MODEL TOWN IN BURMA

by

Aw Taik Moh

B.Sc.(Eng.) Rangoon 1954

Submitted in partial fulfillment of
the requirements for the degree of
Master of City Planning at the
Massachusetts Institute of Technology

July 1957

Signature of Author

Certified by

Accepted by

Chairman, Departmental Committee
on Graduate Students
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290 Massachusetts Avenue  
Cambridge 39, Massachusetts  

July 9, 1957  

Professor Frederick J. Adams  
Head, Department of City and Regional Planning  
School of Architecture and Planning  
Massachusetts Institute of Technology  
Cambridge, Massachusetts  

Dear Professor Adams:  

I herewith submit my thesis, entitled "Model Town in Burma," in partial fulfillment of the requirements for the degree of Master of City Planning.  

Sincerely yours,  

Aw Taik Moh
ACKNOWLEDGMENT

The author wishes to express his sincere gratitude to the faculty members of the M.I.T. City and Regional Planning Department whose guidance and stimulating criticisms have helped him in producing this work. In particular, he wishes to thank the following:

Professors Frederick J. Adams, advisor for this study, and Roland B. Greeley, both of whom have assisted the author to realize some of the planning problems that can be met in the development of his home country.

Professors John T. Howard and Kevin Lynch for their invaluable assistance, criticisms, and encouragement throughout this study.

In addition, the author wishes to acknowledge his gratitude to:

The National Housing And Town & Country Development Board, Government of the Union of Burma, for the state scholarship awarded to the author for advanced study in City Planning.

U Kyaw Sein, Chief Engineer, and colleagues of the National Housing Board for their cooperation.

His friends and classmates in the Department of City and Regional Planning.
SUMMARY OF COMMENTS BY JURY

1. General scope and organization good, although the comment was made that Chapter I (Housing Problems and Conditions in Burma) might better have followed Chapter III (Rangoon - Past and Present).

2. The housing and planning problems facing Rangoon, together with the physical, cultural and economic background against which these problems occur, were well described. Variations in the style of writing suggested that some passages had been quoted without identification as such.

3. The most serious questions raised concerned the plan for the new town of Thamaing. The consensus was that the plan followed too closely Western concepts of neighborhood organization and functioning, rather than expressing the differences in cultural, technical and climatic patterns described in the earlier chapters. Other questions related to the area devoted to the Business and Cultural Centers, which was considered somewhat excessive, and to the lack of a coordinated system of pedestrian circulation - both within the neighborhoods and in the community as a whole.
TO MY WIFE

TAY KAR GIOK
(KHIN KHIN CHO)
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ABSTRACT OF THESIS

The objective of this thesis is to evolve a general planning scheme for new satellite towns in Burma, and to test this scheme by applying it to a specific site in suburban Rangoon.

The first step is to analyze background information and problems of the country and its working population - housing, traditions, culture, economy, and the present and proposed land use patterns of the capital city of Rangoon.

Then the thesis proceeds to study the specific requirements of the individual community, and on the basis of this, to work out minimum standards for neighborhood and town developments. The principle of designing the community as a cluster of neighborhoods is accepted, and the design criteria are then evolved within the general framework of this principle.

The specific planning scheme is suggested in the form of a general land use and circulation plan for a community of 45,000; and a more detailed site plan for a "typical" neighborhood of 1,000 families or about 5,000 persons.

The analytical studies and the standards derived are useful as suggested lines of approach, and as indications of the directions which might be taken to modify western standards so as to reflect Burmese conditions. In most instances they fall far short of the kind of detailed study which would necessarily precede
methodical determination of acceptable standards for Burma—a process which could presumably be carried through adequately in that country.

Similarly, the schematic plan presents ideas which may well be suitable for refinement and adaptation to specific site conditions; but it has not been worked out in sufficient detail or with sufficient knowledge of specific local conditions to suggest that it may be ready for effectuation.
INTRODUCTION AND OBJECTIVES

One of the most important and pressing problems now facing Burma is housing shortage. Extensive damage was done to houses and other buildings during the last war and also during the post-war insurrection. Building activity had almost come to a complete standstill. Meanwhile the population has increased and continues to increase, and the state of insecurity in the country has led to a large movement of people into the towns, many of which have more than doubled their population in the last few years. The people live in great hardship and in unhealthy conditions.

The National Housing And Town & Country Development Board (NHB), created in 1951, has since been the only public body responsible for coping with the acute housing problem, and also on the other hand, as the name implies, to implement the development programs under the "State Welfare Scheme." One of the most significant strides toward the realization of the Scheme was the undertaking of the huge "Industrialization Program" which has its priority parallel to the National Housing Plan.

The Industrialization Program calls for a planned economic development of the country. No economic or industrial development should be advocated for itself, without the human element given full consideration in the healthy enjoyment and equitable distribution of the wealth by such development.

The National Housing Board has, to a good extent, been successful in its attempt to provide public housing for the middle-
income groups. But thus far housing for the poor industrial working population has not been given any thought or consideration. Even if it did exist, it was of the most unimaginable, substandard, unhealthy type scantily provided by the individual industrial enterprises. Can anyone doubt that environment affects efficiency? Is it not reasonable to suppose that a workman will desire to work where he can find the best living conditions? How can a great industrial zone be successfully planned without consideration to the element in the housing of its workmen?

It is therefore the earnest desire of the author to seize this opportunity to work out a housing development plan for the growing numbers of population and industrial workers, in keeping with both the National Housing and the State Industrialization Welfare Programs.

It is hoped that the design principles developed in the course of this study will be useful in the future, as the goal of the government "Country Development Program" is to develop a "model village" in each of the 200 townships of the Union. Therefore, it is proper to first and foremost evaluate the existing conditions and problems involved.
CHAPTER I

HOUSING PROBLEMS AND CONDITIONS IN RANGOON

A study of the present housing situation in Burma will reveal the basic causes for its inadequacy and will thus indicate the possibilities of solution. The common factors directly related to housing problems are: migration, natural growth of population, and haphazard growth of communities.

Apart from the above, Burma is faced with the following problems: (a) housing shortage and high proportion of substandard dwellings, (b) unbalanced degree of urbanization, (c) low level of per-capita income and less man-hour productivity: a major part of the income being spent on the basic essentials of life, (d) limited capacity of building construction and the building material industry for lack of methods, skilled labor and machineries, and (e) lack of building materials due to limited supply of available resources resulting in a low standard of building construction: the available resources being mostly used for other important development projects of national importance. 1

World War II brought enormous destruction to housing in Burma, and the houses that survived the war also suffered due to neglect. Rangoon, the capital city of the country, lost about 33% of its houses while its population has increased tremendously.

Shortly after the attainment of Independence, the country was faced with nation-wide insurrection which further delayed the consideration of the housing question. Thousands of refugees from the rural areas fled to nearby towns for shelter and protection. This migration of the rural population to urban centers aggravated the already acute problem of housing in these areas, where large numbers of people from the countryside have remained after the end of the war because they offer better facilities and business and employment opportunities. In addition to this, there has been a rapid natural increase in population. As a result, unsightly huts, unauthorized structures and unplanned communities, slums, have sprung up all over available vacant land in the towns.

**Characteristics of the Slum Districts**

The principal characteristics of the slums in Burma are the absence of streets, water or sewage disposal facilities, poor ventilation and advanced state of deterioration of structures and extremely dense population. In general, the slums in the cities are the ones in the worst sense. These houses are shacks built of any material at hand, such as old corrugated iron, bamboo mats, thatch roofing and old lumber, averaging less than 300 sq. ft. of floor area. The population density in these slum areas is often about 400 persons per acre, indicating extreme overcrowding.

**Housing Problem in Greater Rangoon**

In pre-war time, the problems of housing were mainly due to social relationship and customs, economic condition and the colonial
rule in the country. With the influx of population and the consequent growth of the city, the privileged well-to-do class of people had always occupied the best part of the city, having sufficient open spaces, low density of population, and with many facilities of town life, such as good sanitation, drainage, water supply and communication. On the other hand, the poorer people were forced to occupy lands lacking such amenities. Often, the poor class residential areas were sited with the factories, resulting in mixed development which is dangerous from the standpoint of public health and safety. At present, these conditions still exist in many parts of Rangoon.

During the war, with the destruction of houses, streets, water supply, sewerage, and other essential services of urban life, the city ceased to function. In post-war period, the living conditions became worse because of the delay in undertaking the work of rehabilitation.

One of the major housing problems at present in Rangoon is the high occupancy rate, the rate of occupants to the number of habitable rooms. "Doubling," or even "tripling," is not unusual under these circumstances. There is an acute shortage of rooms and it has been found from a sample survey in Central Rangoon\(^2\) that the low income groups are paying an unreasonably high percentage of their income as rent for very unsatisfactory accommodations; 33.6\% of the population surveyed paying 20\% or more of their income for gross rent.

\(^{2}\) Housing and Social Survey, NHB, Rangoon, 1954.
It must be borne in mind that the average Burmese family cannot afford more than 12% of its income on rent. The rents of the higher income groups, however, are in a more reasonable proportion to their income. Such a high rent means an economic burden upon the people and in most cases they have deprived themselves of the basic essentials of life.

The survey also indicates that a wide variety of both employed and self-employed families can and do pay a substantial rent; that a rental of from 30 to 40 Kyats per month may be expected from low-income groups in a government operated housing project. Recent experience in housing costs indicates that housing can be built which can be amortized over a reasonable period on a sound rental plan predicated on such average rents. Hence, due to lack of building industry and the high cost of building the housing, public housing would be the only relief or major solution to the housing problem so long as the present economic state of the people continues to prevail.

When the people could not afford to pay such high rents, they either overcrowded in Central Rangoon or moved to suburban areas where the rents are lower but making commuting to work necessary in most cases. All these factors contributed to the worsening or birth of slums in Rangoon.

Map 1 shows the three parts of Greater Rangoon, the housing

3. 4.80 Kyats equivalent to U.S. $1.00.
MAP SHOWING THE THREE PARTS OF GREATER RANGOON, YANKIN TOWN AND MAJOR EMPLOYMENT CENTERS

MAJOR EMPLOYMENT CENTER
MAIN BUS TERMINAL
SUBURBAN BUS ROUTES

SCALE IN MILES

MAP 1
situation of which is discussed below:

(a) Central Rangoon - Lower Part of Greater Rangoon

As planned by Fraser, Central Rangoon consists of sub-blocks of size oriented in the north-south direction. The buildings here, therefore, either face east or west. The population density is about 168 persons per acre, while the maximum population density was found to be 299 persons per acre in only the survey area. It is estimated that outside this area and in certain parts of Central Rangoon, the net residential density would be over 500 persons per acre. The acute shortage of housing accommodations is evident from the fact that the occupancy rate in the Central Area is more than four (Table I).

Due to overcrowding, the average floor space per person is inadequate from the public health standpoint. It is found to be as low as 43 sq. ft. in a 7-person owner occupied household.

The survey reveals that the lowest income group families are small and that there is a great demand for greater floor space per person and for a greater number of rooms as the income increases. The wide variations in such income groups and household sizes suggest that there should be a variety of houses and flats to suit the needs of different households rather than a standard dwelling size designed for the average family. The same survey also shows that 1,556 (17%) households out of 9,142 occupy single-room dwellings. Again, 1,147 single-room dwellings, or 73% of the
<table>
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<td>100</td>
<td>20</td>
<td>373</td>
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<td>120 - 159</td>
<td>140</td>
<td>28</td>
<td>625</td>
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<td>160 - 199</td>
<td>180</td>
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<td>200 - 249</td>
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<td>250 - 299</td>
<td>275</td>
<td>55</td>
<td>191</td>
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<td>300 - 399</td>
<td>350</td>
<td>70</td>
<td>234</td>
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<tr>
<td>400 - 499</td>
<td>450</td>
<td>90</td>
<td>89</td>
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There are 6,332 tenant-households with incomes varying from K 80 to K 499, of which 2,125 (33.6%) pay 20% or more of income for gross rent.
total, are occupied by 3 or more persons. From the point of view of health, privacy, and sex segregation, the single-room dwellings, except for bachelor quarters and childless families, are not advocated in any way.

Also, 61.9% of the dwellings may be classified as durable, while the remaining 38.1% as non-durable. Most of the houses surveyed, and as a matter of fact, in Rangoon, are 2- or 3-story and the facilities of these dwellings are inadequate for even an average standard of living. Every five out of ten such dwellings have their source of water supply outside, only one third use electricity for lighting, and only about half of them are equipped with flushing latrine (Table II).

Lack of open space, children's playgrounds and community services, mixed development, slums, traffic problem, and so forth, have created an atmosphere detrimental to good living environment.

(b) Middle Part of Greater Rangoon

This is probably the best and most pleasant part for housing, with its gentle undulations. In this area the gross density of population is as low as 20-50 persons per acre with 1-10 houses per acre at many places. The big bungalows and detached houses, generally 1- or 2-story in height, are sited in spacious lots with large gardens. There are many permanent buildings made of brick, but there are also semi-permanent structures built of materials like brick and timber whose lives are comparatively shorter. Water supply,
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<td>4.058</td>
<td>44.4</td>
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<tr>
<td>In yard or carried</td>
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<td>5.084</td>
<td>55.6</td>
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<tr>
<td><strong>ELECTRICITY</strong></td>
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<td></td>
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<tr>
<td>Electricity used</td>
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<td>3.165</td>
<td>34.6</td>
</tr>
<tr>
<td>No electricity</td>
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<td>5.977</td>
<td>65.4</td>
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<tr>
<td><strong>TYPE OF LATRINE</strong></td>
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<tr>
<td>Flushing inside dwellings</td>
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<td>4.896</td>
<td>53.5</td>
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<tr>
<td>Others</td>
<td></td>
<td>4.246</td>
<td>46.5</td>
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surface drainage and sewage disposal are, on the whole, satisfactory.

There are still large portions of this area vacant, and it has been proposed that future development in the area should be such as to preserve the present character of a low density residence zone.

(c) Upper Part of Greater Rangoon – Suburban Areas

This part consists of mostly small settlements of a temporary nature. Many cottage industries are to be found in these communities and the water supply and sewage disposal methods are primitive.

For analysis of any urban area, the problems of urban-cum-rural housing in these suburbs and the region should be weighed. In the future, these areas may be only an extension of the original city, as decentralization of population as well as industries can only take place with the development of the suburban fringe and the planning of the region which, together with the city, should be an economic and organic whole.

(d) Riverine Sporadic Developments and Other Small Housing Areas

In the past, houses and huts similar to the rural housing in Lower Burma were put up in a sporadic manner in small areas along rivers and creeks. These dwellings had all the characteristics of spacious rural housing. But with the extension of the cities and the demand for more living space, the building lots were divided into several smaller lots, where new houses or huts were constructed, or dwellings became more and more crowded with the increase in household size. In the long run, the result is the
present confused, amorphous state, with inadequate sanitation and public services and with very poor living conditions. The characteristics of these small settlements, which were originally fishing or agricultural villages, slowly disappeared with the ages. In the present state, these settlements are just immense, boundless, expressionless village slums on the city periphery.

Workers' Housing

There can be no doubt that the third fundamental necessity of life has always been important, but it is assuming in Asian eyes greater significance as the full effects of good housing, environmental sanitation, and cooperative neighborhood living on the life, health, character, and contentment of the individual and family, and particularly the growing child, are coming to be appreciated. Housing is further of tremendous significance in the development of a people from the economic, financial, cooperative, occupational, employment, and engineering standpoints. It is needless to elaborate the progressively constructive role that good, sanitary, commodious housing, with social services within easy reach of the residents, is going to play in the life of the Burmese people, or of other peoples of Asia, including the ever-increasing number of industrial workers, now mostly living in crowded and insanitary conditions, often verging on unhealthy slums.

Housing is a much wider social problem than labor welfare and has a very important bearing on the well-being of the worker
and his family. The present low level of housing building activities, particularly of durable houses made of brick and wooden planks, together with the retarded rates of building during the war and occupation, has developed an accumulated shortage in workers' housing. Many old houses are now being occupied by twice the number of workers they were meant for. Damaged houses have been repaired but are still unsuitable for the safety and health of the workers occupying them. Generally speaking, the type and size of an average worker's house leave much to be desired. The construction of the house in some cases exposes it to the risk of fire and the actual risk of bad sanitation has been increased in recent years.

The industrial housing for the workers near the rice and saw mills along the lower part of the Hlaing River, for instance, should be given immediate attention. New industries in Greater Rangoon and other cities will mean greater job opportunity in these places. Consequently, an accelerated effect on the present trends of migration to the towns and housing demand may be expected. The unnecessary congestion in the core area should be averted by decentralization of industries and a sound distribution of population and employment. This can be achieved by building satellite towns in the suburban areas, where better living conditions and recreational facilities can be found. Of course the building alone of a group of so-called "model" houses or even "model" towns would not effect the removal of bad quality houses or slums in the city.
The only way by which such conditions can be ended is through the enactment of laws which will compel the removal of these nuisances. This is not theory but the result of the experience of many cities.

Post-War Attempts in Housing

It is interesting to note the accomplishment of the role of Union Government in the field of housing and planning. Despite many handicaps, such as lack of technical personnel — architects, engineers, health experts, sociologists, economists, planners, surveyors, and even draftsmen, high cost of building materials and construction, the National Housing Board has been able to carry out the national development program by the construction throughout the country of tens of thousands of dwelling units and urban redevelopment projects, the building of industrial plants, public institutions such as research centers, libraries, schools, and colleges. City and Regional Planning has been introduced in the country for the first time in history and its importance is recognized by the government. However, the public needs to be educated in this field.

On the other hand, the project of the new satellite town of Yankin (Map 1) designed for a population of 20,000 (or 5,000 family units, of which about a thousand have been built) did not prove to be very successful.

The town is located on open vacant land, partly reclaimed, about six miles from Rangoon city and assumes the character of a
"bedroom town," having a net residential density of 100 persons per acre. There is entirely no appreciable business activity or employment concentration within 2½ to 3 miles radius. Although rents are reasonably low, that is, 10% of the family income, those occupying them are mostly either of the low- or high-income groups. Apparently, the first group moved into the area either out of economic necessity or because they needed a living quarters very badly. The second group, because of their high income, either owned automobiles or were able to shoulder the burden of commute-to-work fares and who sought to escape the unwholesome environment of the central area, generally occupied the duplexes or one- and two-story houses.

The medium income people, who, generally speaking, have settled in a favorable area within a short distance of their work-place, are hesitant to even consider the acceptance of the offer of public housing in the new town, which means adjusting oneself to new community life and also an extra or increased commuting cost.

Other drawbacks are: the town residents have to walk a good distance of a few hundred yards to reach a bus line; unsatisfactory conditions of the buildings resulting from poor workmanship as evidenced from the numerous complaints about leaks in the roofs and windows during rains. The building design itself is of low quality; the kitchen, bedroom, and bathroom are too small. This is a good example of the adverse effects a bad dwelling design has upon the overall community planning.

Finally, it must be remembered that Burma has not reached
the automobile age as yet, and that public transportation is in-
adequate and quite expensive. The author therefore takes the view
that housing for the people must be provided in the very close
vicinity of their work-place, within easy reach by walking, cycling,
or a 5 to 10 minutes' bus ride. A long journey from home to work
is very taxing, inconvenient, unhealthy, and a great nuisance under
tropical conditions, especially on a hot summer or heavy monsoon
day.
CHAPTER II

TRADITIONS

Before a proposal of housing is made for any country, it is necessary to study the physical, social and economic requirements, customs, and culture, and the traditional ways of house planning and construction of the country. This chapter is devoted to the study of the traditional house and its construction and the pattern and basic requirements of a typical Burmese village community.

Geographical Background

Burma is in the tropics (Map 2). It lies between the 10th and 28th parallels of latitude and extends from 92 to 100 degrees East longitude. The climate is generally hot, though somewhat modified according to altitude, which ranges from the flat Delta, the beautiful Shan Plateau averaging 3000 ft. above sea level, and the almost impassable mountains in the north, northeast, and northwest, which rise from 6000 to 8000 ft. and occasionally to over 10,000 ft.

Owing to the southwest monsoons, the seasons are the rainy season from middle May to October, and the dry season for the remainder of the year. The highest temperatures are reached just before the rainy season commences. In Lower Burma, the temperature will rise from about 65° in December to a little above 98° in May. Rainfall comes only with the monsoons and varies from 200 or more inches on the coasts, about 100 inches in the Delta district,
MAP OF BURMA SHOWING ANNUAL RAINFALL
AND SELECTED CENSUS TOWNS

MAP 2
and 35 inches in the dry zone centered on Mandalay.

**Culture and Religion**

Burmese culture is a culture of contrasts perplexing to administrators used to patterns of European or other Asiatic cultures. Although the everyday life of the people is simple, a large proportion of the men in the villages learn to read. The official religion is Buddhism, and the literacy is associated with religion and the reading of sacred texts. The literacy and sophistication of the Burmese belie the simplicity of their economy, not a money economy, though there is money. Their personal autonomy belies the patterns of interdependence of young children on parents and old parents on children. They are a people without great poverty or great accumulated wealth.

Predominantly rural, the Burmese live in villages that are practically autonomous, with very little crime and litigation. Their lives, like their villages, are centered about a monastery, which gives their private lives and the life of the village focus and rhythm. Most of the men are literate; the women have a great degree of responsibility in agriculture and in domestic and monetary matters. The land is rich, and wants are simple; there is much time for festivity, dancing, races, and dramatic performances. Work is performed without compulsion, and there seems little evidence of anxiety. Building a fortune is not a pattern offered to the individual. The guiding principle is to increase in merit
so as to be reincarnated at a higher stage of development, and
merit results not from accumulating but from giving, not through
inheritance but through one's own achievement, not from anxiety
but from doing good deeds, and not from charting new paths into
the future but going along a known route.

The first effective contacts with Western civilization were
commercial. Teak was exported, cotton goods imported. Entry into
the 19th century money economy meant a change in the level of as-
piration of the Burmese, who had to learn to want and value material
things instead of concentrating on immediate states of being, to
spend their money on foreign goods and their labor in making money
to buy these goods rather than devoting their small traditional
surpluses to religious gifts that would increase their personal
merit.

The Burmese are absolute believers in personal worth and in-
violability; they do not try to impose their religion, their ways
or knowledge on other populations. If such groups are "segregated,"
it is because they also prefer their own customs. If they have
their own chieftains, it is because there are such autonomous units
throughout Burma; all rule is by such personal allegiance, from the
unit of the village circle to the association of palm-sugar manu-
facturers. 1 All status, except that of the king, is achieved, and
achievement is open to anyone through accumulation of merits,

1. Furnivall, J.S. "Colonial Policy and Practice." Cambridge,
strengthening what they call 'kan', a term by which the outside world might understand personality or personal potency or luck; and with a strong kan, education can lead to status through attainment of office, or by way of the monastery. Potentially, all men are born equal, whatever their race, allegiance, or religion.

It is impossible to speak of the life of the Burmese without speaking of their religion. Traditionally, the monastery has been the focus of village life so far as social and religious activities are concerned. The duty-day services at the pagoda, which the villagers with their families attend every eight days in festive array and with festive foods, punctuate the Burmese month, providing highly social occasions.

The great festivals are religious. The Buddhist "Lent," a period when all festivities, including wedding celebrations, are interdicted and meals of the devout are limited to one a day, color a fourth of a year's life. The great festival marking the end of the "Lent" is the occasion of brilliant occasions.

Religion affects the standard of living. The best way of spending money, the expression of a "high" standard of living, is to give, as an act of merit; not for the sake of others, but for one's own enhancement, for the strengthening of the kan. If there is enough money, one builds or donates for the building of a pagoda; for less, one can establish a shelter near a pagoda for

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the devout, or a rest house on the mountainside, or merely a small roofed structure where jars of water can be kept for the thirsty travellers who pass. Gifts are occasionally given to monasteries by simple villagers, and food is given daily to the mendicant monks. Excess money can be spent on other deeds of merit, such as buying and liberating fowl; and since this is directed first of all at the preservation of life, it is not "interference," but a deed of great religious merit for the Buddhist. Spiritual merit is accumulated, rather than material wealth.

Health and well-being, which are aspects of personal potency, are also bound up with religion. There are two religious systems: besides the official Buddhism, there is the relation with the "nats," beings who are easily offended and have to be propitiated to prevent hostile acts. These two religious systems, the official Buddhism and the unformalized religion of nats, are the basis of concepts about health and illness, misfortune, well-being, potency, and achievement. The kan, the sum of personal merits and demerits, has sometimes been translated into English as luck. But there is no such thing as luck among the Burmese; there is only the deserved state. People are born in favorable or unfavorable circumstances, but this is no cause for resentment or envy. It is the inevitable outcome of the previous existence, and the individual can change it. A really great act of merit, like building a pagoda or monastery, can help a man to skip several existences in his progress toward
delivery from incarnation.

The monastery and the monks are the center around which the village life lives. The mendicant monks walk daily about the village, receiving their gifts of food. And in every household, the day's supply of food includes a portion for the monks. There is no compulsion or persuasion in this; like all giving, it is done voluntarily and with enjoyment. To give is a merit. In Upper Burma, every village has its monastery; but at present in Lower Burma, where many of the new villages have a shifting population of tenants and laborers, only about a fourth of the villages have monasteries.

Traditionally, every Burmese boy has to join the society of the monks and assume the yellow robe, if only for a few days. Without this initiation, a man's kan would always be one-sided, that is, his ill deeds would swell the sum of his demerits, but his good deeds would not be counted as merits. There is a marked preference for male children. Only a male can be initiated in youth into the Buddhist priesthood, and the sponsorship of the ceremony is an important deed of merit on the parents' part. Parents who have no sons of their own may sponsor the initiation ceremony for a boy whose family is poor and unable to afford the expense of a proper rite. Some stay on after initiation, taking permanent vows, or vows for a period of years; others return later in life. The monks form a powerful group in Burma. Traditionally,
the education of the males is in their hands, education covering literacy as well as principles of conduct and interpersonal relations, and of living in general.

The monks live mainly a life of meditation in monasteries, the monastic life being one of abstinence.

At the time when the boy joins the monastic order, girls undergo an ear-piercing (ear-boring) during a great three-day celebration, which marks their official entrance to the status of womanhood. This is the only festival in a woman's life. As regards the social structure of Burma's variegated peoples, the family pattern seems to be uniform, with some variations among the isolated tribal groups. Children can set up separate homes after marriage, depending upon means. They also stay with parents in the same home. In the Burmese family, usually the boy goes to stay with the girl in her father's home for some time after the marriage. Parents take care of their children and children support parents in old age as a matter of course, though emotionally, the individual appears to be self-centered. This accepted interdependency between parents and children contrasts with the British pattern, in which parents owe support to children, and self-esteem is tied up with independence in old age.

The Burmese do not have many children. A family of five or six live births is unusual. Everyone does want to have children. But

3. Ibid., p.57.
this does not arise from a desire to continue the family name, since, in the Burmese tenets of reincarnation, continuity is only personal continuity. There are no family names, traditionally, among the Burmese; neither is status derived from the family. It is the personal name, based on the individual's day of birth, that is important. The Burmese are pictured by all writers as highly sociable, valuing companionship, conversation, and sheer human noise.

Impact of Western Law on Village Administration System

When the British administrators came to Burma, they found a dual system of government; there was a king who ruled the people at a distance through an official administration which emanated from his court out to the local districts, and there were hereditary headmen who ruled by personal authority. The king had certain customary powers which were respected; beyond these, he had no means of enforcing orders. The traditional administration had not been seen - as was the new - as an external authority enforced from above, nor had the traditional system been regarded as interfering with the daily life of the people.

The headmen were hereditary chieftains of a group of people who happened to live in adjoining villages, the so-called "circle." They governed people, not a locality, so that sometimes people in the villages who had come from elsewhere, owed allegiance to another, and were not under their authority. Again, the group of villages

4. Ibid., p. 58.
were thought of as having always belonged together and their chief as having been born to them. Their laws also belonged to them and were part of village life and structure; they were followed as inherent to a way of life, not through imposed obedience to authority. The headman guided and arbitrated; he did not coerce. He had no policemen; they were not needed here.

To Western eyes, the Burmese system appeared confused, areas of authority seemed undefined, and the law seemed neither organized nor binding. The British administrators proceeded to make changes which they thought were in accord with the patterns already present, with a view to creating uniform, rational arrangements. They found it confusing that some headmen were in charge of only one village, while others were responsible for a varying number of villages. They graded the headmen into three grades according to the number of villages under their jurisdiction; and they did away with "irrational" hereditary elements and appointed the headmen as salaried government officials. They thus changed personal authority to territorial authority, placing the people as local residents under the headman. The circle, based on organic relationships between people, was replaced by the district, a local administrative unit based on space.

This system encroached upon the "autonomy of the circle by interfering with its internal administration;" however, the head-

5. Ibid, p.52.
men unofficially retained much of their original authority, since it was theirs by right and tradition. By the end of the 19th century, these discrepancies between assumed form and actual practice had been administratively corrected. For the sake of efficiency, the district - the old circle - was cut up into villages, and the village became the largest self-governing unit. New duties were imposed upon villagers and headmen, heavy penalties for non-compliance were introduced, but no new rights were conferred. The village itself was now converted from a "social and residential unit into an administrative unit." A number of villages make a township, which is administered by a Township Officer, and a number of townships form a District under the management of a District Commissioner. All these officers are appointed by the government.

Rural Predominance

The first postwar census, taken in February-March 1953, revealed that the population of 253 towns in Burma numbered 2,902,000. According to the 1931 census, only about 12% of the peoples of Burma, that is, 1,667,000, out of the then population of 14,650,000, lived in towns or cities of more than 5000 persons.

Burma is an agricultural country, a land of villages and rural areas where 85% of her population resides. These people rarely lived in isolation in the fields, with the exception of some, who lived

6. Ibid.

together in suitable and habitable places near the fields where they cultivate. The feeling one gets while traveling from one end of the country to another is that Burma is a vast countryside. Even in the capital city of Rangoon, with a present population of 737,000, and in other principal cities like Mandalay, Moulmein, Bassein, or Henzada, except for the densely-built and crowded bazar of shopping areas, a large part of the cities appear little better than rural clusters of houses with civic services and amenities not much superior to those in the villages, and withal more crowded. Also, the small towns often present an appearance of overgrown villages. The urban and rural may jostle together in towns and cities, but the preponderant part of the so-called urban population of Burma appears to be, for all practical purposes of city life, largely rural-minded.

**Village and Village Life**

Fig. 1 shows the plan of a typical Burmese village, the population of which ranges from one hundred to several hundred households, centered around the residence of the village headman and monastery. Usually the headman occupies a roomy house and a large lot on the main street of the village. A well in the front yard of the lot serves both his house and the neighbors'. Facing the headman's house, on the other side of the street, are a couple of small business stores and a small secular school operated on a voluntary basis. The school building is simply a vacant house. The entire school group is assembled at the same time, seated on the floor.
TYPICAL LAYOUT OF
A BURMESE VILLAGE

FIG. 1
The lessons of the different grades are recited one after another. While one grade is engaged in recitation, the other pupils are expected to study, or at least remain quiet. The school contributes to the literacy of the village, although in large measure the high literacy is generally attributable to the monastic schools. Next to the school is a big open space which serves as a bazar in the morning hours, as a playground for the rest of the day, and as a festival ground seasonally. Most meetings take place either in the headman’s residence or in this open area. A monastery and a pagoda are generally located on the periphery of the residential area, but need not be on the same side of it.

Lots vary in size, with the bigger ones fronting the main street or close to the headman’s. All streets are not paved: the only difference between the front and the back streets is that the former is wider so that the horse-and-buggy could use it, and the latter mainly for pedestrian use only. Travel between villages is chiefly by horse-carriage.

The traditional picture of the Burmese village life is that it was a very happy life, with no indigents and no hard work, with gaiety and very frequent festivity. There is much sociability and few quarrels. Rich and poor have enough to eat, and eat approximately the same food. All have the same amusements: perhaps the rich pay the minstrels and other entertainers, but the poor are

there to enjoy them. The villagers live in spacious houses and spend as much time as possible out of doors. Any money not needed to cover these expenses goes to pay for entertainment for the village, silks and bangles, and, above all, for charity. Burmese detest hoarding and miserliness. The land is incredibly fertile. Men, women, and the older children and bullocks all share the work.

At home, crafts are practiced; women cook and weave cloth. Women are the petty traders of the villages, and some houses have a little shop. But this is not "work," and the shop is mainly an excuse to bring more people in for visits. If work as such is not valued, neither is living off the labor of others. There is much festivity in the village during the nine months when it is allowed, and almost every evening except during the rainy season—half of which covers three months of this festive period—there is some amusement, often lasting through the night. There are dances and dramatic performances, either held in public open spaces or in the street in front of the sponsor's house. The great festivals are brilliant with lights, the shrines with burning tapers, the pagodas lit by tiers of lamps; the monasteries, houses, rafts are full of lights. The great festival at the end of the three-month "Lent" lasts for seven days. During the months when there is no work in the fields, the men renovate their homes and house furniture, receive visits, or go visiting. The village has always been important as a social group in which people share together the turning-points in their family life and the seasonal
Housing in Rural Areas: The Traditional Burmese House

The 1953 Union Census (Appendix) for a number of selected towns shows some very interesting characteristics of the distribution of households according to types of structure, tenure, household occupancy, and number of stories of dwelling unit:

Out of the average total number of households, the percentage of
i) homeownership is 63.56 against 22.7 rental,

ii) single dwelling unit structure is 74.43 against 25.57 multi-dwelling unit structure,

iii) single household dwelling units is 91.19 against 8.81 multi-household dwelling units,

iv) single-story dwelling units is 83.32,

v) 2-story dwelling units is 12.38.

It is evident from this that even in towns the great majority of the houses are single dwelling units, single-story, and the percentage of homeownership is quite high, except in Rangoon city.

Like most of the humid tropics of Southeast Asia, rural Burma has evolved its abode on stilts in order to avoid the dampness of the soil and flooding in the monsoon, and to allow free passage of air underneath for cooling in the sultry weather (Fig. 2.) The posts are of timber or bamboo, the walls are woven bamboo chips or matting or of wooden planks, and the roof generally of flimsy thatching material (leaves) - at times of slate, tiles, shingles, or corrugated iron or other metal sheets according to availability. For protection
against wind and rain, the roof slopes rather acutely and shuts out both light and air.

Figure 3 shows the plan of a typical Burmese village house. It takes the form of a single story "framed structure" in the engineering sense and timber is used extensively – for stilts, the height of which varies from place to place, shingles for walls, partitions and roofing, and planks for floors. The usual cubicle-components found in such a village house are the verandah, living room, two bedrooms, dining room, storage room, bathroom, and a chimney-less kitchen. The wall separating the kitchen and the bathroom from the dining room has, more often than not, only one opening, which is the door. The reason for this is to prevent cooking smell, generally believed to bring on fever, from entering into the interior of the house.

There is also a small storage outhouse, in which firewood or coal is stored and partly used as a workshop. Timber and land are plentiful and cheap, which probably make for the spacious building and its large lot, averaging about 12,000 square feet. The building compound is usually fenced with bamboo matting four to five feet high. The front entrance is made of timber, while the back door is of bamboo matting. The flower garden, the vegetable garden, and the fruit-bearing tree corner are very pleasant and valuable properties to the occupants of the house, and the plants nurture and bear fruit, vegetables, and flowers without much human effort. The fruits and
PLAN & SECTION OF A TYPICAL BURMESE VILLAGE HOUSE

FIG 3
flowers go to decorate the household altar as often as fresh ones are available and the vegetables, such as tomatoes and chillies, are used for food. The only source of water supply is the well in the back yard. For cooking and bathing, water has to be fetched from the well and carried into the house.

The toilet is a simple pit privy in the back yard, but on the opposite side of the well. There are usually several pairs of wooden slippers at the back door of the house for common use when going out to the backyard, and it is customary, and for reasons of hygiene, for one to wash his feet in the bathroom after using the privy. The back yard is mainly used for clothes washing and drying, sometimes bathing in the sun near the well, rearing fowl, and where the womenfolk can sit in the sun to dry their hair after a wash. But when it rains, the clothesline has to be moved into the storage house or into the dining room.

When a visitor comes to the house, he is obliged to take off his shoes or slippers as soon as he steps into the verandah, after which he is ushered into the dining room. Very often the verandah, enclosed with timber railings and having a sloping roof, is used as a sort of outdoor "living room." If the house owner were a farmer, the storage house is often larger and functions both for storage and as a stable. If the housewife wishes to open some small business such as selling cheroots, candies, or spices, the verandah might well serve the purpose. However, the goods are taken inside and kept in the house at night.
The Small Town

The setting of a small town is basically that of a cluster of villages developed without any planning whatsoever. Although the main street and a few other streets may be metalled or paved, in general these are very narrow and meant for very light automobile traffic. Along these "main" streets are string developments of residence, mixed business of a great variety, and public buildings, all interwoven to present a disintegrated administrative unit.

Almost all the houses, except the Subdivisional Office and the town's clinic, which are usually brick structures, are built of timber or other inflammable materials. Community services such as a fire station and sanitary facilities are not much better than could be found in the villages. Few towns in Burma have piped water supply systems and sewage disposal is by the bucket collection system.

The town, being made up of a number of villages, offers a great variety of business activities, such as crafts, cottage industries, pottery, lacquerware, general and retail shops, teahouses, and theaters. Transportation of goods and communication with other places is by horse-carriage if the journey is short, and by bus, private automobile, or by boat for longer distances.
Present Patterns

The existing arrangement of areas for living, working, shopping, and other urban activities shows what kind of city Rangoon is, and sets the stage for what can be done to improve it. The map of General Uses of Land 1955 (Map 3) shows how much of the pattern is already fixed, and sets the limits to the changes that can be planned for with reasonable expectation of realization, either through development of new areas or through redevelopment of obsolete areas.

By reason of its function as the nation's capital, main seaport and airport, Rangoon has institutional uses not found in other cities. Generally, these holdings are assets to the community and valuable land reserves. A place to earn a living is the first need for city people. For the reason aforesaid, a large concentration of business activity and high densities of population are found in the Central Area adjoining the harbor.

Due to absence of planning in the past, most of Rangoon's built-up areas are "mixed" developments. For instance, in a residential district, a good many of the residences may have their ground floors used for business; residences intermingle in predominantly business or industrial districts. Stores and shops are scattered among residence areas in a harmful way. They are often
strung out along main streets, instead of being concentrated in definite centers where better merchandising is combined with automobile parking and other customer conveniences, and neighborhood protection. Some land areas better suited to residence have been built up with industries. In short, zoning was never known. The effect of such unplanned, haphazard growth is a wasteful disorder, where no type of land does its job really well. The results include overcrowding, poor living conditions, unprofitable business, reduced property values, and lower tax income. It is therefore that, for the purpose of planning for the future, the generalized land use map of 1955 has been accepted as a basis for such study.

Residential

Housing has been discussed in Chapter I. A summary is therefore made here on the various residential units and their residential densities of the city.

(a) Municipality of Rangoon: The municipality of Rangoon is made up of 35 Wards or Census Circles which again can be grouped under three parts — Central Rangoon, Middle Rangoon, and the suburbs, divided from the city proper by Rangoon River and creeks. The net residential densities in these census circles vary from as low as 7 persons per acre to well over 400 persons per acre in the Central Area (Table III). Such an unbalanced distribution of population and an unusually high density in any area are unhealthy. Therefore, for future developments, the desirable population densities have to be carefully worked out.
TABLE III

DENSITY OF POPULATION PER ACRE IN 35 CENSUS CIRCLES, RANGOON

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<tr>
<th>Ward No.</th>
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Central Rangoon, the downtown area, accommodates the greater portion of the city's population, major trade centers and facilities, government administrative machinery and other amenities usually found in the cities. Middle Rangoon, on the other hand, is the most beautiful and predominantly low density residential area of the city, where, in comparison with the Central Part, more large open spaces are situated.

(b) Suburbs: Practically all the suburbs (Map 4) of Rangoon are residential in character, with small scale local service and cottage industries scattered here and there.

Open Spaces and Recreation

Central Rangoon suffers great inadequacy of open space and recreational areas. The following are the few ones of any significant size:

1) The Maidan, located a few blocks north of the Rangoon General Hospital, is much used by children only,

2) The Burma Athletic Association Ground, a semi-public athletic field north of the Central Railway Station,

3) Race Course Ground in the low density residential area, to the west of the Rangoon-airport railway line,

4) Three small parks in Central Rangoon, viz:

a) West Rangoon in the west,
b) Bandoola Park in the center,
c) Dufferin Gardens in East Rangoon.

The Bandoola Park is widely used both for recreational and social gatherings. Few schools other than the parochial schools
CITY OF RANGOON AND NEAR SUBURBS

CITY LIMITS
SUBURBS
MAIN ROADS
have adequate outdoor play space. However, with the government's determined drive against illiteracy, new state schools of modern standards are being planned and constructed.

Substantial recreational grounds exist only in Middle Rangoon and the near suburbs. Inya Lake at the northern end of the municipal boundary and Victoria Lake within the municipality provide the best setting for the city as a whole. Several yacht clubs and swimming clubs are located at Inya Lake, which is extensively and advantageously used by the public, especially in the warmer seasons. In summer evenings, however, people stroll along the strand or flock to the nearby jetties.

The Zoo and the Horticultural Gardens are situated south of Royal Lake. It is the former that attracts large crowds of people every day of the week, and bus service provides transportation from downtown to this place, which is more popularly used as a picnic area.

Business

By virtue of its location, harbor and other commercial facilities, Rangoon is developed as the most important center for trade, internally and particularly with foreign lands. Most business, retail and general, is concentrated, as string developments and occasionally found in residential quarters, in the downtown area. As a result, it creates planning problems.

The location of wholesale business along Strand Road on the water front, as shown on the Land Use Map, is logical from the stand-
point of transportation needs.

Goods, from the daily food supply, which pours into the city by boat or automobile from surrounding villages, to exportable items such as rice and timber and imports such as textile and tinned provisions, are being transited at this main port.

Public Institutions

The civic center, the huge, thick-walled structures of the Supreme Court, Secretariat, etc., constitute the most prominent and fascinating sight of the downtown area.

There are only two public hospitals: the Rangoon General Hospital and the Dufferin Maternity Hospital. Both of these need urgent expansion to adequately and efficiently serve the public.

Most of the schools shown on the land use map having big compounds are parochial. The University of Rangoon occupies a magnificent site on Prome Road about 4½ miles from Central Rangoon. It also has the advantage of the lake front. But with the annually increasing numbers of students' enrollment, accelerated by the new program of a free education system, the University faces a grave problem of shortage of classrooms, dormitories, and most important of all, teaching staff. The authorities concerned, however, have taken steps toward meeting the demands, and new buildings and extensions are being made on the University campus. But it is felt that new sites have to be acquired for the future to avoid excessive overcrowding on the existing campus.
**Industries and Warehousing**

That Rangoon is the only chief shipping and commercial center of the country is evident from the fact that its entire waterfront is occupied by industries, warehouses, dockyards, and other harbor facilities. In fact, most of the city's industries are located along the river. Rice mills, timber mills, power and utilities plants and warehouses flood the waterfront of Rangoon and Pegu Rivers; while in Dawbon, flour mills, chemical and other industries and dockyards dominate. In Dala there are also many rice mills, timber mills, and private and government dockyards. Across the Pegu River is Syriam, the main storage base of (BOC) Burma Oil Company's petroleum.

In the north, in Insein-Thamaing area, on both sides of Insein Road, are several small local service factories, such as shoe manufacturing, leatherworks, pottery, cottage industries. Newly constructed industrial plants in this area are the government-owned Cotton Spinning and Weaving Factory and the Pharmaceutical Factory. The construction of a jute mill, with a capacity of 24 million bags, is in progress.

**Utilities**

The Rangoon water supply, derived from Hlawga Lake and the Gyobyn Reservoir, 15 and 45 miles north of the city, respectively, is the most highly developed municipal supply.\(^1\)

Except the University and areas north of Royal Lake, which have

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private sewerage systems, the city's sewerage system is operated by the municipality.

The Rangoon Electricity Supply Board, with its power plant located in West Rangoon, is the only such source in the city. It supplies electricity to areas as far north as Insein and the airport.

For the new town of Thamaing, the design of which is presented in Chapter V, water and electricity supplies are available from their supply lines on Prome Road and Insein Road, respectively.

Traffic and Street Pattern

The street pattern of Central Rangoon is essentially that of the grid iron, and the modes of commutation are the bus and railway. Commuting fares, even for short distances, do impose an extra economic burden on an average middle income person. Besides, the means of transportation are inadequate.

This, and the simple reason that better urban amenities are found in the core of the city, probably, or partly, explains why people choose to live and overcrowd in the Central Area.

Railways

(a) Intertown: There are two main lines connecting Rangoon with other cities. One leads to Prome, about 160 miles to the north, making a short halt at Insein. The other, the Rangoon-Mandalay line, runs for about 60 miles in the northeast direction to Pegu, whereafter the course is directed northward and touches Mandalay, the second biggest city, and many other towns in the upper regions of the country.
(b) Local, Suburban: Local railway commuting service is available between the downtown area and (i) Insein-Thamaing on the Prome Line, (ii) Thingangyun in the northeast on the Mandalay Line, and (iii) Kanbe, the New Yankin Town, and Mingaladon, bypassing the airport.

Bus

(a) Intertown: There are only two main bus routes connecting with other major cities, viz.: (1) Rangoon-Prome Road. This is a beautifully tree-lined, quite heavily trafficked road, from which the Insein Road and a feeder road branch off, running almost parallel with the Insein railway line and feeding into the airport, respectively. (2) The Road to Mandalay, running alongside the Rangoon-Mandalay railway line from Rangoon to Mandalay via Pegu.

(b) Suburban Service Lines:

(1) Rangoon-Insein,
(2) Rangoon-Mingaladon-Airport,
(3) Rangoon-Kanbe,
(4) Rangoon-Thingangyun.

Since each of the above four service lines connect Rangoon with its respective suburb only, it is obvious that there is no direct link between the various suburbs - which demands some specific study in the field of public transportation, especially when new satellite towns are developed around Rangoon.

(c) Intra-city Service Lines are numerous between different parts of the city. These are all run by cooperatives and these too do not offer the privilege of transfers on a single ticket.

All bus termini are located in the Central market area.
Ferry Service

Ferries ply the Rangoon River between Rangoon proper and Dala, which has a population of about 24,000, the majority of whom work in workshops, dockyards, warehouses, and industries on Rangoon's waterfront. Ferries also ply between Rangoon and Syriam.

Airport

Rangoon has only one airport for both internal and external services, and it is situated about 10 miles north of the city. Access to the airport is mainly via Prome Road; only one train leaves Central Rangoon in the morning for this area and returns in the evening each day.

FUTURE LAND USES

Rangoon, the "Seat of Government," should offer a setting for effective conduct of national and world affairs. For its own people, it should be a good place to live. For all the people of the Union of Burma, it should be an inspiring symbol of their country.

Not until the present National Housing And Town & Country Development Board was formed in 1951 was the basis laid for a comprehensive approach to planning. And although, since its inception, all the principal features of postwar reconstruction have been realized with proper planning, it was in 1955 that the Board was able to develop and present in outline the basic elements of the Greater Rangoon Comprehensive Plan (Map 5).

The comprehensive plan covers all basic elements that, added
GREATER RANGOON COMPREHENSIVE PLAN

- open spaces and green belts
- residential
- public buildings, civic centers
- markets
- public utilities and services
- light industries
- heavy industries
- harbor and warehouses

MAP 5
together, determine what kind of community this shall be: the use of land; government establishments; transportation; housing and slum clearance; population distribution; and community services.

The heart of the concept is to tie many different kinds of special purpose plans together, so that roads fit with residential areas, centers of employment with transit facilities, school service boundaries with traffic barriers; so that all parts fit into their places without conflict, to promote order, convenience, economy, and livability. Its main features are shown on Map 5 and described in the pages that follow.

The plan is not a blueprint, but a general design. Such a guide is an essential first step, to be followed immediately by a number of more specific plans. It must be reviewed periodically, to adjust its sights to new times and conditions. Although it must be firm enough to serve as a guide on which people can rely, it must not be a permanent straight-jacket.

General as they are, the things the plan proposes are practical. They are based on years of study of the needs of the community.

The planning problems of today are the direct result of rapid, unexpected population growth in the past. Figure 4 shows the census for Rangoon from 1881 to 1953. The population growth so plotted out is a smooth curve up to about 1940, but with a sudden jump in 1953. The unusually great population increase registered in 1953, however, is attributable to two factors:
i) World War II – at the end of which most of the people who migrated from rural areas into the cities remained settled in these places,

ii) Insurrection after Burma attained Independence, as a result of which many people fled the countryside and migrated into towns and cities, thereby aggravating the many problems, such as housing, economic, health and living conditions.

Major Proposals

For the future, the goal is gradually to sort out conflicting uses that do not fit together, and to establish sound land uses in the older areas; and in the new areas, to plan in advance for healthy new growth. The Greater Rangoon Comprehensive Plan (Map 5) recommends in general terms the best arrangement for the different land uses that can be worked toward during the next 30 years. It is a scheme for the city of an ultimate population size of 1,150,000, with a proposed overall density of 75 persons per acre, gross residential density ranging from 33 persons per acre near the airport to 200 persons per acre in the core area.

At present, redevelopment and public housing projects are being carried out within the city itself. The Royal Lake, called the "squatters' colony" after the war, has now been improved, and with its outstanding landscape beauty, makes an exciting park. This area will finally link up with the open space at the Golden Shwe Dagon Pagoda and the Presidential Palace to the west to present a big stretch of open ground in Central Rangoon.
Inya Lake, the most pleasant public reservation and outdoor recreation area for swimming, boating, and picnicking, will have its present character preserved or even improved.

With vast amounts of undeveloped vacant land providing much leeway, Greater Rangoon will be an extension of the existing city mainly in the northern direction as far as Mingaladon Airport and also to include Dawbon in the east. The development of areas on the other side of Hlaing River and Rangoon River such as Dala, however, is not practical or economical for the near future, due to lack of sources of cheap and good water supply, need for one or more bridges or tunnels to span the river, and reclamation of lands subject to periodic floods.

New satellite towns, as the partially completed new Yankin Town, will be or are conceived to be built. These communities will be self-contained, well-rounded socially, and will include places for employment and facilities for service and civic life.

Cottage and small scale industries not injurious to public health are allowed in or around neighborhood units. The relocation of some of the existing industries are being projected and the construction of new ones is in progress. The general direction of the prevailing wind is from the southwest, so that the present location of the mixed industries along Rangoon River, particularly in the western sector, is harmful and constitutes a nuisance to the residence areas in the "wind shadow." Thus it is proposed to have two well-
defined industrial zones, namely

(a) Light Industries in Insein-Thamaing between the Hlaing River and the railway line, and in north Rangoon,

(b) Heavy Industries in Dawbon, where a great expanse of underdeveloped, vacant flat terrain exists and is suitable for their future expansion.

Two road bridges, besides the existing railway bridge, will connect this heavy industrial zone with the city proper: one with Central Rangoon, the other with Thingangyun and other residential suburbs in the mid-eastern part of Rangoon and the Road to Mandalay. For the light industrial zone, a new highway will make a complete loop, enclosed by the network of railways and then join Prome Road north of the airport near the rifle range. The proposed highway will be at least 200' to 300' in right-of-way in suburban areas and it will absorb most of the commercial traffic which now overloads Insein Road and Prome Road, and also ease the flow of traffic downtown. It will provide direct connection by roads for the suburbs.

The two existing railway lines, Rangoon-Prome and Rangoon-Mingaladon Airport, will be made into a loop (Maps 5 and 6). Also a new line will hook up this loop with the Pegu-Mandalay Line, so that in the future, trans-shipment of goods between Prome and Pegu or Mandalay via Rangoon will not have to be handled at the highly congested Central Station. As for future public transportation, the bus will still have to be heavily counted upon, since the limited
government budget is not able to make any appreciable improvements in the existing railway commuting facilities.

The main harbor, now occupying a part of Central Rangoon, will be removed to Dawbon for the following reasons:
(a) The proposed site is suitable and large areas are available for future expansion,
(b) The river is sufficiently deep here for easy approach of ships; the waterfront is also in close proximity of Central Rangoon and residential areas. It also has a well-established railway connection,
(c) With the removal of the harbor to Dawbon, Central Rangoon will have open space along the vital waterfront for public recreation.

Against the background of new developments, rich agricultural lands are being preserved.

THE DEVELOPMENT AGENCY

The National Housing And Town & Country Development Board, an autonomous board created in 1951 after the National Housing And Town & Country Development Act, has been the only public housing agency responsible for national housing and development programs in the national and local levels. The fact that the former local housing authorities, including the Rangoon Development Trust and the Buildings Section of the former Public Works Department (now Highways Department) have been abolished and their staffs transferred to the Board, explains the above statement.
The National Housing And Town And Country Development Act 1951, provides that the Board will prepare the basic surveys and development plans and implement these plans. Development Areas and Plans are first approved and officially recognized by the Ministry of Housing. Once they are adopted, the Board has full powers in exercising controls over the Development Areas, copies of which are distributed to the various government agencies concerned. If the Development Area includes a municipality, developments and redevelopments within the municipality are controlled by the municipal government, but with the approval of the Board and in accordance with the Development Plan.

For the purpose of developing any feature of an official plan, the 1951 Act also provides that the Board, with the approval of the Minister of Housing, may acquire land, hold land hereafter acquired, or sell, lease, or otherwise dispose of land so acquired or held when no longer required.

Although wide powers are vested with the Board for the effectuation of the development plans, its activities, especially in physical planning, are very much limited. Plans are now being prepared for only certain regions, towns, and villages for the following reasons:

(a) There are practically no town planners in Burma. There is also an acute shortage of architects, engineers, surveyors, and other technical personnel; at present, the Board has the necessary
technical personnel to undertake the works of town and country development in different parts of the country only in a limited way.

(b) In the western countries, the Local Councils are generally the Local Planning Authorities responsible for the development of towns and cities within their jurisdiction. But in Burma it is impossible to set up similar organizations due to lack of funds, planners, or technical personnel.

(c) The financing of the projects for town and country development is yet another problem and, in many cases, funds for the Central Departments or the Local Councils are not sufficient for the purpose.

General Housing Policy

The present policy is to provide the public, particularly the low and middle income groups, with adequate living accommodations. For this purpose, the Estates Section of the National Housing Board is charged with the duty of allotment of these living quarters.

Anyone, irrespective of race, religion, or culture, may apply to the Board for such accommodation. The natural course of decision in allotment is that those in desperate need are given the first priority, disregard of family income, and the rent collected being 10% of the income. No special consideration is being given to the dwelling size with respect to family size.
Giving out loans is a new venture to the Board. Loans up to a maximum of 50% of the total building cost are available to people with "good standing." Hence, this privilege, in effect, is only "available" to the relatively richer class.

Realizing the shortcomings such as the above, there has been much discussion on the revision of the existing system, and the idea of a 'rental-with-option-to-sell' is much favored. It is imperative that the basic principles of future developments and re-developments must be in line with this policy.
Throughout this study the extent to which community development is governed and conditioned by physical planning shall be considered—the nature of housing layout, the size, type, and characteristics of the neighborhood units and their relation to the town center and the town as a whole, schools and open spaces and the planning of transportation and communications. Each of these shall have to be considered, but it would be well to first pay attention to the neighborhood unit as the basis of modern town planning.

A planned neighborhood is visualized as a geographic unit of between five and ten thousand people, which supports its own educational, shopping, amusement, and recreational facilities and social institutions. The design of a neighborhood will feature a local community center and, possibly, sub-centers, to which all buildings and streets within the unit are conveniently related. Besides providing a suitable physical form of residential living, the neighborhood is contemplated as a medium to promote the feeling of a community and a more or less coherent social life.

No discussion of the neighborhood is complete without inclusion of those minimum design standards associated with the establishment of facilities upon which the neighborhood rests and from which it derives its social self-sufficiency. These minimum standards are
without uniformity, both qualitatively and quantitatively, simply because the neighborhood is a fairly recent concept in residential planning. It is therefore the object of this study to attempt to deal with this important and growing aspect of neighborhood development applicable in a country like Burma, where every village has a monastic school and/or one organized by the local people on a voluntary basis.

A rigid standardization of area, population, or community provision is rightly to be deplored. Besides, on account of the great variance in the physical, economic and other conditions vitally affecting the plan, it is impossible to lay down hard and fast rules for general application. There are, however, certain criteria which may be applied and certain standards which must be met.

With the schools going to play an important role in the welfare of the people and the nation, the primary school may be used to determine the basic unit for planning. The primary school should be inside the unit, and if it is also agreed that young children should not have more than one-half a mile to walk, then it will be obvious that the size of the unit will be limited by these factors.

**Neighborhood Size**

The pattern of neighborhoods is determined by the need to provide each family with a sense of being in one particular community, with its own planning identity, and its own basic social services. The size of any particular neighborhood is limited by
the need to have all the social services, such as shops, schools, play spaces, and a meeting hall, within easy walking distance of any home, and by the pattern of the main roads which must not, of course, pass through it. Each neighborhood unit will have its own focus in the form of a shopping and community center, and all the neighborhoods will focus onto the town center.

Although there is as yet no established policy as far as school sizes are concerned, the consensus is that for administrative efficiency, the appropriate number of pupils for a primary school, including the two kindergarten classes, should be 400; that is to say, there are twelve classrooms, each with thirty-four pupils, in a six-grade primary school. If the school enrollment is assumed to be 9.25% of the population, and an average family size of 4.5 persons, then the total neighborhood population will be 4,400 or 970 families. In rural areas, where the percentage of enrollment to the total population is somewhat lower, the neighborhood unit size of 1,000 families or 4,500 persons, based on the size of the primary school, will be more logically acceptable.

One other key factor that limits the neighborhood size and density is the weather - two and one-half hot summer months from March through the middle of May, followed by the monsoon through October, a period of five and one-half months. However, the climate is mild throughout the year in the densely inhabited areas to permit people to use the outdoors constantly, except during periods of
heavy rains and hot sunshine. The Burmese people's marked preference for detached houses with a private compound is a very important social factor that should be taken into account.

Attention must also be given to the fact that an area larger than 200 acres would necessitate more than one-half a mile's walking distance from the far corners of the unit to the centrally located school and community center, so that the density may not be less than five families per gross acre.

Whatever its effects on community development, a plan which allows little children to reach school in safety is the greatest social consequence. The total site area of the primary school, including its playground, is three acres minimum, but preferably four acres.

Table IV shows the present school system in Burma.

Middle School and High School

In the case of middle schools and high schools, a somewhat larger enrollment is desirable in order to permit a sufficient range of course offerings without uneconomical small classes. An enrollment of from 400 to 600 is probably satisfactory for a middle school which will require two neighborhood units or a "community" to support it, and an enrollment of from 600 to 1000 is desirable for a high school which will require two "communities" (making a small town) or four neighborhoods to operate.

Both the middle school and the high school, like the primary
### TABLE IV

**PRESENT SCHOOL SYSTEM IN BURMA**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Primary School</th>
<th>Middle School</th>
<th>High School</th>
<th>College - Non-Professional</th>
<th>College - Professional</th>
</tr>
</thead>
<tbody>
<tr>
<td>KG 1</td>
<td>KG 2</td>
<td>5</td>
<td>1</td>
<td>8</td>
<td>4 years</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>11</td>
<td>2</td>
<td>12</td>
<td>6 years</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>13</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>15</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Matriculation: 16 years
school, will have their own playground, and the total area will be three acres and eight acres as a desirable minimum, but preferably four acres and ten acres, respectively.

A community will be designed in such a manner that its two neighborhoods will not be too far apart. This is important, in that children of ages 11 to 13 should not travel more than three-quarters of a mile to reach the middle school.

These small, basic units of 1000 families will then be grouped in clusters of four or five around a "major" neighborhood center, which, serving a population of 20/25,000, can support a large group of shops, cinema, bigger pagoda, health center, library, public houses and other community buildings.

The importance of the really small group has to be recognized, so that the small, basic unit of 5000 persons or so will again be broken down into "housing groups" of diverse types and income standards centered around some feature of community life such as a tenants' clubroom (replacing the old-fashioned headman's house) or children's play area.

This division and subdivision of the residential areas is a timely recognition of the fact that social life does in fact consist of a series of circles of ever-increasing size, beginning with home and family, then the small group of immediate neighbors between whom practical "neighboring" and mutual help may take place, then the wider community of the neighborhood, and finally the town itself.
For a city with a population from 30,000 to 50,000, a vocational school may well be recommended for training in some specialized fields.

The following Table shows the proposed divisions of residential areas by population size:

**TABLE V**

PROPOSED DIVISIONS OF RESIDENTIAL AREAS BY POPULATION SIZE

<table>
<thead>
<tr>
<th>Population</th>
<th>School</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood</td>
<td>4,500 - 5,000</td>
<td>Primary</td>
</tr>
<tr>
<td>Community (2 Neighborhoods)</td>
<td>9,000 - 10,000</td>
<td>Middle</td>
</tr>
<tr>
<td>Small Town (2 Communities)</td>
<td>18,000 - 20,000</td>
<td>High</td>
</tr>
</tbody>
</table>

**Densities**

The number of dwellings per acre, or the building density, is of general interest, as it shows the degree to which the property can be occupied and affords a common basis of comparison. The number of houses per acre is therefore the measurement of the saturation of the plan and is also an index of housing conditions. This is best expressed as the number of families houses per gross acre, including the street area, but excluding parks and open spaces. In any particular case, the greater the number of families housed per acre, the
less the cost per unit will result from the plan. But a high density, brought about by crowding a large number of families on small lots with narrow streets and lack of open spaces, is poor economy. It leads to undesirable living conditions, the correction or prevention of which is the object of industrial housing and a necessity of any industrial system.

An allotment of less than six families per gross acre, unless the topography is unusually difficult, or an especially expensive development is planned, will indicate a wasteful subdivision of the land and a lot size in excess of ordinary requirements. On the other hand, a compactness of over twelve families per gross acre, unless some are housed in rows or apartments, will indicate too intensive use of the land and unfavorable conditions, on account of insufficient light, air, and open space.

Density will be influenced by the type and grouping of the houses, the width of the streets, and the space allowed for front yard, back yard, and between houses, rows, or groups of buildings. Detached houses, placed too close together, may afford a greater amount of open space than row houses, but the side yard space may not be useful in adding to the convenience and in providing necessary light and air; in fact, it may be detrimental.

When the cost of land is high, the number of families housed per acre must be increased, and this can best be done by building row houses, apartments, or two or four-family flat houses, rather
than by crowding detached or semi-detached houses upon small lots. Group or row houses may frequently present developments equally as attractive as single or twin houses.

**Dwelling Types**

The choice of building types depends a great deal upon the following factors:

(a) geographical condition of the area

(b) traditions, customs, and preference - which is for the single-family, detached, single, or two-story building

(c) building materials used - brick, timber, bamboo, and thatch. Concrete, being expensive, will not be used. Combustible materials like bamboo and thatch will not be used also. Table VI shows a comparison between the advantages and disadvantages of the two chief building materials, namely, brick and timber, that will be used. The main disadvantages cited therein of the timber building can, however, be discounted by its sound design and proper maintenance. For instance, by using tile roofing, the effects of the summer heat within the building will be greatly reduced, and a good preservative, such as creosote, will protect and prolong the life of the building.

(d) Buildings three stories or taller are rare, even in the big cities, and most of these existing ones are apartment houses. The three main reasons for the non-preference of the tall buildings are obvious: (i) electricity is costly, so that most of the houses more than three stories high are of the walk-up
### TABLE VI

**ADVANTAGES AND DISADVANTAGES OF BRICK AND TIMBER AS BUILDING MATERIALS**

<table>
<thead>
<tr>
<th>BRICK</th>
<th>TIMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Especially good for summer because it makes the interior of the</td>
<td>In summer - very warm inside the house.</td>
</tr>
<tr>
<td>house cool.</td>
<td></td>
</tr>
<tr>
<td>2. Damp atmosphere inside the house in colder seasons.</td>
<td></td>
</tr>
<tr>
<td>3. ---------</td>
<td>Timber floors - can be used to sit or sleep on. Sometimes a mat or</td>
</tr>
<tr>
<td>--------</td>
<td>rug is spread for the purpose.</td>
</tr>
<tr>
<td>4. Durable and permanent; less maintenance cost.</td>
<td>Less durable, but life span reasonably long; maintenance cost slightly</td>
</tr>
<tr>
<td>less maintenance cost.</td>
<td>higher.</td>
</tr>
<tr>
<td>5. Fire resistant.</td>
<td>Fire danger.</td>
</tr>
<tr>
<td>6. Initial cost higher.</td>
<td>Cheaper in cost and easier to construct.</td>
</tr>
<tr>
<td>7. Scarce in sparsely developed rural areas.</td>
<td>Abundant.</td>
</tr>
</tbody>
</table>
type, (ii) tall buildings have their upper floors exposed to sunlight so much so that the summer heat is unbearable, and (iii) multi-story buildings demand greater water pressure, which often presents a problem.

Considering the above elements, it is desirable that both bricks and timber be utilized for the dwelling types, which the writer proposes for any new residential developments, presented in Table VII.

**TABLE VII**

<table>
<thead>
<tr>
<th>No. of Bedrooms</th>
<th>Type</th>
<th>No. of Stories</th>
<th>Gr. Floor</th>
<th>Top Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 BR</td>
<td>Detached</td>
<td>2</td>
<td>Brick</td>
<td>Timber</td>
</tr>
<tr>
<td>4 BR</td>
<td>Detached</td>
<td>2</td>
<td>Brick</td>
<td>Timber</td>
</tr>
<tr>
<td>3 BR (Detached)</td>
<td>Semi-detached</td>
<td>2</td>
<td>Brick</td>
<td>Timber</td>
</tr>
<tr>
<td>2 BR (Detached)</td>
<td>Semi-detached</td>
<td>2</td>
<td>Brick</td>
<td>Timber</td>
</tr>
<tr>
<td>1 BR (Detached)</td>
<td>rows</td>
<td>1</td>
<td>Brick</td>
<td>Timber</td>
</tr>
</tbody>
</table>

Except the one-bedroom houses, all the recommended dwelling types are two-story, with timber upper floors and brick ground floors, instead of only using either timber or brick solely for the whole structure. This method of construction is aimed at the following points:
1) Reduction in costs, initial and maintenance, making homeownership more accomplishable,

2) With the use of two-story houses instead of one-story houses, every dwelling unit will have its own yard space without occupying too big a lot,

3) The ground floor, being enclosed by brick walls, provides an excellent "relief" shelter from the summer heat, particularly in the day. On the other hand, wooden or parquet floors are preferred, and in fact better for healthful living as far as dampness is concerned,

4) A widespread conflagration will not be possible, or at least can be retarded, since most of the houses are either detached or semi-detached and have brick walls on the first floor.

Following are Tables VIII and IX. Table VIII, taken from a sample survey in downtown Rangoon, gives the number of families by number of persons in proportion to the total number of families in the survey area. Table IX shows the proportion of each type by number of bedrooms in Rangoon city, the new Yankin town, and that proposed by the writer for any future developments.

Comparing Table VIII with columns (A) and (B) of Table IX, it is inferred that, although most of the present dwelling units in Rangoon are two-bedroom and that because about 35% of the total families have six or more persons, these two-bedroom units are being overcrowded.
# TABLE VIII

FAMILY SIZES, RANGOON SAMPLE SURVEY AREA

<table>
<thead>
<tr>
<th>No. of Persons in the Family</th>
<th>Percent of Total No. of Families Surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 persons</td>
<td>15 %</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>7 and over</td>
<td>25</td>
</tr>
</tbody>
</table>

# TABLE IX

DISTRIBUTION OF DWELLING TYPES

<table>
<thead>
<tr>
<th>(A) No. of Bedrooms</th>
<th>(B) Existing Rangoon City</th>
<th>(C) New Yankin Town</th>
<th>(D) Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17 %</td>
<td>60 %</td>
<td>15 %</td>
</tr>
<tr>
<td>2</td>
<td>54 %</td>
<td>30 %</td>
<td>30 %</td>
</tr>
<tr>
<td>3</td>
<td>19 %</td>
<td>10 %</td>
<td>30 %</td>
</tr>
<tr>
<td>4</td>
<td>7 %</td>
<td>-</td>
<td>20 %</td>
</tr>
<tr>
<td>5</td>
<td>3 %</td>
<td>-</td>
<td>5 %</td>
</tr>
<tr>
<td></td>
<td>100 %</td>
<td>100 %</td>
<td>100 %</td>
</tr>
</tbody>
</table>
The dwelling units in Yankin Town are rather inadequate to meet the modern standards of good living, and the bulk of these units are contained in four-story, thirty-two-unit walkups. The distribution of the different types and the absence of the larger types of dwellings in this new town apparently do not fit in with the family-size patterns at all, which is yet another reason why people are so reluctant to move out to this area.

It must be noted that the most common family sizes range from three to six persons, with practically no single-person families. This trend is expected to continue unless disturbed by some unforseeable developments. Therefore, it is thought that the more suitable distribution of the dwelling types will be as proposed in column (D), Table IX.

**Roof**

The best type of roof covering is tile. This is locally available except in sparsely developed rural areas. It can withstand heavy monsoons and also provides a good insulation against the heat of the sun. The pitch of the roof may vary from 30 to 60 degrees, as usually practiced, to allow quick drainage of rainwater from the roof.

**Orientation**

In the hot-humid zone, elongated buildings in the east-west direction are good. Buildings located on the north-south axis receive relatively the most penalty compared to all other climatic
zones. Hence, as far as possible, the rooms should face to the north and south, and the west side of the building should be shaded, which can be done by using trees with spreading branches and dense foliage. The reason is the avoidance of the hot rays of the western sun.

Another consideration of design is to provide free air movement through the building. To obtain the greatest benefit of air movement on days when there is only a slight breeze, orientation in its prevailing direction is the answer. In this case, the prevailing breeze is almost north-south because "the monsoons tend to have a north-south direction, owing to the alignment of the mountains and valleys." The rooms can, however, be protected against squalls and driving rains by canopies or verandahs.

Residence Lots

The residential lot is the unit of the town plan, and much depends, both as to the effectiveness of housing and the living conditions which will be established, upon providing building lots of suitable size and shape. Bad housing has been due frequently to wasteful use of land in the original subdivision of the property, which has laid a heavy burden of increased cost upon the development.

If the lots are too deep, the property at the rear is wasted,


and there is a natural tendency to make the lots narrow and to fail to provide sufficient space between houses, thus preventing proper living conditions. On the other hand, if the lots are of insufficient depth, the frontage must be necessarily increased, and this will greatly increase the cost of street improvement and utility installation.

The size and proportions of the lot will depend upon a number of factors, but should meet certain conditions. The general conditions and requirements will have to be studied and decided upon before the street layout is made; and the subdivision of the property in the block should conform thereto as closely as topography and other factors influencing the location of streets permit. The dimensions of a lot will nevertheless be affected by the type and dimensions of the house, the location of the house on the lot, and the grouping of the house units.

The traditional Burmese single family dwelling, as discussed earlier, demands a sizeable lot area. In order to satisfy this demand and modern town planning principles, the dimensions of such dwelling lots should have a minimum width of 40 feet and a minimum depth of 80 feet.

**Commercial District**

(a) Neighborhood: Shopping facilities represent not only an economic focus but a social one. They offer the natural means of bringing together the people - whether the old or new residents of
the area. In thus mingling with their neighbors, they may also find
the makings of neighborliness or a "get-together" on some common
causes for the welfare of the community.

All parts of the neighborhood require ready access to local
shopping centers. Since shoppers are mainly pedestrians, "edge
location" of shopping centers is completely out of the question.
It is therefore logical that the neighborhood center, just as the
primary school, be given a central location, readily reached from
all sections of the neighborhood.

The neighborhood shopping center will mainly consist of service
and household supply groups, such as a confectionery, school sup-
plies store, tea shops, food shop (eating place), hardware store,
tailoring shop, personal service shop. A total area of 1.5 acres
would be quite sufficient for this purpose.

However, in addition to the above site, there will be a
separate one of 7,000 square feet or so for the neighborhood bazar,
where the daily food requirements may be obtained. It will not be
an "open space bazar" but rather a sheltered shopping arcade which
will contribute to the social atmosphere of the community and
protect shoppers from rain and shine.

Depending on the layout (length) of the neighborhood, instead
of one bazar there may be a need for two minor food groups at con-
veniently-distanced locations, so that no person will have to
travel more than half a mile to a bazar.
Such a compact arrangement will bring the primary school within safe walking distance of the young children and the daily shops within easy reach of the mother with the pram—two important yardsticks by which the "humanity" of planning may be measured.

Cottage industries and small-scale industries not injurious to public health will be allowed in or around the neighborhood unit.

(b) Town: The shopping center, like the neighborhood shopping centers, should be centrally located. It needs to be near, but not necessarily in immediate conjunction with, other buildings housing activities of community-wide interest. Further attention will thereby be focused upon the common community interests and center, allowing activities conditioning social cohesion. Since these other buildings likewise require central location, a location adjacent to the town park-playfield provides the natural center for them. They can be attractively and conveniently housed on the periphery of the playfield. The high school, social center and library branch could be combined into one structure, with the high school playfield adjacent.

Around the town center, the placing of apartment buildings, three- or four-story walk-ups, might be considered feasible. This would make a greater amount of purchasing power readily available to the shopping center and further foster the center atmosphere.
**Religious Center**

A site may be reserved in the core of the neighborhood, either near the primary school or the neighborhood park, for a pagoda, which is usually built by the local people themselves. As for the monastery, one will well serve two or three or even more neighborhood units, and its site is obviously found in the green wedges between the neighborhood units or communities.

**Recreation**

Recreation areas accessible from all parts of the neighborhood and adequate for age groups are neighborhood features. At present, no measures have been developed in Burma for estimating the desirable standards for the different kinds of recreation areas. Therefore, for the purpose of design, the following rough rule of thumb is accepted:

- Primary school with playground - 3 acres minimum
- Middle school with playground - 3 acres minimum
- High school with playfield - 8 acres minimum

It is recommended that the play area be combined with the respective school at a same location.

**Neighborhood Park**

Shade, walks, benches, and a pleasant outlook are the chief requirements for passive recreation areas. It is desirable to provide some active recreation, such as "chinlone," badminton,
volley ball, etc., unless such activities are supplied elsewhere.

The park area will depend not only on the population load but on the design of the park. A minimum of 1.5 acres is recommended for any neighborhood park, regardless of population load. Smaller areas which total this figure are acceptable only if they are so located, interconnected, and landscaped as to give the same amenity and sense of relaxation to those strolling through them as would the larger park. The minimum total park area for a neighborhood of 1,000 families will be 3 acres.

Attractive landscape treatment is an essential requirement for all recreation areas and should receive particular attention in the design of school play areas and neighborhood parks, so as to eliminate or minimize any adverse effects on adjacent residential areas. This can best be achieved by separating the school site and residence areas by the neighborhood park and, if possible, making the active play areas of the school and neighborhood park face each other.

Town Playfields and Parks

Town playfields and parks are intended principally for youth past high school age and for adults of all ages, who together make up approximately 65% of the population of the town. This group can rarely be accommodated on high school playfields, and children of high school age not in school and even high school children usually make extensive use of town playfields.
Such a playfield normally will serve an area within a radius of half a mile to one mile. Wherever possible, the playfield will be combined with a town park. Such a town playfield–park might include the following functional features: (1) children's playground, including space for small children; (2) playfield for older boys and men; (3) playfield for older girls and women; (4) shelter buildings and swimming pool; (5) recreation center building; (6) park and landscaped area or areas; (7) open ground for evening festivities.

In addition to an attractively landscaped park for passive recreation, facilities will be provided for such games as soccer, basketball, tennis, and the like. When it is not practicable to combine the town playfield and park in one recreation unit, these facilities will be provided on the playfield.

The appropriate size of a town playfield–park will vary with the population of the district, but will depend principally on the functional features to be provided and the play activities and facilities that are to be accommodated. In newer and relatively undeveloped sections and wherever land is reasonably cheap, a site of 15 acres, divided between play and park spaces, is a desirable standard.

Public Utilities and Related Service Facilities

The principal utilities required by a neighborhood unit are its water, sewerage, and electric systems.
Water: Water may be obtained perhaps from deep wells, from a river, or from lakes or artificially created reservoirs surrounded by a protected water catchment area. In Burma, water is derived very largely from wells, ponds, and nearby streams, which are subject to surface pollution.

As part of the well construction program, the government has begun to install four-inch wells and piped water systems in every village instead of protected shallow dug wells. One tube well is considered adequate to serve 200 persons or about 40 to 50 families, and the cost per well, including labor and supplies, is approximately $400.

The tube well has by far proved to be the most economical source of water supply, with a reliable, constant supply of water; for a neighborhood unit of 1,000 families, therefore, it will be more proper and economical to utilize larger tube wells. Elevated tanks or standpipes may be attractively designed and located on tracts of land sufficiently large to permit adequate landscape treatment.

Sewerage: The sanitary disposal of human excreta represents a major public health problem throughout Burma. Only the larger towns and cities have sewerage systems. Recognizing the seriousness of the problem, the government in 1952 embarked on a rural well and latrine construction program which calls for the provision of septic tanks in areas sparsely populated. This method is
perfectly acceptable, and for small communities the disposal of sewage may be accomplished satisfactorily by the use of septic tanks.

As the density of development increases, public facilities become essential. It is therefore wise to require the installation of public sewerage facilities in the initial stages of urban development, if the public system is at all feasible.

**Electric Power and Wires**: The government in 1950 started working on two major electric-supply schemes, viz.: (1) Hydro-electric Supply Scheme and (2) Rural Electrification Program. In this respect, great success has been achieved by way of providing electricity to the remote areas and improving and extending the existing power facilities.

Overhead wires located in streets are unsightly, interfere with the growth of street areas, cause severe interruptions during storms, and are sometimes hazards in the fighting of fires. These harmful effects of overhead street wires may, however, be mitigated by securing the removal of overhead wires from the streets and placing them in alleys or on easements for this purpose along the rear line of lots. The ideal method is to place the conductors underground in conduits, as it leaves the streets unmarred by wires and protects the wires against damage by wind and fire. But this solution is expensive. It is therefore recommended that for all future developments, electric power lines be installed on easements.
Disposal of Wastes Other Than Sewage

The various waste materials, other than sewage, that are produced in a community are garbage, rubbish, ashes, street sweepings, and refuse from manufacturing, trade, and building operations.

Garbage, of course, presents the most difficult disposal problem. The sanitary fill method of garbage disposal, whereby garbage and other wastes are buried under carefully controlled conditions, is coming into increased use, especially in cities where areas of vacant, low-lying land are available. The method is economical, usually unobjectionable if not too close to built-up residential areas. For the rural areas in Burma, therefore, this method is most suitable.

For the more highly developed areas, incineration is a satisfactory way of disposing of nearly all classes of refuse, for the heat produced may sometimes be used for the generation of steam or for the drying or disposing of sludge from the sewage treatment plant. In this method, a combined collection may be used.

Civic Center and Public Buildings

In the developing countries where "walking distance" is a controlling factor in physical planning, the grouping of public buildings in a civic center proves a convenience to the public. Efficiency and economy may be promoted when buildings are so grouped as to facilitate easy contact between public officials
and to make possible the joint use of such facilities as the police and fire stations.

A smaller aggregate acreage may be required for a group of buildings than for scattered structures, assuming in each case comparable standards of open space for setting, protection against fire, and separation from adjoining development.

Moreover, the grouping of public buildings gives them the increased importance, dominance, and esthetic significance when each building becomes an integral part of a harmonious composition, an opportunity that is lost if buildings are erected at scattered locations. A civic center may thus become a symbol of the civic interest and cultural attainments of the citizens of the community.

Since a central location is essential, a civic center will normally be placed within or at one edge of a central business district. Great care is therefore needed in selecting a location that will not block desirable business expansion.

Requirements of Neighborhood Center

(a) Community Center: The community center is (1) to serve as a meeting place for group political, civic and social functions, and (2) to provide a place for those activities, social, recreational, and quasi-public, which cannot take place in the home and which are necessary adjuncts to a full cultured and civic life.
The first of these two functions requires a large hall or auditorium which is available to any organized group. Since the public school is operated to serve all community needs, the school auditorium is the natural and proper place for such meetings and social functions, and all primary schools will have to be designed to serve this purpose.

By grouping leisure activities around a recreative and educational center, a neighborhood can develop into a socially conscious community.

(b) Other essential public buildings for a neighborhood unit include (1) a post office, (2) a clinic, (3) police and fire stations which can be housed in one structure, (4) an administration building to house the various governmental agencies—NHB, PWD, etc. The main functions of these agencies are maintenance and development works and they therefore need yard and storage space. If the neighborhood unit is an isolated one, the administration will preferably be centrally located, while the storage yard should be given a much less favorable location. If, however, two neighborhood units are planned or are in close proximity of each other, then the administration building, with its storage yard, can rightly serve both the units (one community), in which case it will require a central location just as the middle school.
Requirements of a Town Center

The town center is the chief administrative, business, entertainment, and cultural center of the town as a whole. As an administrative center, it is the meeting place for the city fathers and the workplace of local government and other officials, and for these purposes requires buildings like the council chamber, the municipal offices, offices for government departments, and the police station. It is the meeting place for the population as a whole - for such activities as the announcement of election results, the celebration of important anniversaries - and must provide a main civic square, a civic or town hall.

As a business center, it is a place where the townsmen go when they want to buy luxury or high-cost goods, to search for a bargain, or to obtain a wider choice than can be found in their neighborhoods; and as a business center, it is also the home of commercial and professional firms, and for the wholesalers supplying the shops in the town and neighborhood with goods. It contains every kind of shop building, from the large departmental stores to the small, intimate shops; and all kinds of office and warehouse building.

As an entertainment and cultural center, it is the place where the citizen goes to watch a play or to see the latest film; where he should be able to listen to serious music; to visit exhibitions of sculpture and pictures; to read or borrow books;
to eat good food. It is the place where different groups with particular interests meet together to pursue them - the religious society, the music society, the chamber of commerce, and other groups which require for their support a larger population than that found in a single neighborhood. Buildings appropriate to it are the theater, cinema and concert hall; the museum, art gallery and library; restaurants, cafes, and all the miscellaneous halls and rooms officially known as "places of public assembly." On the basis of the proposed divisions of residential areas presented earlier in this chapter, the high school and the vocational school will rightly be located in or around the town center.

Finally, the town center is the focus of the circulation system, and either in or near to it will be the interchange bus station and the railway station.

For the purpose of planning a town center, these various functions will be divided into three broad groups: the business or commercial group, which may be subdivided into the shopping center, offices, and wholesale warehouses; the civic group, being the main administrative, cultural, and social centers, containing the town halls and other public buildings, and educational and recreational buildings, like the vocational-technical school and the theater; and in general the industrial area, containing the cottage industries and workshops.
**Street and Transportation Systems**

The street system forms the major network of the city and is perhaps its most important single element. This system largely determines the ease, convenience, and safety with which people travel about the city. No other element in the physical make-up of the city is so important as its streets. In the design of a circulation system, it must be borne in mind that Burma is not in the "automobile age" yet, and the system therefore must be such as to accommodate the bicycle and the pedestrian.

Even in the capital city of Rangoon, there is an average of only one motor vehicle to every thirty-four persons, and one tri-cycle to every sixty-four persons. In the districts, the number of persons to a motor car is very much higher than this and horse-drawn carriages are not at all out of date, so that the types of traffic become "mixed." Under these circumstances, it is most desirable to provide sidewalks on every local street.

**Classification of Street Types**

Directness of access, increased speed of through travel, reduction of accident hazards, and elimination of unnecessary traffic from the neighborhood should be fostered by a clearly articulated street pattern. This should be composed of various types of streets, each designed for the character and volume of its traffic, and which may be classified as follows:

1. These figures do not include bicycles and military vehicles.
1) Residential service street – providing direct access to residential structures; serving only a comparatively small number of dwellings.

2) Neighborhood feeder streets – connecting service streets to each other, to community facilities, and to minor traffic arteries; serving only neighborhood traffic.

3) Minor traffic streets – connecting feeder streets to major traffic streets and to district centers. Preferably outside of, or bounding, the neighborhood; serving district traffic.

4) Major traffic street – connecting cities and major districts of a single city; serving large volumes of comparatively long distance, fast-moving traffic.

For the sake of economy, durability, safety, and convenience, streets in residential developments should be the result of sound engineering design, the practice of which need not be discussed here. However, the following principles and minimum requirements will be followed:

1) For residential service streets and feeder streets, with two-way traffic:
   - Curb to curb width: \(26' - 0"\)
   - 2 planting strips, 7 feet each: \(14' - 0"\)
   - 2 sidewalks, 4 feet each: \(8' - 0"\)
edge of sidewalk from private property,
1 foot on either side...................... 2' - 0"

Total right-of-way width.............. 50' - 0"

2) For minor traffic streets with two-way traffic:
curb to curb width.......................... 36' - 0"
2 planting strips, 7 feet each.............. 14' - 0"
2 sidewalks, 4 feet each..................... 8' - 0"
edge of sidewalk from private property,
1 foot on either side...................... 2' - 0"

Total right-of-way width.............. 60' - 0"

With these generous allowances for the street rights-of-way, it is believed that traffic even in the larger towns, where it may increase appreciably in the next thirty years, will not constitute a problem.

Basic Types of Minor Street Systems

In large development areas in which topography is comparatively flat, it is customary to use a gridiron system of minor streets for the subdivision of the large areas of land lying between major thoroughfares.

On rough topography, to which a gridiron minor street system is not well adapted, an irregular layout of streets,
closely following contours, may be used. When well done, this system of minor streets avoids the necessity for heavy cuts and fills and produces good building lots.

Regardless of the basic type of minor streets system used, there can be great flexibility in its application. Minor streets in residential districts are often deliberately made indirect or discontinuous in order to discourage through traffic. They are designed with the primary objective of making the best possible use of land for home sites and of providing convenient access between homes and local shopping centers, schools, transit stations, and major thoroughfares.

**Means of Transportation as They Affect the Design of Parking Spaces**

There are generally three kinds of transportation:

a) **Bus:** This usually runs on main thoroughfares connecting cities, suburbs, or districts. If a town is serviced by the bus, strategic points of stop will be provided along its route.

b) **Carriage:** This mode of transportation is mainly for inter-neighborhood use, and carriage stands will be provided. For each neighborhood a carriage-stand area of 3000 sq. ft. to accommodate ten carriages may be considered adequate.

c) **Tricycle:** This is used for comparatively shorter distances and largely utilized for intra-community (that is, within the neighborhood) communication. Tricycle stands will be provided at convenient locations, such as neighborhood shopping centers
and sub-centers. The central tricycle stand will be "off-street," while those at the sub-centers may be "on-street."

All of the above proposed requirements and "minimum" standards for the various neighborhood elements are by no means exhaustive. At best, they only form the basic guiding principles for the writer to start out with the design of the model town, which follows immediately.
CHAPTER V

GENERAL PLAN FOR NEW TOWN OF THAMAING

The site for the new town is situated in Thamaing, about five and one-half miles from Central Rangoon. The ground is gently rolling, with very little area having slopes exceeding 8%. The existing village consists of only a small number of huts and other temporary type residences. Most of the terrain is now undeveloped, fairly thickly wooded land. However, the clayey soil will not sustain heavy multi-story structures.

Existing discernible features are:
1. Light industrial site, with new plants growing rapidly,
2. Existing government-owned Cotton Spinning and Weaving Factory east of Insein Road,
3. Insein Road, Prome Road, and Insein Railway,
4. University of Rangoon and Inya Lake southeast of the site.

The site, as seen from the Comprehensive Plan, is within easy access of the port, airport, and all other parts of the city. Even if the proposed highway may not be built in the foreseeable future, the town could well assume its functions with the existing main roads and railway. Another reason for choosing this site for the town, besides its being buildable, is that there will be an estimated number of 14,000 workers in the area. And it is of paramount importance that housing
be provided for these people and their families in an area within walking or cycling distance of their workplace—chiefly the new industries.

**Relationship to the Region**

It must be borne in mind that the cost of commuting is not cheap and that existing means of transportation are not adequate, and that the distance people could travel either walking, cycling, or by carriage is very limited. The town is therefore planned to be a self-contained and balanced one, and its primary purpose is to take the working populations of the new industrial plants in the area. The site for the town lies east of the Rangoon-Prome railway. The area is a suburban one and roughly rectangular in shape.

**Pattern (Map 7)**

The proposed limited access highway will run along the west boundary beyond which is the Rangoon-Prome railway. On the east, Prome Road forms the boundary. The main approach to the town center, however, will be (a) by the existing Insein Road for north-south connection, and (b) by the new Link Road running across the town in east-west direction. The town center is developed between the Government Research Institute's site and the Government Weaving Factory to form the focus of the plan.

The housing groups are on the higher and gradually sloping ground, clear of main traffic connections, with woods and sub-
arterial roads forming barriers between them.

Circulation

The chief road access to the town from Rangoon and the north is by the proposed highway, and Insein Road, which runs through the town, and buses will continue to operate on this route. Branches lead from this road to the industrial areas and to the residential areas, but the new Link Road provides the main connection between the town and points to the east. There is an independent system of feeder streets running through the residential areas, giving connections between them.

The proposed highway will be a divided one, with 200 feet right-of-way. A railway station is provided at the point where Link Road crosses the railway line, so that there is a direct connection by rail between this town and Insein in the north, and Rangoon City in the south.

Industry

The industrial areas, including the weaving factory, total 1,000 acres to accommodate 15,000 workers at a gross density of 15 persons per acre. This low density was taken to provide a wide factor of safety, and because of the nature of the industries.

Housing

The residential areas consist of ten comparatively small and compact neighborhood units of from 4,500 to 5,000 people,
each with its primary school, local civic and shopping centers, any part being within easy walking distance of any other. The areas are grouped in clusters around high schools and as near to the town center as possible, in order that community facilities of a more urban scale than is usual could be provided.

The total population of the town is 45,000 to 50,000, or 10,000 families. It is assumed that there will be on the average 1.5 industrial workers per family, so that the total number of workers in the town will be 15,000.

The main basis of the design of residential areas is to group two neighborhood units together and without any major roads separating them. This eliminates the traffic that might otherwise be hazardous to children of middle school ages.

An 80-acre undeveloped parcel of land, south of the town, is allocated for the University of Rangoon.

Landscape

Good agricultural land north of the industrial area and the undeveloped wooded area west of the cemetery on Prome Road are left in their natural state and projected into the area to bring rural life into immediate contact with the urban one. The wooded area between the weaving factory and the northern end of Inya Lake is advantageously exploited for a park, which is enhanced by having a lake frontage on the east. A picnic area and a community boat club are located at the lakeside.
**Town Center**

The town center, with Insein Road bordering it on the west, is composed of two units: the business district and the civic center, 90 acres and 60 acres, respectively. The center is located within slightly more than a mile's distance of all residences as well as the industrial work center.

The town hospital occupies a beautiful 12-acre site, circumscribed by the park, and is accessible from all parts by road.

**Religious Institutions**

The site location of pagodas, where people go to worship, is not for the planner to determine. It is generally a decision that rests with the venerable monks. However, the planner does in actuality, even without rigid control, specify the general locations for these religious objects, since the only "open" spaces available for these purposes are the parks within the town, and the reserves and the undeveloped land outside the town.

**Utilities**

Water for the town is available by tapping the Gyobyu water supply line (for Rangoon from Gyobyu Lake) on Prome Road. Electricity is likewise available from its power line on Insein Road. Regarding sewage disposal, for a town of this scale, sewerage system is recommended. Two alternatives for

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1. Utilities discussed in Chapter III.
the means of final sewage disposal are observed. If this system is connected with the Rangoon City sewerage system, the joint system has to be thoroughly studied; the other method that may be adopted, as suggested by the sanitary experts, is to provide a separate system for "Upper Greater Rangoon" to serve Insein, Thamaing, and the University area. In this case, the sludge-rich fertilizer—may be used in the nearby farmlands.

Land Area

The total land area required for all types of use in the town is shown in Table X. This includes all open spaces, but excludes farmland, reserves, and the site allocated for the University.

**TABLE X**

**LAND AREA FOR NEW TOWN**

<table>
<thead>
<tr>
<th>Type of Use</th>
<th>Area in Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All Public Buildings (including Schools)</td>
<td>144</td>
</tr>
<tr>
<td>2. Open Spaces</td>
<td>280</td>
</tr>
<tr>
<td>3. Business</td>
<td>110</td>
</tr>
<tr>
<td>4. Residence</td>
<td>1,500</td>
</tr>
<tr>
<td>5. Industries</td>
<td>1,000</td>
</tr>
</tbody>
</table>
Plan Implementation

Lands necessary for the town will be acquired and retained by the Government and the National Housing Board controls its development, which is set by stages:

Stage 1. In view of the number of factories already built in the area—the weaving factory, the pharmaceutical factory, and some branches of the Research Institutes—five neighborhoods (Nos. 1 through 5, Inset of Town Map 7) are built immediately. The town center begins to blossom, while the more important public buildings in the town civic center, the High School adjoining the weaving factory, and the boat club are also built. The areas reserved for parks are improved.

Stage 2. As more industries are developed, the construction of Neighborhoods Nos. 7 and 8, the second High School, and the town hospital take place.

Stage 3. Construction of Neighborhoods Nos. 9 and 10.

The pace of building construction and the intervals between the different stages depend upon that of the industrial growth, since the town is primarily built to accommodate its industrial workers. With the existing close coordination between the National Housing Board and the Industrial Development Corporation, and other governmental agencies, the demand for housing in this area at different times will not be difficult to determine.
The industrial plants, the construction of which is supervised by the National Housing Board, are State-owned and handed over to the Industrial Development Corporation after completion. The Board also supervises and finances the construction of all the other buildings in the town, which are turned over to the local municipality on completion. All the dwelling units in the town are intended for sale on a rental basis, but the Board holds the lands.

The Neighborhood Plan (Map 8)

The housing at Thamaing is planned as clusters of two neighborhood units having a common middle school and an administration building (PWD.) Both the middle school and the primary school have playgrounds, and each occupies a total site area of 4 acres. This analysis is concerned with the design of the cluster lying south of the Research Institutes and between the railway and weaving factory.

All the neighborhoods have their own primary schools, which are located in their heart, their own center of shopping and public buildings, such as police and fire stations, post office, clinic, etc. The schools are designed to accommodate branch libraries and auditoria for neighborhood use as well and are less than half a mile from the farthest corners of the neighborhood.

Given the same architectural and landscape treatment, curved streets may be more pleasant and attractive than straight ones.
Nevertheless, the following points about the straight street, which is preferred and accepted in the neighborhood design, are worth consideration:

a) It can be very attractive and pleasant by special landscape treatment;

b) The monotony which it may evoke can be overcome and its esthetic response enhanced by a deliberate break of the building line and by using a variety of building types (Fig. 5);

c) It is easier and cheaper to construct, especially on flat terrain, than curved streets;

d) It is easier to remember and locate;

e) Lots become regular in shape; curved streets produce odd-shaped lots and the space between the rear lot lines is often not effectively used.

Two feeder streets run through the neighborhood in a north-south direction. (Map 8). They are staggered so that they do not assume the character of "through-traffic" streets. A system of culs-de-sac and the feeders broken into regular intervals by them, together make up the street pattern. The culs-de-sac run east-west and practically all the houses either face north or south, which gives them the best suitable orientation.

A three acre park with an active play area for adults is located adjacent to the primary school.

The total number of dwelling units is 1,090; 151 being in
TYPICAL LAYOUT OF RESIDENCE LOTS
NEIGHBORHOOD NO. 1 NEW TOWN OF THAMAING

FIG. 5
one-bedroom row houses which are sited farthest from the school area, the reason being that most of these families are either small or are without children. The remaining 940 dwelling units are two-story detached single-family houses ranging from two-bedroom to five-bedroom in size and scattered on 50 ft. x 100 ft. lots. The gross density of the neighborhood unit is 7.1 families per acre.

There are four types of traffic movement: automobile, cycle, carriage, and pedestrian. The first three types move about on pavements only. Tricycles are used for short distance travels within a neighborhood or from one neighborhood to the closer areas of another, whereas the carriage is used for travels of a much greater distance.

All the internal streets are 50 feet right-of-way with laterite (hard surfaced) sidewalks and planting strips on both sides. Ten-foot easements, provided between the rear lot lines for utility, also serve as pedestrian walks and for vendors who are accustomed and prefer to use the "back alleys," and promote "back door neighborliness." Practically all the sidewalks and easements lead to the central mall, which is 20 feet wide and runs through the entire length of the cluster.

There are three (horse) carriage stands in the neighborhood, or five in the cluster. The one near the middle school in the
CIRCLE SHOWS SITE OF NEW TOWN AND REVISED SECTION OF TRAFFIC SCHEME

GREATER RANGOON COMPREHENSIVE PLAN

- open spaces and green belts
- residential
- public buildings, civic centers
- markets
- public utilities and services
- light industries
- heavy industries
- harbor and warehouses

NATIONAL HOUSING AND TOWN & COUNTRY DEVELOPMENT BOARD - RANGOON, BURMA

MAP 9
street separating the two neighborhoods serves the latter. One "off street" tricycle stand is provided near the bazar and neighborhood center not only for the convenience of shoppers, but also for mothers who do the morning shopping and send their children to school. Direct east-west connections by cycles between the different parts of the neighborhood are provided by means of two short laterite roads. A timber overpass is built, about half way between the north and south limits of the neighborhood, for cycles and pedestrians crossing the highway to the industrial area.

Modification of the Greater Rangoon Traffic Scheme

With the birth of the new town, it is necessary to revise part of the Greater Rangoon Traffic Scheme. The one modification involved (Map 9) is bringing the new Link Road further south and connecting it with the road running along the northern tip of Inya Lake.

Summary and Conclusion

The general aim of this paper has been to observe how the Burmese people live and to suggest some minimum standards for better living in terms of planning. What this paper has covered is by no means exhaustive. The problems facing the people and the country which is being industrialized are legion, and cannot be studied without being on the spot. However, the important
thing is that this paper attempts to grapple with some of the most important questions involved in planning of the scale from the neighborhood unit to the town, and the solutions might be thought of as theoretical blueprints.

The compound-for-every-dwelling-unit system is retained in order that the traditional way of life of the people may be preserved, and at the same time, it helps the government program, encouraging home ownership.

In general, there is the need for more study and information in such fields as the education system, the economy of the people, and the government budget. Such information will undoubtedly be a valuable asset in planning new neighborhoods and towns and in replanning the old ones.

Summarizing, this paper was written as an attempt to attain, broadly speaking, three main goals: first, to show that better living can be achieved by some good planning efforts; second, to emphasize the importance of initiating investigation and research toward answering basic planning problems; and third, to make the Burmese architects, planners, and engineers realize that they have something useful to learn and to contribute toward the reconstruction of the country.
### A) Population of Selected Towns:

<table>
<thead>
<tr>
<th>Town</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandalay</td>
<td>185,867</td>
</tr>
<tr>
<td>Moulmein</td>
<td>102,777</td>
</tr>
<tr>
<td>Bassein</td>
<td>77,905</td>
</tr>
<tr>
<td>Henzada</td>
<td>61,972</td>
</tr>
<tr>
<td>Akyab</td>
<td>42,329</td>
</tr>
<tr>
<td>Prome</td>
<td>36,997</td>
</tr>
<tr>
<td>Rangoon</td>
<td>737,079</td>
</tr>
<tr>
<td>Tavoy</td>
<td>40,312</td>
</tr>
</tbody>
</table>

### B) Distribution of Households According to Types of Structure, Tenure, Household Occupancy, and Number of Stories of Dwelling Units, by Selected Towns:

#### TOTAL NO. OF HOUSEHOLD DWELLING UNITS

<table>
<thead>
<tr>
<th>Town</th>
<th>TOTAL NO.</th>
<th>8,711</th>
<th>18,662</th>
<th>14,323</th>
<th>42,767</th>
<th>20,726</th>
<th>9,224</th>
<th>154,431</th>
</tr>
</thead>
</table>

#### OWNED NUMBER PERCENT

<table>
<thead>
<tr>
<th>Town</th>
<th>OWNED NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akyab</td>
<td>6,303</td>
<td>72.36%</td>
<td>12,047</td>
<td>64.55%</td>
<td>10,737</td>
<td>74.96%</td>
<td>29,236</td>
<td>68.36%</td>
</tr>
<tr>
<td>Bassein</td>
<td>3,715</td>
<td>43.56%</td>
<td>7,565</td>
<td>40.88%</td>
<td>6,020</td>
<td>42.89%</td>
<td>15,636</td>
<td>36.56%</td>
</tr>
<tr>
<td>Henzada</td>
<td>1,749</td>
<td>21.15%</td>
<td>3,749</td>
<td>20.40%</td>
<td>3,049</td>
<td>21.80%</td>
<td>7,069</td>
<td>16.74%</td>
</tr>
<tr>
<td>Akyab</td>
<td>1,229</td>
<td>14.69%</td>
<td>2,569</td>
<td>13.89%</td>
<td>2,155</td>
<td>15.34%</td>
<td>5,318</td>
<td>12.57%</td>
</tr>
<tr>
<td>Bassein</td>
<td>486</td>
<td>5.69%</td>
<td>1,086</td>
<td>5.81%</td>
<td>916</td>
<td>6.38%</td>
<td>2,186</td>
<td>5.18%</td>
</tr>
<tr>
<td>Henzada</td>
<td>283</td>
<td>3.49%</td>
<td>616</td>
<td>3.34%</td>
<td>521</td>
<td>3.57%</td>
<td>1,617</td>
<td>3.77%</td>
</tr>
</tbody>
</table>

#### TOWN 3 and over NUMBER PERCENT

<table>
<thead>
<tr>
<th>Town</th>
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<th>NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
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</thead>
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<tr>
<td>Akyab</td>
<td>0.28%</td>
<td>0.08</td>
<td>0.47%</td>
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<td>0.08%</td>
<td>0.02</td>
<td>0.08%</td>
<td>0.02</td>
</tr>
<tr>
<td>Bassein</td>
<td>0.03%</td>
<td>0.01</td>
<td>0.06%</td>
<td>0.01</td>
<td>0.08%</td>
<td>0.01</td>
<td>0.08%</td>
<td>0.01</td>
</tr>
<tr>
<td>Henzada</td>
<td>0.06%</td>
<td>0.01</td>
<td>0.08%</td>
<td>0.01</td>
<td>0.08%</td>
<td>0.01</td>
<td>0.08%</td>
<td>0.01</td>
</tr>
</tbody>
</table>

#### AVERAGE

<table>
<thead>
<tr>
<th>Town</th>
<th>NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
<th>NUMBER</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akyab</td>
<td>0.08%</td>
<td>0.02</td>
<td>0.11%</td>
<td>0.02</td>
<td>0.02%</td>
<td>0.00</td>
<td>0.02%</td>
<td>0.00</td>
</tr>
<tr>
<td>Bassein</td>
<td>0.01%</td>
<td>0.00</td>
<td>0.01%</td>
<td>0.00</td>
<td>0.01%</td>
<td>0.00</td>
<td>0.01%</td>
<td>0.00</td>
</tr>
<tr>
<td>Henzada</td>
<td>0.01%</td>
<td>0.00</td>
<td>0.01%</td>
<td>0.00</td>
<td>0.01%</td>
<td>0.00</td>
<td>0.01%</td>
<td>0.00</td>
</tr>
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</table>

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* Less than .01
BIBLIOGRAPHY


Stamp, L. Dudley. Asia.