clear that Doxiadis' technical and functional approach, such as standardization, laws of expanding synthesis, modulas in practice , creation of human scale, all are applied in most of the projects. His universal and global approach is also apparent in the institutional projects in Bangladesh. The institutional projects such as Politechnic Institute and Education Extention Centre in Rawalpindi, Pakistan, Teachers Training Home in Syria, have similarities with projects in Bangladesh, specially in terms of scale, grouping of forms, articulation of spaces etc.

Chapter Six

Conclusion

Constantinos A. Doxiadis, by training is an Engineer, an Architect and a Planner and his project amply reflect that. Doxiadis tried to relate the work of an architect like a scientist and he stressed the need for finding for a system of thought, which can be implemented through a proper scheme. As an Engineer he is precise and always chooses the simplest of systems the post-lintel. The structural system forms well expressed skeleton over which wall and roof works as a skin. Composed with simple light post- lintel structures, the works of Doxiadis are easy to build and economic. His approach of roof treatment, in terms of shell construction, folded plates and double roof all give a sense of engineering innovation to achieve a greater span and at the same time they give a sense of termination.

According to Doxiadis, architecture is a product, but a product that contains ingredients from all the social, cultural and technological world. According to Doxiadis here one has to follow a system that should not only be concerned with visual property and in presenting good facade to streets, but to creation of a better environment and an improved habitat as a whole.

Doxiadis principles regarding architecture is functional rather intangible in thoughts. His approach toward standardization, law of expanding synthesis, layering, repetition, four dimensional synthesis, Ecumenic architecture, total and real architecture, architecture and science are not thought provoking in terms of social and cultural value rather it supports the constructional, functional and environmental factors (such as standardization, use of prefabricated materials which was new concept in the sixties and widely accepted later with the development of technology. His laws of expanding synthesis is a concept for future growth for institutional building, layering in system of thermal protection of building etc). The four complexes (Teachers Student Center, National Academy for Rural Development, Home Economics College and Bangladesh Academy for rural Development) by Doxiadis of contemporary period are appreciated by users and non users. Doxiadis, taking human being as a source, designed his buildings in a universal approach and thus his architectural concept gave rise to a vocabulary that seems to fit anywhere in the world. The basic tenets of his Philosophy are-

a. Human scale in practical and aesthetic terms.
b. Economy in the utilization of space.
c. Economy in function and maintenance
d. Use of best possible microclimate

Doxiadis in his entire project gave priority to these four tenets and the first three remains constant for projects around the world where the microclimatic aspect is applied according to need. His approach of protection from rain and sun is very simple. He makes useful climatic control by the passages covering at least one side of the block and he puts an overhang on each opening. A slanting cornice at the roof level also serve the useful purpose of protecting the wall. The slanting cornice resembles curved eaves of traditional Bengali monuments. Thus the form, planning and scale of his different projects located anywhere in the world such as Bangladesh, Greece or Ghana apparently seems similar. This is why critics may find his architecture similar but this similarity in the true sense do not create monotony. For example, his works in Bangladesh have similar approach in terms of design principle but each having its own identity. He intelligently used the same element with wide variation. Elements like hemispherical shells, double roofs, corridors etc all are used with wide variation in his complexes in Bangladesh thus achieving wide variety within these complexes. This is definitely a major achievement.

His architectural features in terms of basic architectural elements, relationship and ordering ideas have already been expressed. His approach in planning is very clear and straightforward. A strong repetitive order has been established with the use of units. This reflects his philosophy of law of expanding synthesis where a unit is the part of the whole. Repetitive units are usually classes and residential blocks. Units relate the whole as appendages to major spaces.

His approach of circulation was very straightforward. Usually linear, sometimes at perimeter, circulation space connects different forms and defined spaces. Vertical circulation usually located in clearly articulated towers. Some non-ending circulation provides an expression of future synthesis. His structural concept is not very strong and different approach was made in different projects. His structures were mostly columnar sometime used as composite columns. Columnar structures were used to articulate spaces where as wall structure is to support the enclosed spaces. Doxiadis tried to achieve a sense of hierarchy

among different functions by giving priority to specific function in its formal expression. The shape and size of ouditorium, administration and cafeteria are sensitively approached to express its functional variation. Thus the auditorium in the Teachers Student Center and the Home Economics College were given a hemispherical shape. Double roof in the administrative block of both institutes also expresses its functional importance.

He invited natural light in a different manner, generally through wall penetrations, mostly located in the upper portions of external surfaces, sometime through surface penetration from interior court. The extensive use of operable glass is remarkable, which represented modernity during the middle of this century. The use of Jali works, which is environmentally pleasing, represents local construction element.

The planning background of Doxiadis helped him to perceive building forms and activity in a broader framework. The use of passage represents a street pattern. All the spaces and parts of the project can be reached by passages like the house in a city. These corridors are wide enough to work as promenade, inviting people to spend time there.

The most significant part of any project, designed by Doxiadis is the layout. The layouts are beautifully integrated with the site. Mostly the blocks are arranged around open courts of variable sizes. The open green areas are well integrated with the corridors and useable spaces thus creating a very pleasing environment.

Interaction with nature, strong indoor-outdoor relationship is very distinct in his project. Due to prolific growth of plants in Bangladesh, all his project look wonderfully landscaped and peacefully engulfed by nature. The conscious use of landscape gives a sense tranquility and harmony to all the institutions designed by him.

Doxiadis purely dealt with architecture as a product and has produced a type or style which can serve a varied function at different locations, just as a car can be be used by any owner at any part of the world. For similar purposes he has stressed standardization. He did not visualize standardization as 'modular- co-ordination" or Corbusier's modular related to anthropometrics. He envisaged standardization of building , of building elements and even form.

Though C.A. Doxiadis has worked extensively in thirty-six countries world wide, he is hardly mentioned by contemporary architectural historians, because his works made very little impact on development and trend of architecture at local and global level. As an architect Doxiadis can be assumed to be rigid, personalized and pragmatic.

A questionnaire survey of the projects designed by Doxiadis was done. The result appeared quite satisfactory from the both users and viewers point of views. His functional approach of design, strong indoor-outdoor relationship, linear layout which may also be termed sensible and rational, there is an inherent economy in utilization of space. All spaces are independently accessible through a net- work of spacious corridors. This makes the space Use- efficient. His layouts reconfirm the fact that corridors are a useful part of functional design in Bangladesh.

Scale is an important achievement in his design. The users or the man is the focus and supreme in his architecture. Spaces are never overpowering not even when designing an auditorium. By using the shell roof over auditorium, a unique and gradual blend is provided. The elevation of the larger buildings with repetitive, proportionate elements of vertical and horizontal line give an intriguing mechanical look of industrial mass production era. Besides these rectilinear forms he has also tried to draw from local forms of bamboo-hut, C.I sheet construction and carved eaves of monumental buildings. In a complex he has tried to bring relief from rigidity by making one mass free flowing with shell and curved construction. In places he has used cantilevered double roof.

A relatively weak approach in design was his expression in distinction between served and service spaces. Mostly services were placed incidental, though in fewer places it was found in a regular order. The most outstanding part of his design is his skyline. A wide variety of silhouette is achieved in the sky with the use of flat, circular and diagonal lines.

Proper control of microclimate is another important element of his design, which is often appreciated by the users. His intuitive use of flora and green setting attracts the users tremendously.

Doxiadis did his projects just before the modern era, which is an outcome of proper choice of technology. Chronologically his major work was done before "form follows function" was accepted as a dictum. Doxiadis might not have won the recognition of his peer group but

he was definitely successful in wining the satisfaction of his clientele, meaning both owner and user.

To conclude about Doxiadi's works it should be mentioned that he was a strong follower of the prophet of Architecture , Vitruvius. If we take Vitruvias words about architecture that architecture is the product of function (commoditus), structure (firmitus) and beauty (venustus) then it is very clear that Doxiadis had paid due respect to his prophet.

Doxiadis opined about an architect that, an architect must be a man able to work the long day through, bent double under a load of bricks and mortar and stone and steel, laying foundations; but able , when evening falls, to leave his work-site and climb some high rock, there to gaze out to the horizon of a rising world whose dynamic evolution will lead to a dynamic architecture. If the architect is able to be all this, a mason in his work but a dreamer in his ideas, then he may be able to help us find the architecture of a world to come.

.....An Architect must become a scientist, carry out research, create a system of thought, devise a program of action and carry out proper schemes of organization in government, in industry, in production, in design.

Constantinos A. Doxiadis

Appendix One

Questionnaire Sample

Name :

Address :

1.Do you like the open spaces surrounded by buildings? If yes, for

a. Viewing and enjoy the green space.
b. Because it is an opening for air.
c. It is a nice place to sit in.
d. All the reason mentioned above.

2.Do you think the building should be

Closer/higher/closer and higher/should be of less height/the existing is perfect.

3.The color of the building should be

more colorful/ less colorful / the existing is the perfect.

4. In which place you enjoy to walk.

Corridor/ within building / outside building.

5. How do you feel the natural lighting condition in the following spaces.

	Adequate	not adequate
a. Students Union Building		
b. Auditorium		
c. Games room		
d. Cafeteria		
e. Teachers lounge		
f. Class rooms		
g kitchen		
h. Guest room		
i. Administration		
j. Library		
k. Gallery		

l. Student hostel
m V.I.P hostel
n. Mosque
o Residences

5. How Do you feel the condition of natural ventilation in the following spaces.

	Adequate	not adequate
a. Students Union Building		
b. Auditorium		
c. Games room		
d. Cafeteria		
e. Teachers lounge		
f. Class rooms		
g kitchen		
h. Guest room		
i. Administration		
j. Library		
k. Gallery		
l. Student hostel		
m V.I.P hostel		
n. Mosque		
o. Residences		

6. How Do you feel the thermal condition in the following spaces.

	Adequate	situation in summer	situation in winter
a. Students Union Building			
b. Auditorium			
c. Games room			
d. Cafeteria			
e. Teachers lounge			
f. Class rooms			
g kitchen			
h. Guest room			
l. Administration			
j. Library			
k. Gallery			
l. Student hostel			

m V.I.P hostel
n. Mosque
o Residences

7.Your comments on other architectural qualities

	successful/good/attractive	average	not successful/not good
Space quality			
Indoor			
Outdoor			
Circulation			
Indoor			
Outdoor			
View from			
Inside			
Outside			
Functional Arrangements			
Within Building			
Outside Building			
Control and security			
Complex			
Individual blocks			
Maintenance level			
Building			
Outdoor spaces			

Appendix Two

CONSTANTINOS APOSTOLOS DOXIADIS

Born 1913

Constantinos A. Doxiadis, son of Apostolos and Evanthia (Mezeviri) Doxiadis. His father, a paediatrician, was Minister for the Resettlement of Refugees.

Graduated

Architect-Engineer from the Technical University of Athens in 1935, did graduate work at Berlin-Charlottenburg University.

Military Service

* Corporal, Artillery of the Greek Army (1940-1941).
* Chief of the National Resistance Group (1941 - 1945).& Captain in the Greek Army at the time of Greece's liberation (1944 - 1945).

Married

Emma Scheepers, April 30, 1940; children: Evanthia, Calliope, Euphrosyne, Apostolos.

Died June 28, 1975, after a long period of illness

Honorary degrees

Swarthmore College Pa., U.S.A., 1962 (LL. D.)

Wayne State University, Mich., U.S.A., 1964 (D.H.)

Mills College, Calif., U.S.A., 1964 (LLD.)

N. Michigan University Mich, U.S.A. 1965 (1.H.D.)

Detroit Institute of Technology, Mich., U.S.A. 1966 (D.Sc.)

University of Rhode Island, R.I., U.S.A., 1966 (D.F.A.)

University of Pittsburgh, Pa., U.S.A, 1967 (D.Sc.)

The University of Michigan, Mich., U.S.A., 1967 (LL.D.)

Tulane University, La., U.S.A., 1968 (LL.D.)

Kalamazoo College, Mich., U.S.A., 1968 (LL.D.)

Marietta College, Ohio, U.S.A., 1969 (D.Sc.)

Case Western Reserve University, Ohio, U.S.A., 1969 (L.H.D.).

Worked

Chief Town Planning Officer, Greater Athens Area (1937 - 1938).

Head, Department of Regional and Town Planning, Ministry of Public Works, Greece (1939 - 1945).

Taught

* Lecturer and Acting Professor of Town Planning, Technical University of Athens(1939 - 1943).
* Visiting lecturer at the Universities of Chicago, Dublin, Harvard, Michigan, New York, Oxford, Princeton, Yale, Massachusetts and Georgia Institutes of Technology, Swarthler and Trinity Colleges.
* Professor of Ekistics at the Athens Centre of Ekistics, Athens Technological Organisation.

Served

* Under-Secretary and Director General of the Ministry of Housing and Reconstruction, Greece (1945 - 1948).

* Minister - Co-ordinator of the Greek Recovery Program .
* Under-Secretary, Ministry of Co-ordination (1948 - 1951).
* Member of the Greek delegation, San Francisco Peace Conference (1945).
* Representative of Greece to France, England and the
* United States of America on the problems of post-war
* Reconstruction (1945).
* Head of the Greek Delegation at the U.N. International
* Conference on Housing, Planning and Reconstruction (1947).
* Head of the Greek Delegation at the Greco-italian War
  Reparation Conference (1949 - 1950).

Consultant

* Consultant for United Nations on Asian Highway; Housing in India and Algeria; Housing and Planning in Skopje, Yugoslavia. Food and Agriculture Organisation of the United Nations.
* Land and Water Use Survey, Kordofan, Sudan.
* A International Bank for Reconstruction and Development on housing in Jordan.
* Inter-American Development Bank ,development of the River Plate Basin.

Researcher

* City of the Future, Human Community ,The Ancient Greek City and the Capital

Elected

* Corresponding Member, Deutsche Akademie for Landesplanung (1937).
* Honorary Corresponding Member, Town Planning Institute of Great Britain (1947).

* Chairman, United Nations Working Group on Housing Policies, Geneva (1948).
* Honorary Corresponding Fellow of the Royal Incorporation of Architects in Scotland, Glasgow (1964)
* Member of the International Committee, The Institute on Man and Science, New York (1965).
* Honorary Member, Industrial Designers Society of America (1970).
* President, Doxiadis Associates Int., Consultants on Development and Ekistics, Athens, Greece,
* Chairman, Board of Directors and Chief Executive Officer, Doxiadis Associates Inc., Washington .
* Chairman, Board of Directors, Doxiadis Urban Systems Inc., Washington D.C.
* Chairman, Board of Directors, Athens Technological Organization, Athens, Greece.
* President, Athens Centre of Ekistics, Athens, Greece.

Awarded

* Sir Patrick Abercrombie Prize of the International Union of Architects (1963).
* Call de Orop (The Mexican Gold Medal) Award of the Society of Mexican Architects (1963).
* Award of Excellence, Industrial Designers Society of America (1965).
* Aspen Award for the Humanities (1966).

Books and Publications

* A Plan for the Survival of the Greek people;
* Ekistic Policies for the Reconstruction of the Country with 20-year Program (1947).
* Dodecanese (prepared in co-operation with several scientists), 2 volumes (1947).
* March of the People (1948).our Capital and its Future)
* Architecture in Transition (in English, French, German, Japanese, Portuguese)

* The New World of Urban Man
* Urban Renewal and the Future of the City (1966).
* Campus Planning in an Urban Area. A master plan for Rensselaer Polytechnic Institute)), prepared by Doxiadis Associates, Praeger Publishers, Inc., New York, 197 1.
* The Great Urban Crimes We Permit by law, lycabettus Press, Athens, 1973.
* ,Anthropopolis, City for Human Development, Athens Publishing Center, Athens, 1974.
* Ecumenopolis, the Inevitable City of the Future, in collaboration with . Papaioamou. Athens Publishing Center, Athens, 1975.
* Building Entopiao, Athens Publishing Centre, Athens, 1975.
* Action for Human Settlements, Athens Publishing Centre, Athens, 1976.
* Ecology and Ekistics, edited by Professor Gerald Dix, Published by Elek Books Ltd. London 1977
* Numerous articles in Creek and international journals

Major Projects

Entire application of his theories on Ekistics, C.A. Doxiadis studied, programmed, planned and designed, in collaboration with his colleagues, a great number of human settlements and other development Projects. These projects cover several fields, like rural settlements, agriculture and irrigation, industrial settlements, manufacturing, power and public works, commerce and . tourism, transportation and communications, housing, urban renewal and development of new cities. etc.

Some of the more significant projects are

Brazil	*	Plans and programs for the Greater Rio de Janeiro (State of Guanabara).
Cyprus	*	Tourist Development Studies and Master Plan for the city of limassol.
Ethiopia	*	Axum Cathedral.
France	*	Development Study for the Mediterranean Region.
	*	Sub-division of France into major program and development regions.
Ghana	*	The new city of Tema for 500,000 people.
		& Plans and Programs for the Accra-Tema region.
Greece	*	Tourist Development Studies for the Western Coast of Greece, and the Athens Coastline.
	*	Master Programs and Plans for the Island of Rhodes, Ioannina, Serres, and other cities.
	*	Designs for the Pierce College Campus, in Aghia Paraskevi, and a 500-bed hotel in Thessaloniki.
	*	New town of Aspra Spitia.
Jordan		& Tourist Development Studies for the South Aqaba Coastline.
	*	Tourist Development Studies for the Caspian Coast.
Iraq	*	National Housing Program.
	*	Plans and Programs for Baghdad and other major cities.
Italy	*	Tourist Development Study near Otranto.
Libya	*	National Housing Program and National Transport Plan.
	*	Regional Program and Plan for towns and villages of Cyrenaica.
	*	Planning of Marsa el Bregah and the city of Beida.

Pakistan	*	Plans and Programs for Islamabad, the new capital.
	*	Greater Karachi Resettlement Program for 500,000 people.
	*	New Campus for the University of Punjab, Lahore, and the Agricultural University of Udaypur.
Saudi Arabia	*	Plans and Programs for the capital city of Riyadh.
Spain	*	Plans and Programs for the development of industrial poles in E. and W. Australia.
	*	Tourist Development Studies for Australia
	*	Regional Plans for the province of Culpuzcoa and the island of Tenerife.
Sudan	*	Plans and Programs for the Greater Khartoum and for Port Sudan.
	*	land and Water Use Survey for a 90,000 sq.km. savanna area in the Cordovan province.
Syria	*	Master Plan of the University of Aleppo.
	*	Plans and Programs for the cities of Hama, Homs and Selemiyah.
	*	Urban Renewal and Development Plans for Eastwick, in Philadelphia, Pa; louisville Riverfront, Hampton Downtown, Va. Georgetown Riverfront, Washington D.C; Miami Downtown, Fla.; Downtown Columbia (S. Carolina).
	*	Plans and Programs for Lusaka, Kafue and other cities.
	*	Program for the resettlement of homeless people.
	*	Survey of the Trans-Asian Highway linking the Middle East with South-East Asia.
	*	African Transport Plan.
	*	Programs for the development of the River Plate Basin involving Argentina, Bolivia, Brazil, Paraguay and Uruguay

EKISTICS as a concept is derived from the Greek word ΙΑΟΙΚο (home) and the verb 01Ki4W" (settle down). Ekistics is a Science of Human Settlements, denotes the interrelationship of man with his environment. Ekistics brings together not only architect, the engineer and the town planner, but also on an equal footing, the sociologist, the economist, the administrator, political scientist, the geographer, the mathematician, and other artists and scientists. Although by far the greatest investment every community, past or present, has gone to its houses, buildings, roads, and other permanent structures and works, co-ordinated, rational result has rarely been attained especially during the last centuries. Ekistics tries to help this situation creating an appropriate science and by developing research, planning and action on sound methodological foundations. EKISTICS as a discipline is taught at the Athens Centre of Ekistics, Athens Technological Organisation. With participants for many disciplines and many lands, representing different cultures and diversified backgrounds, the ACE transmits a system body of knowledge to the ekisticians of the future. lectures on Ekistics have also been delivered at many universities an institutes, and to professional groups in many countries. EKISTICS in action is applied by Doxiadis Associates, a firm of Consultants on Development and Ekistics created by Doxiadis With headquarters in Athens, Doxiadis Associates have worked since their establishment in 1951 in five continents and thirty-six countries.

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