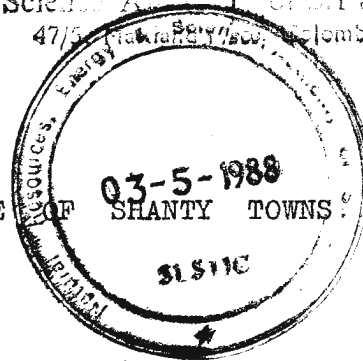


Future of shanty towns



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FUTURE



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PREFACE

This is the last of three documents reporting studies of shanty towns in Colombo under the title "Design for low-cost living".

The first document titled "Portrait of a shanty town" was published in May 1976 and showed maps of areas of a shanty town and plans and sketches of a selection of shanty houses. At the same time, a booklet of Papers delivered at a Seminar on 8 May 1976 was also published.

The second document "Analysis of a shanty town", published in July 1977, traced the development of a shanty town using aerial photographs, discussed maps of sample areas and the plans of many individual houses and analysed the results of a detailed questionnaire survey.

This third document, "Future of shanty towns", reports a survey of Colombo carried out in mid-1976, describes various "solutions" to the "shanty problem" attempted in different parts of the World and makes suggestions about the future of shanty towns.

ACKNOWLEDGEMENTS

This report concludes a research project under the title "Design for low-cost living" which has been supported by the National Science Council. All the survey work in Colombo, the expenses of the Seminar and the publication costs have been borne by the N.S.C. Additional work has formed a part of Post-graduate Studies or has been carried out privately.

Those who took part in the initial studies in 1973 are listed in "Acknowledgements" in "Analysis of a shanty town". Their work laid the foundation for these studies.

A complete set of Aerial Photographs to the new metric scale of 1:5000 (approximately 1 foot to 1 mile) showing Colombo and Mount Lavinia and also Dehiwela and Katubedda was specially prepared by the Air Survey Section of the Government Survey Department for the Department of Architecture.

The Colombo Survey described in the first part of this report was carried out by the following students who had just completed their second year of study in the Department of Architecture at Katubedda Campus:

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 6. D.L.B.M. Jinasena
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 9. Miss K.S. Ranasinghe
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 12. N.H. Jayakody
 13. R. Mayoornathan
 14. H.P. Silva
 15. V. Sri Amareswaran
- and by the following students who had just completed their First Year:

1. Miss A.P.J. Abeysuriya
2. A. Chandrahasan
3. D.G.A.L. Dassanayake
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15. M. Selvakumar
16. K. Senthilgiri
17. K. Sivapalan
18. W.N.R.P. Somipala
19. S.L.C. Wijeratne
20. G.S. Wijesuriya
21. Miss M. Lalithampal
22. Miss S. Rajadurai

Survey training was given with the assistance of Mr. and Mrs. S. Amendra and Mr. and Mrs. N. de Silva, all of the Architects' Consultancy Group of the State Engineering Corporation. All were former students and had taken part in the earlier surveys reported in "Analysis of a shanty town*.

The computer analysis of the survey results was carried out at Katubedda with the assistance of Mr. K. Abeyratne of the Department of Architecture and of Mr. N. Manoharan, formerly a post-graduate student. The analysis was completed at Leicester Polytechnic in England.

The two sketches in Figures 8 and 9 are by M.T.L. Peiris while a second year architecture student.

Proposals for the Future are based partly on discussions and projects by the following Post-graduate students in the Department of Architecture:

1. Sunil Amendra
2. Nimal de Silva
3. Miss Iranganie Gunawardena
4. S.W.P. Agalawatte
5. A. Piyasiri
6. R.A. Jayasinghe
7. N. Manoharan
8. R. Sivaraman
9. S.K. Somaskandiah
10. Miss P.N. Manthilake
11. D.J.R. Ponnai
12. Miss M. Ratnasabapathy
13. S. Anandaganeshan
14. S.R.P. Gulawita
15. W.H.E. Perera
16. Miss M.A.G. Cooray
17. N. Attygalle

The UN Policy was discussed with members of the Colombo Master Plan Team, with a team of advisors, who visited Sri Lanka in 1974 and to whom the Post-graduate Architecture students reported and with the United Nations Environmental Programme on a private visit to Nairobi.

Dr. Joachim's work has been summarized from his doctoral thesis and from private discussions.

The analysis of housing stress was made in 1975 by Post-graduate students in the Department under Michael Slingsby, Director of Post-graduate Studies.

Studies of multi-storey flats and aided self-help housing were made by Messrs. Manoharan and Sivaraman for submission as their M.Sc. Theses.

A study of the Uda Walawe Project was made by Post-graduate students with the cooperation of the River Valleys Development Board.

Discussions were held with the Tamil Nadu Slum Redevelopment Board and a visit made to a shanty area and a redevelopment project while on a private visit to India. Chandigarh was visited during the same visit.

Brief discussions were held with Professor Achwal while he was visiting Sri Lanka as an examiner on behalf of the Royal Institute of British Architects, and the University of Sri Lanka.

South American experiences have been described by John Turner in "Freedom to Build" and by many others.

Technical assistance with survey organisation, data processing, tape recording, photography and the large task of publication was given throughout by Mr. S.G. Weerasooriya and Mr. K. Abeyratne of the Department of Architecture and by other staff at Katubedda Campus.

Further copies of the four publications, "Portrait of a shanty town", "Analysis of a shanty town", "Future of shanty towns", and "Seminar Papers" are obtainable from the National Science Council. The original survey information is available for reference and further analysis at the National Science Council Library and at Katubedda Campus.

While it must be evident from the above acknowledgements that this research has only been possible through a tremendous amount of teamwork and cooperation, the people named are not responsible for the conclusions and indeed, may disagree with them.

The final acknowledgement must go to the shanty dwellers themselves who, throughout these studies, have cooperated in every way possible. It is hoped that their replies and information will lead to a better future.

INTRODUCTION

Shanty towns have grown rapidly throughout the developing world in the last Quarter Century. The industrial revolutions of the last Century brought population growth and economic expansion simultaneously to the now developed countries. But in the countries now developing, medical improvements and population growth have come before industrial and economic expansion. Development, even if it comes now, has an overwhelming task of catching up.

The rate of population growth is far greater than the rate at which new land can be farmed, even with extensive irrigation projects such as the Mahaweli Diversion Scheme. To feed many more mouths on just a little more land demands higher productivity. In most parts of the World, this is being achieved with more mechanized farming and the development of "SERVICE" industries to manufacture and maintain equipment, provide fuel, electricity, irrigation water and fertilizers. The result is that the Cities must absorb the population increase of both themselves and that of rural areas. In India, the National population growth rate is between 2 and 3% but the cities are growing at 6%.

The rates of urban growth in developing countries are far beyond the capabilities of employers to provide jobs, beyond services such as water supply and drainage, beyond health and education facilities and beyond housing provision. The problems of "urbanization" now rank in global importance with those of "defence", "population", "health", "food", "pollution" and "energy".

The most evident result of unctrollable urbanization has been the prolific growth of shanty towns throughout the developing world. A shanty town is a group of dwellings erected illegally in an urban area at standards below those in current force. The houses might be adequate in a rural area but, crowded together in an urban context with inadequate sanitation, water supply or rubbish disposal and very little open space, they become a health hazard devoid of life's qualities we have a right to expect. The occupants have no right to the land they occupy and so they are reluctant to spend money on improvements and they rely on force of numbers for their security.

The problems are less acute in Colombo for a number of reasons. First, the climate is warm and humid throughout the year. People do not die of exposure, life is largely outdoors reducing the problems of disease, droughts are not as desperate as in India and fires are rarely serious. Second, urban services are better than

in many cities though some are stretched to their limit. There are buses, hospitals, rice rations and taps, wells and latrines are adequate for most of the year. Third, there is a lot of old permanent housing where people live in preference to shanty houses, presumably because of greater security rather than because the physical conditions are better. Fourth, rural areas are relatively well developed with roads, hospitals, schools, electricity and so on which reduces a little the virtually inevitable "urban drift".

For these and other reasons, the problems are less acute in Colombo than in many countries and Sri Lanka may be fortunate in having a chance to alleviate present hardships and foresee and avoid future ones but there is no simple answer. The most obvious "solutions" are impossible through lack of money, materials, land, skills or motivation.

This report attempts to lay a foundation of fact, draw out certain guidelines, learn from experiences elsewhere and make some suggestions about the future of shanty towns.

SURVEY OF COLOMBO

The purposes of the Colombo Survey were

- 1) to estimate the number of people living in Colombo shanty houses;
- 2) to describe housing conditions in order to help designers and to assess ideas about possible future housing;
- 3) to examine, on a wider scale, some of the more important features of Wanathamulla Shanty Town described in "Analysis of a shanty town".

The Sampling Process

The size of Colombo and the large number of shanty houses made a complete survey impossible. It was therefore necessary to select a "sample", a smaller number of houses which would represent them all. To do this, a list of all the houses would have been needed but there was no such list. The electors' list, the Census and the Socio-Economic Survey do not identify shanty houses and a Municipality system of Registration was found to be too far out-of-date. The only other comprehensive surveys were maps and aerial photographs of Colombo. It was decided, therefore to divide Colombo physically into "Survey Areas", select a sample of these and then select a sample of houses from within each Area for more detailed study.

Preparation

Colombo is covered by "Four-Chain Ordinance Survey Sheets", maps at a scale of about 1:3000. Unfortunately, most were over 25 years out-of-date when land now covered by shanty houses was "swamps", "rough pasture" or "Crown Land". These maps, while useful as a base for data collection, were totally useless for locating shanty housing.

In the hope of identifying and mapping shanty housing from Aerial Photographs taken in 1972/73, a set of photographs of Colombo was specially prepared to the new metric scale of 1:5000 (about 1 inch to 1 mile). This "photo-mosaic" of Colombo was 3 metres (10 feet) long and contained enough detail to identify individual houses with a magnifying glass. Attempts to map shanty housing using mechanical drafting equipment at the Survey Department had been abandoned because the roof outlines were too indistinct, because the roofs did not indicate the house positions closely enough, because there was too much vegetation and because detailed ground checks revealed many changes in the intervening four years. Extensive footwork was inevitable.

The maps were cut and glued into composite maps whose boundaries coincided with those of the Aerial Photographs. Survey staff worked in groups each with a Photograph and corresponding composite Map. The City was divided into

over 300 "Survey Areas" each as near as possible to a quarter-mile square. They were divided up with boundaries formed by features such as roads, railways or canals that could be seen on the Aerial Photographs and identified on the ground.

The next step proved too optimistic. It was hoped that a fixed percentage (perhaps about 60%) of shanty houses could be counted on the Aerial Photographs. The other 40% would be hidden under vegetation or shadows and there would sometimes be two or even three houses under one roof. If the roofs in all Areas were counted on the Photographs and the houses in some Areas counted on the ground, the fixed percentage figure could be established and the total number estimated.

Shanty houses were recognized on the Aerial Photographs by their relatively haphazard arrangement of small roofs. As well as difficulties with shared roofs and vegetation, there was confusion with garages, CTB buses and even tombstones. Nevertheless, it was hoped that about 60% of the houses would be consistently spotted.

The selection of the Survey Areas for Ground Counting was important not only to check the Air Counts but also to achieve a representative sample of houses for detailed study. Traversing a Survey Area on foot was an arduous

and time-consuming task, a more accurate estimate could be made by concentrating most effort on Areas where there were a lot of shanty houses. A "weighted sampling system" was therefore devised. For Survey Areas with an Air Count of 30 shanty houses or less, the Area number was written on one card; if the Air Count was 31-100, two cards were written; if it was 101-300, three cards and if it was over 300, four cards were written. Picking the cards at random then produced a "weighted random sample".

One further refinement was necessary. The number of Areas to be surveyed would depend on the consistency of the Air Count/Ground Count error and the time to Survey each Area would vary with size, travelling time, weather conditions and numbers of shanty houses. Yet staff, students and space were only available for a short vacation and funds were limited and budgetted. An "open-ended" sample was therefore needed. This was achieved by giving each Area a "Survey Order Number", 1 for the first card picked up, 2 for the second and so on. Provided all Areas up to a certain Survey Order Number were surveyed, the sample would remain representative.

Survey staff began by learning, testing and improving the survey methods in Areas of their own choice. After completing these pilot surveys, the Air Counts and the sample selection, the main survey could begin.

The Survey of Areas

The first objective was to survey the Areas whose Survey Order Numbers were 1 to 30. Each Area was covered on foot by a group of three students. They counted the houses marking numbers in approximate positions on their maps and shading the positions of groups of 25 or more shanty houses. They also recorded details of houses as described later. The response of the occupants was virtually 100% the only exceptions being four Areas near the Kelani River where there was a Cholera outbreak and one near the Bandaranaike Conference Hall where relocation was imminent.

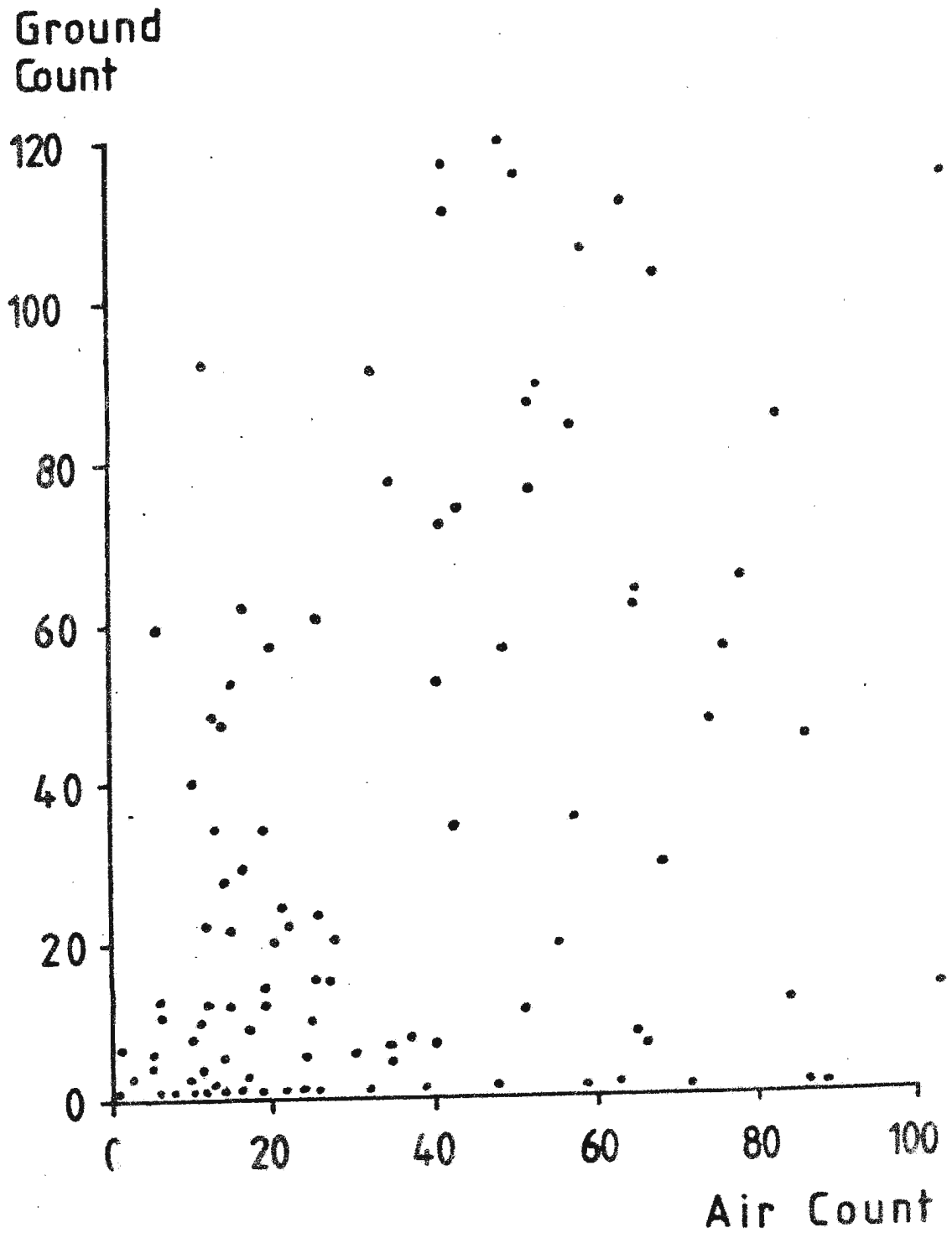
Results of Area Survey

The Ground Counts proved the Air Counts totally unreliable. Figure 1 compares the Counts. Each spot represents one Area and each indicates the Air Count on the horizontal axis and the corresponding Ground Count on the vertical axis.

During the survey as the Ground Counts began to prove the inaccuracy of the Air Counts, two independent Air Counts were made and the average taken but the wide, virtually random, scatter of the spots in Figure 1 shows that the Air Counts were almost totally unreliable. Something such as the profuse vegetation in the tropics rules out

Figure 1

Comparing Air and Ground Counts



what was expected to be a very useful and rapid technique.

The result of the totally useless Air Counts was that there was no quick way to estimate numbers of houses and far more ground survey work was necessary. The number of Areas to be surveyed was raised and those up to Survey Order Number 106 were eventually completed. The number of houses surveyed had to be halved to save this time. The almost random scatter of the Counts also negated the weighted sampling procedure devised and the sample was treated as a simple random sample.

Colombo was divided into 329 Survey Areas of which 106 were surveyed and 4209 houses were counted. Thus, the approximate number of shanty houses in Colombo

$$= 4209 \times \frac{329}{106}$$

$$= \underline{13,100}$$

This is a fairly reliable estimate because it is based on a survey of one third of Colombo in quarter-mile square Areas scattered throughout the City.

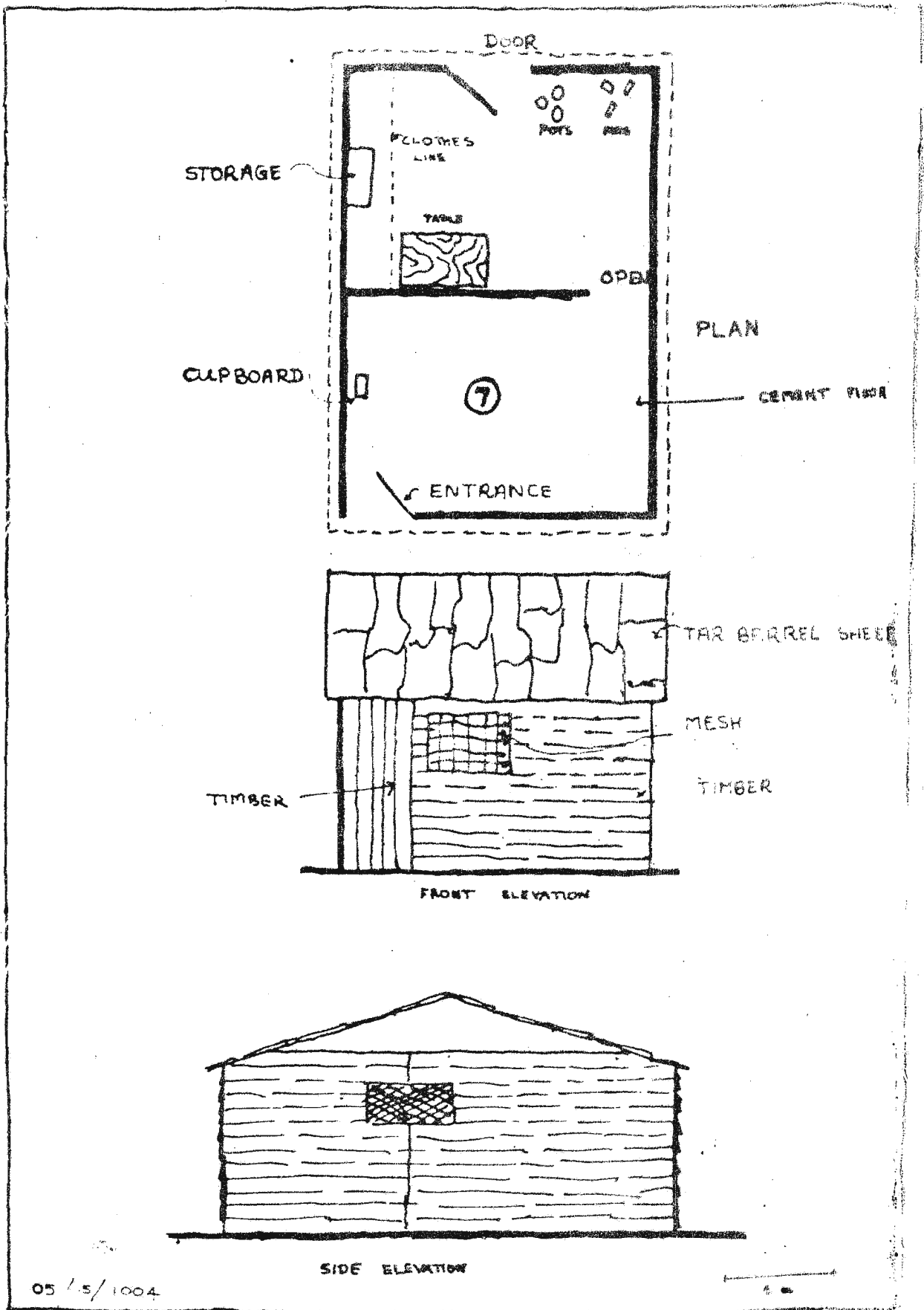
The Survey of Houses

Students drew plans and two elevations of a small selection of houses in each Area they surveyed. They also calculated the floor area and noted the number of habitable rooms, number of occupants and construction materials for computer analysis.

The actual houses to be surveyed were specified because a choice would have introduced personal bias and perhaps invalidated the sample. Many Areas had very few shanty houses while some had hundreds (one sixth had none, one sixth reached single figures, ~~one half reached single figures~~, one half reached double figures and one sixth reached treble figures). A straight one in ten sample would have given no information about many Areas and too much work in others. Students were therefore asked to survey the 4th, 16th, 64th and 256th houses in each Area. Originally, they surveyed twice this number but the number had to be reduced in order to save time to cover more Areas as explained earlier. Mapping of selected towns was also eliminated.

A total of 226 houses were surveyed and drawn in the form shown in figure 2. The number, 05/15/1004, identifies its position on the maps and its data in the computations. The scale is 1:50 (about 1/4 inch to 1 foot). The plan shows walls, doorways, the eaves line, the cooking fire and furniture. The circled number indicates the occupants. The elevations show the form of the house and the construction materials.

Figure 2 Typical House Survey Drawing



The houses were scattered throughout the City and are assumed to constitute a simple random sample from which various deductions may be made about shanty housing as a whole.

The total number of occupants in the 226 houses was 1519. Thus, the average number of occupants per house

$$= \frac{1519}{226}$$

$$= \underline{6.72}$$

Therefore, the approximate number of people in shanty houses in Colombo

$$= 6.72 \times 13,000$$

$$= \underline{88,000}$$

This is lower than is popularly believed and, if the City population is taken as 1 million, represents about 9% compared with 30% or more in many Cities in other Developing Countries.

House Size

The sizes of the 226 houses are shown in Figure 3 from which deductions may be made about house sizes generally.

The diagram shows that 1% of the houses were under 5 square metres in area, 13% were between 5 and 10 square metres, 27% between 10 and 15 square metres and so on. The most common size was between 10 and 15 square

(100 to 150 square feet; 1 square metre is approximately 10 square feet). Forty percent of the shanty-houses were under 15 square metres and a further 40% were under 25 square metres. Twenty-five square metres is half the size of the smallest house now built and would fit into a "2000 square foot house" seven times.

The total area of the houses surveyed was 4, 198 square metres and so the average size

$$= \frac{4,198}{226}$$

$$= \underline{18.6 \text{ square metres}}$$

But this figure is deceptive. Figure 3 shows that most people live in less space while some people have a lot more space and so raise the average. The smallest shanty house was only 2 metres by 1 and included a boutique counter and a cooking fire.

The dotted line in Figure 3 shows the house sizes at Wanathamulla for comparison. Here, there were rather fewer people in the 10-15 size range and rather more in the 15-20 range. The average size in Wanathamulla was 19.3 square metres, only slightly larger. A check was made of large houses (over 25 square metres) and most of these were located on the Northern, Eastern and Southern edges of the City where the pressure on land was less.

Figure 3

The Size of Houses

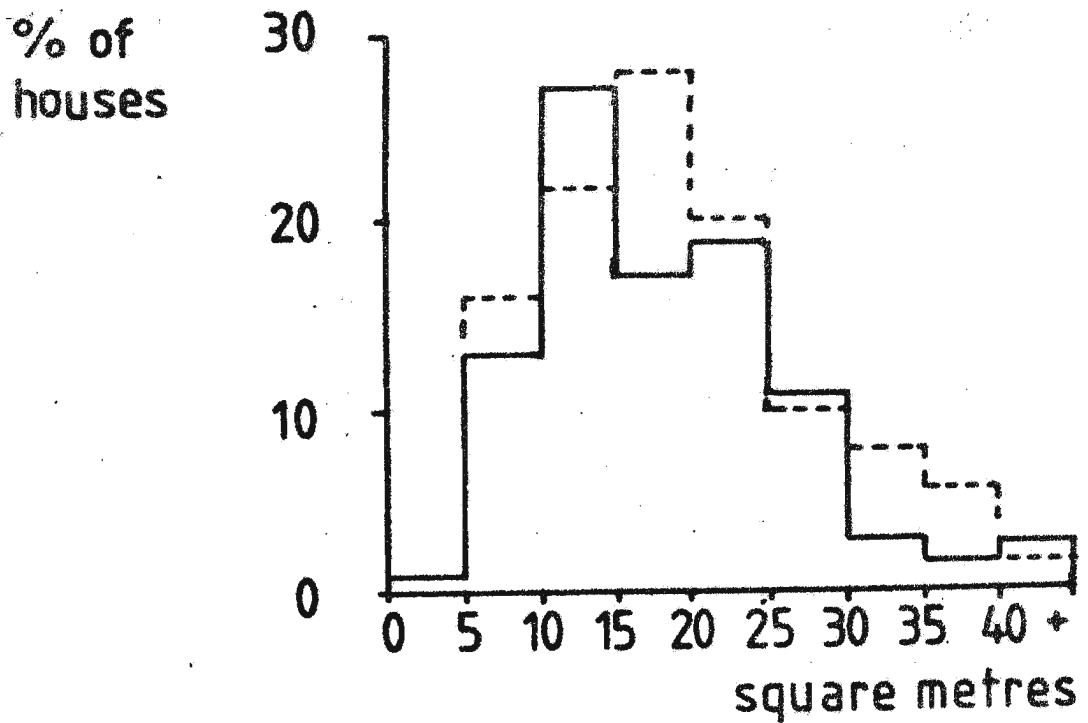
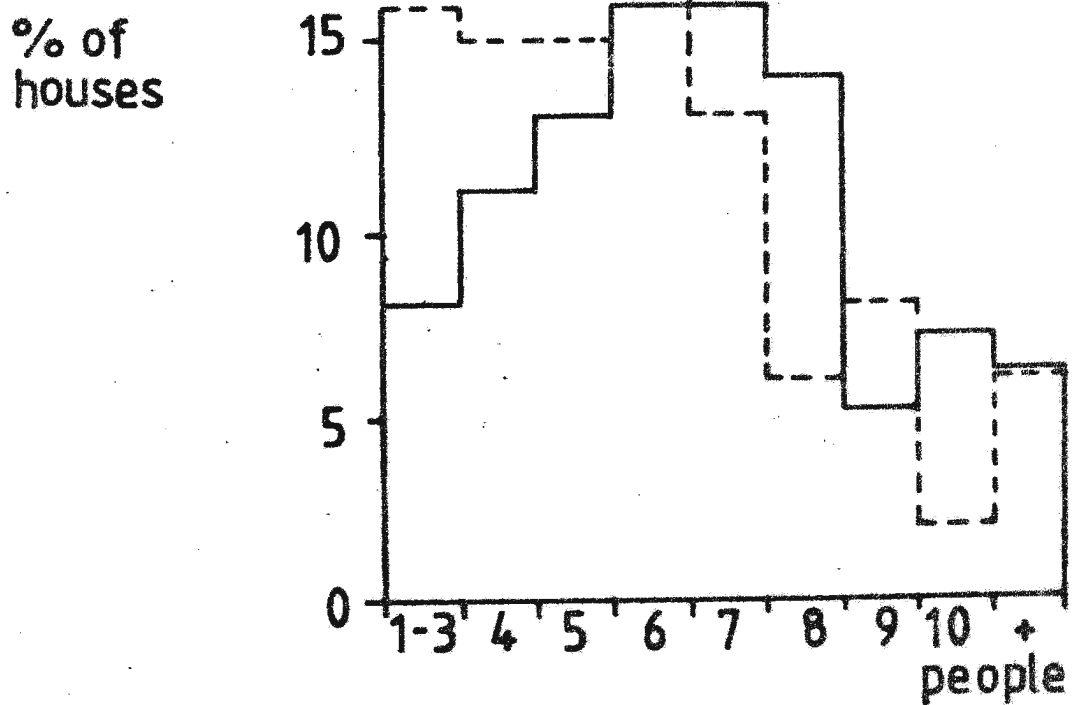


Figure 4

Household Size



Household Size

The numbers of occupants in the 226 houses is shown in Figure 4. Occupancies between 4 and 8 were common. One household in three had 5 members or less, one in three had 6 or 7 and one in three had 8 or more.

Again, the dotted line shows Wanathamulla for comparison. These, households were significantly smaller and averaged 6.0 compared with 6.7 generally in the City. Again, a check showed that this was typical of a shanty town on the edge of the City. It may be a combination of age and location; Wanathamulla was occupied 25 years ago when land pressures were less and new generations may prefer the more central shanty towns, despite greater densities, because they are closer to employment areas.

Space per Person

A total of 1,519 people lived in the 226 houses surveyed which had a total floor area of 4,198 square metres.

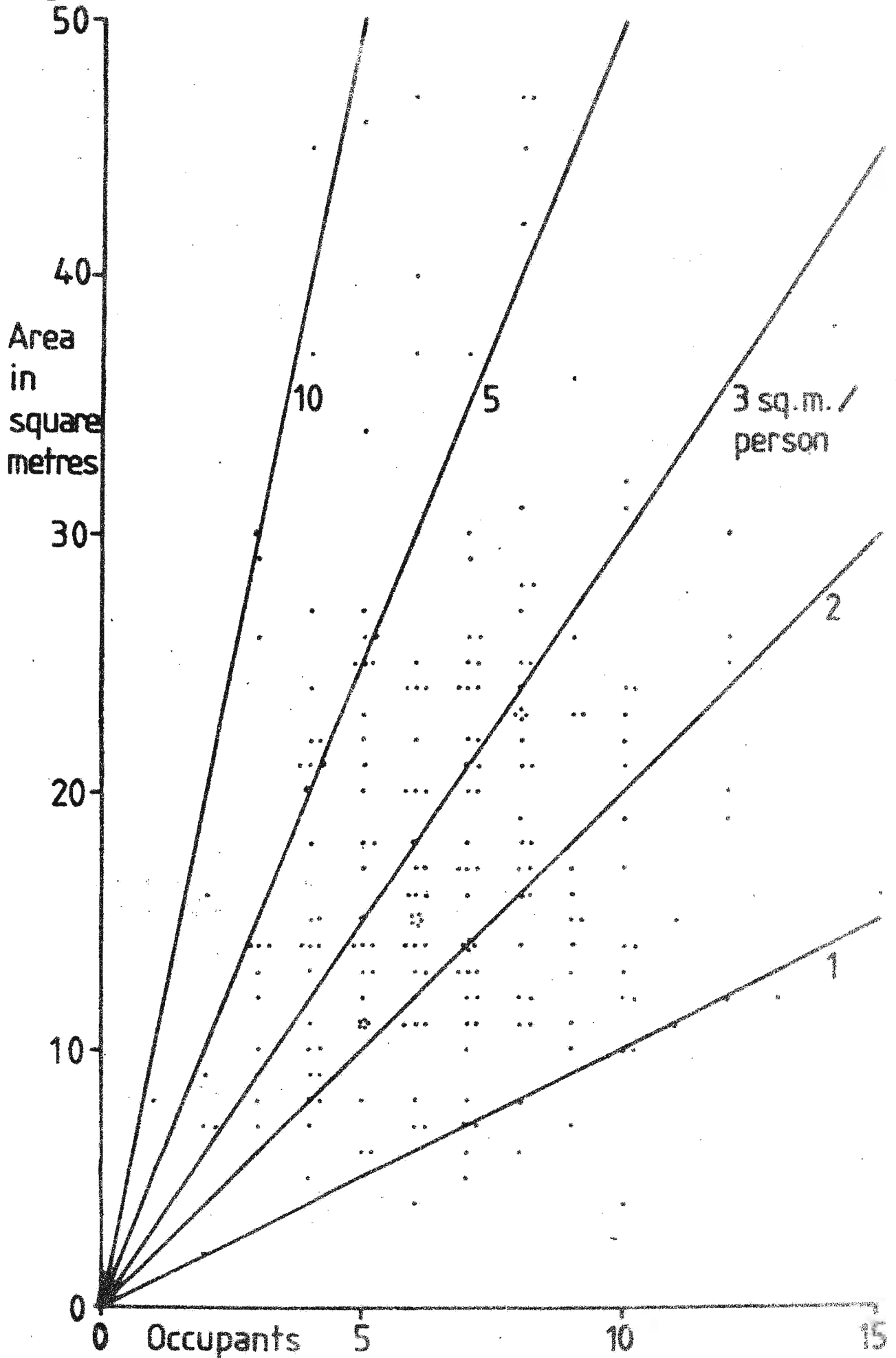
Thus, the average space per person

$$= \frac{4,198}{1,519}$$

$$= \underline{2.76 \text{ square metres}}$$

At this density (about 30 sq. ft. per person), a 2,000 sq. ft. house would accommodate over 60 people.

Figure 5 House and Household Size



Wanathamulla was less dense at 3.22 square metres per person. A detailed check showed that the distribution of space was dramatically unequal. Figure 5 is a comparison of the area of each house with the number of its occupants. Each spot represents a house and indicates its area on the horizontal axis and its occupants on the vertical axis. It defies any concept of "space standards". The wide scatter of spots shows that larger households do not occupy larger houses. There are many larger households in smaller houses (bottom right) and smaller households in larger houses (top left).

The diagonal lines in Figure 5 show 1, 2, 3, 5 and 10 square metres per person. About 30% of the houses have under 2 square metres and a further 30% between 2 and 3 square metres per person. Thus, roughly one household in three has "bedspace only", one in three has "twice bedspace" and one in three has "more than three times bedspace".

This dramatic inequality was first noted at Wanathamulla. When housing seems already "absolutely minimal", the variation is hard to believe. Clearly, architects have a great deal more to learn about the use of space and "minimal requirements".

Housing Density

Housing is currently measured in "bed spaces per acre". Figures over 235 are "high density" in Britain and dense City Centres in Developing Countries can exceed 1000. (One acre is 4,840 square yards. The metric measure of area is the Hectare, 10,000 square metres, about 2.5 acres).

It is not possible to calculate density directly from the Colombo Survey because open space was not surveyed but it is possible to estimate density by making assumptions from the Wanathamulla Survey.

At Wanathamulla, the average ground coverage in the five areas surveyed was about 0.3. The internal space per person was 3.22 square metres. For the City as a whole, the internal space was 2.76 square metres per person, 17% denser than at Wanathamulla. If it is assumed that ground coverage in the City was also 17% higher, it was 0.35. This is an assumption based on the likelihood that internal and external space shared the extra pressure for land. It follows that the total land area per person

$$= 2.76 \times \frac{1}{0.35}$$

$$= 7.9 \text{ square metres (85 sq. ft.)}$$

Thus, people (or bed spaces)

$$= \frac{10,000}{7.9}$$

$$= 1,300 \text{ per hectare}$$

$$= \underline{500 \text{ per acre}}$$

This is twice Britain's "high density" but half that found in some city centres.

Land Area

The total land area occupied by shanty housing in Colombo

$$= \frac{88,000}{1,300}$$

$$= 70 \text{ hectares}$$

$$= \underline{170 \text{ acres}}$$

This is equivalent to an area of a half mile square, about 2% of the City, the area of the Fort or a little more than the Vihara Maha Devi Park (Victoria Park).

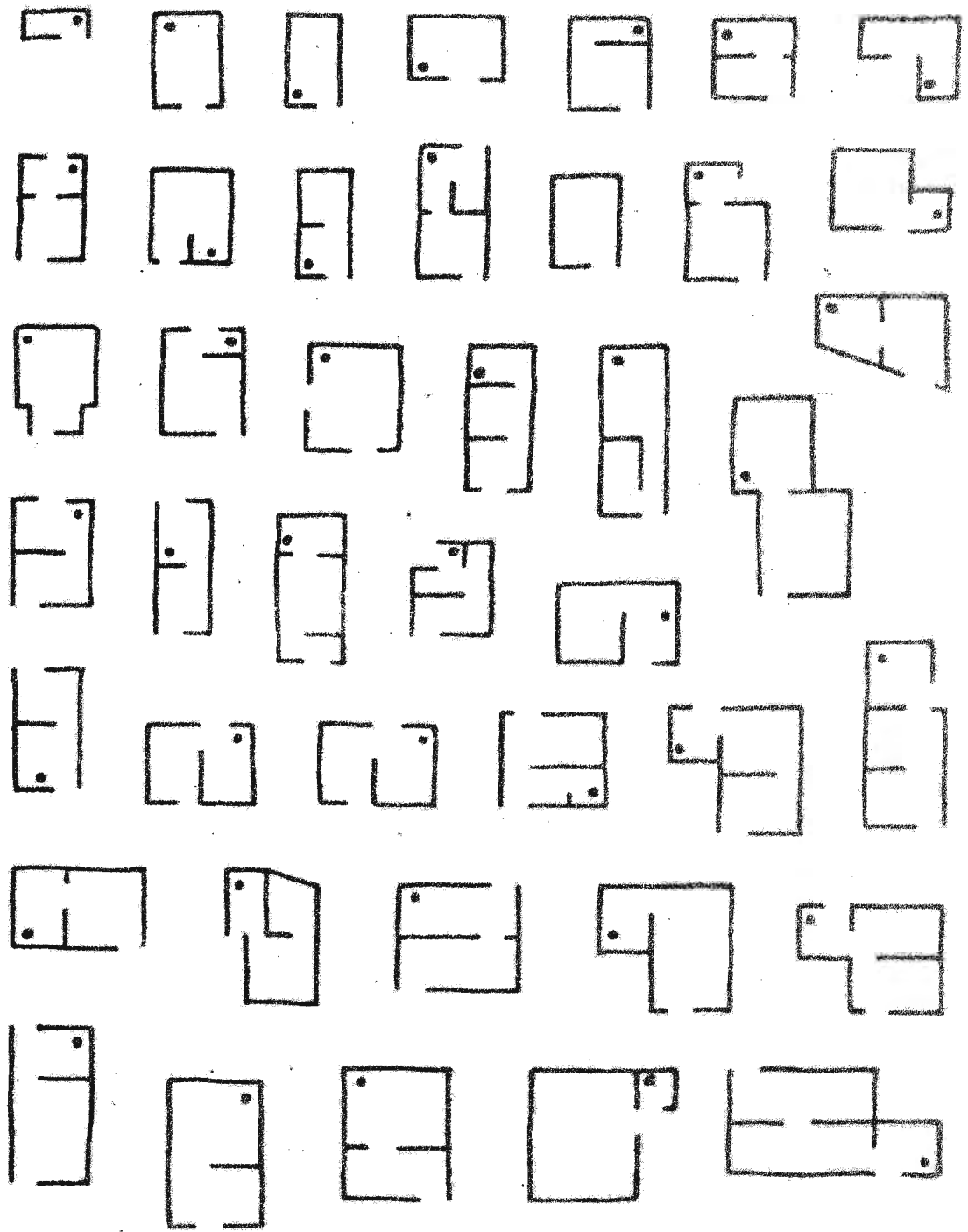
House Planning and Construction

Learning the statistics of space and people, attention now focusses on the construction and planning of individual houses.

About half the roofs were of metal sheeting, either corrugated iron or flattened tar barrels, and half were cadjan, a local thatch of woven coconut leaves. Over 80% of the houses had wooden plank walls, the rest using cadjan, metal sheets or mud. One third of the houses had one habitable room (a room used only for cooking or storage was not

Figure 6

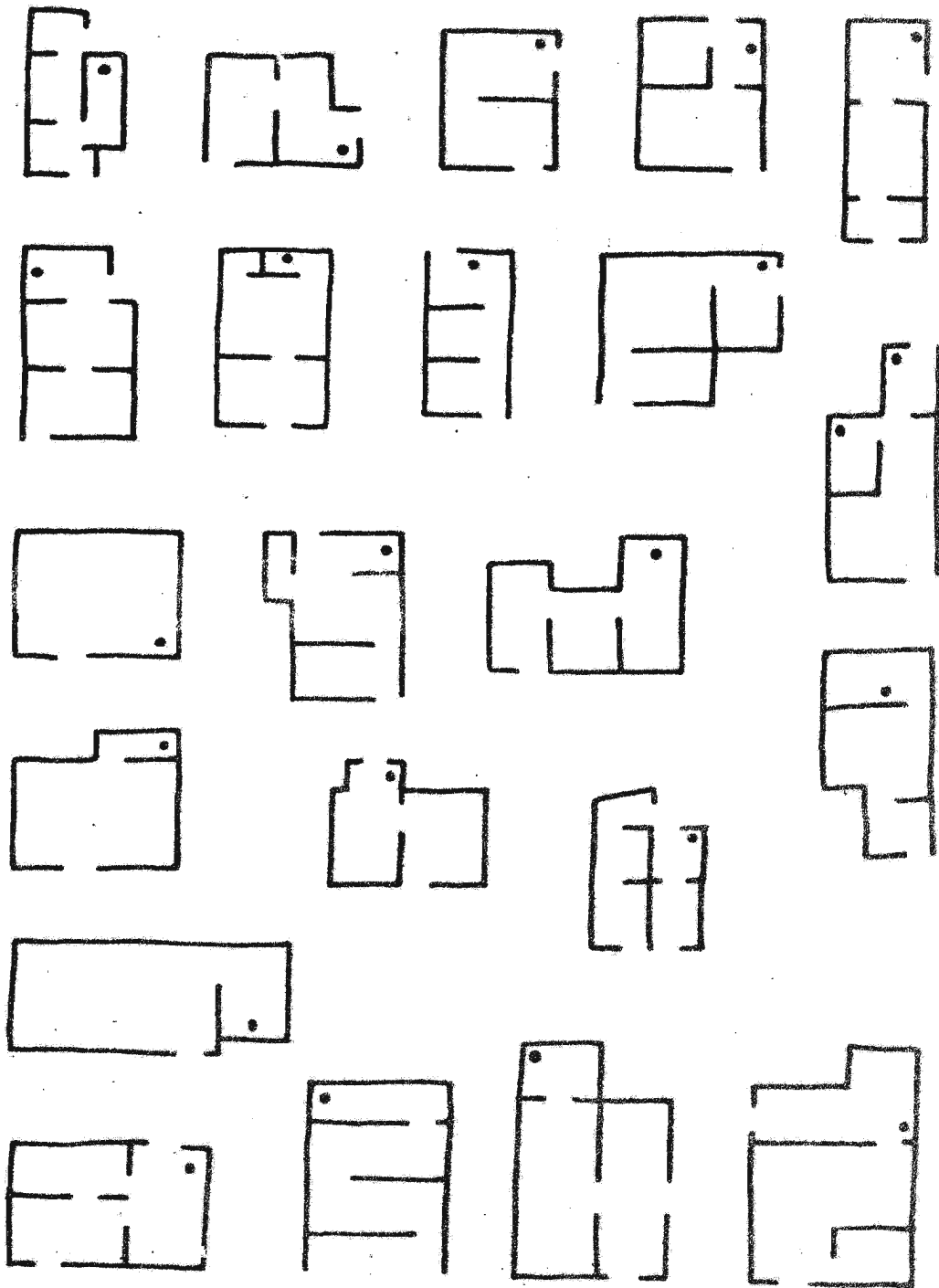
Comparative House Plans



└ 1 metre

Figure 7

Comparative House Plans (continued)



┌ 1 metre

counted as habitable; rooms divided by furniture or screens were counted separately), one half of the houses had two habitable rooms and the remainder had three or four. But it was in the plan arrangements, as at Wanathamulla that the greatest and most surprising variety was evident.

In Figures 6 and 7, over 60 plans selected at random have been simplified to show only walls, doorways and cooking fires (marked by a dot), reduced to the same scale (1:200) and arranged in order of increasing size with the main doorway at the bottom. It is clear at a glance, that the plans are very varied and it is difficult, even with careful study, to see any "design principles". There are no patterns of room relationships and no evident relationships between doorways, rooms or the fire. This is remarkable in view of the fact that it is room relationships that get most attention in house planning. An "ideal" plan is worked out and the occupants are almost forced to use space in that predetermined way.

The detailed plans, of which Figure 2 is an example, give hints and insights into the ways-of-life by indicating such features as boutiques, workshops, sewing machines, showcases, suitcases, rolled or hanging sleeping mats, kerosene cookers (for occasional use), places of praying and shrines, beedi manufacturing (cheap local cigarettes), baby hanging cot in a knitted blanket, radio, writing table, goats etc. etc. The fire is sometimes near the door and

Figure 8 In a Shanty Town

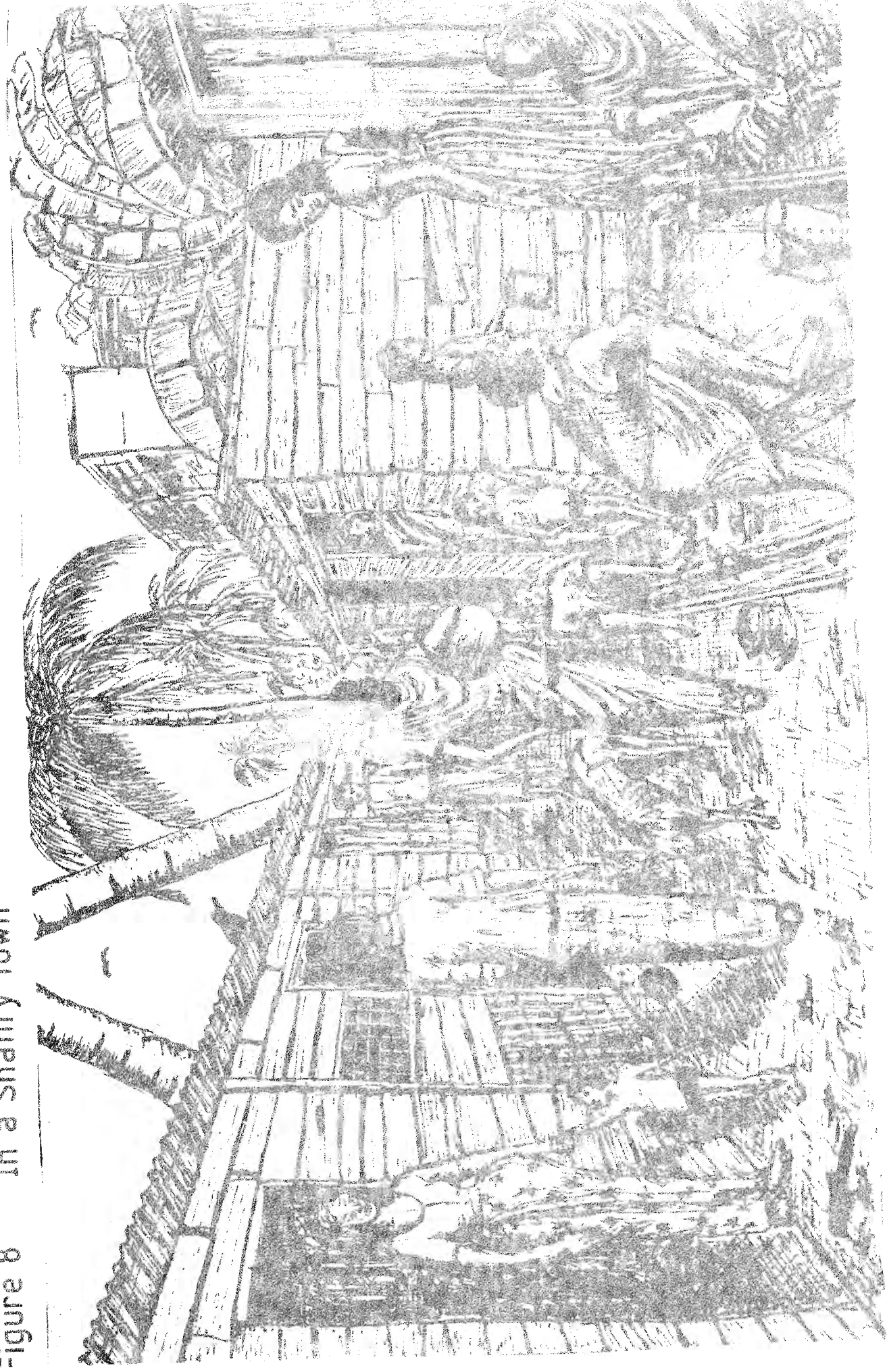
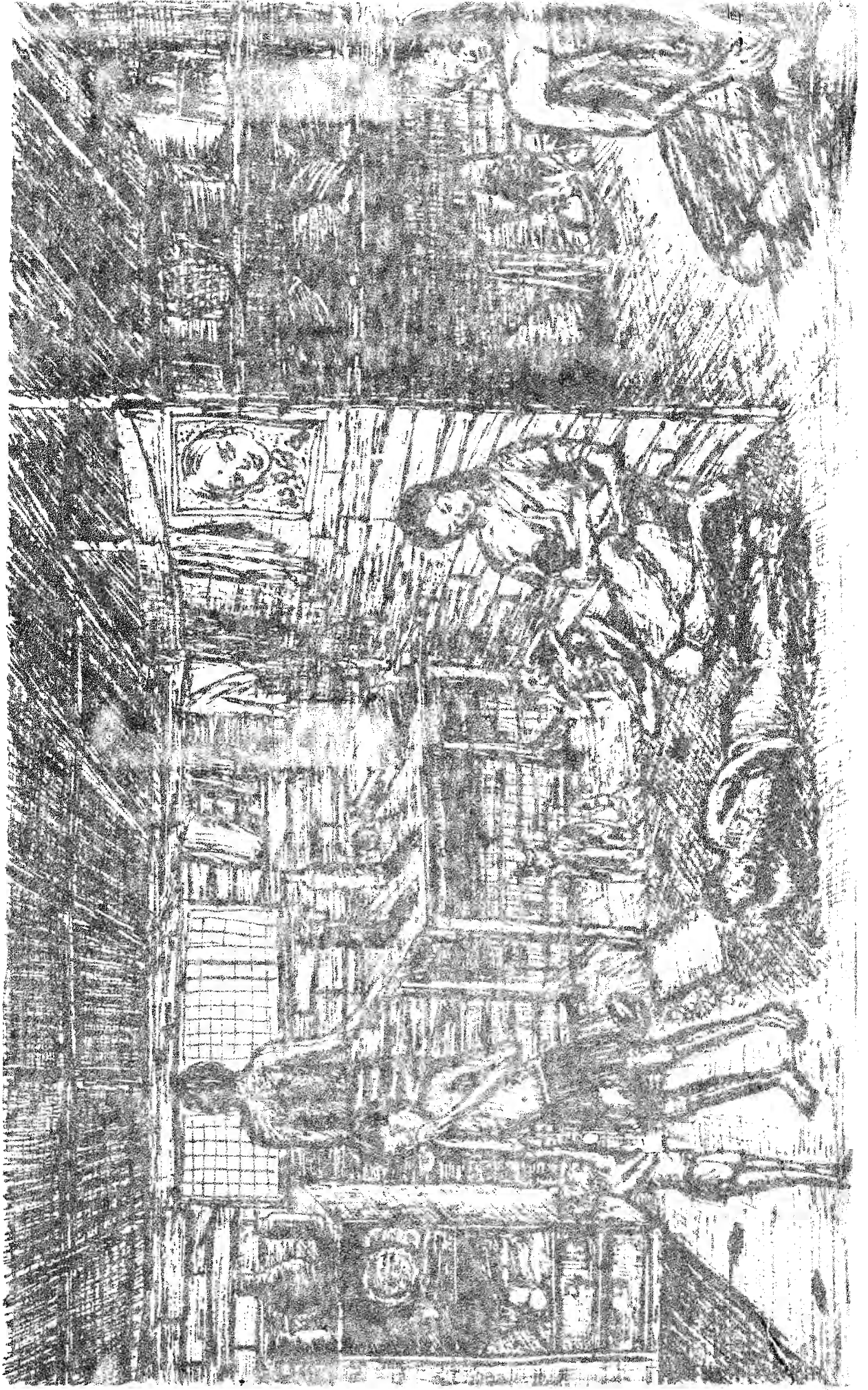


Figure 9 Inside a Shanty House



often not, it is located in the first room or in the second or elsewhere, sometimes outside but often inside, sometimes in a throughway and so on; there is no pattern. Perhaps architects should be more concerned with variety adaptability and free choice and less with functionally efficient layouts.

Finally, in this section on the Colombo Survey, because statistics and even plans do so little to convey the spirit of the shanty town, Figures 8 and 9 attempt to convey that spirit outside and within a house. There is poverty, simplicity and lack of sanitation but not squalour or idleness; there is order, activity and life.

Summary of the Colombo Survey

There are about 13,000 shanty houses in Colombo.

There is an average of 6.7 occupants per house.

One household in three has 5 members or less, one in three has 6 or 7 and one in three has 8 or more members

The shanty population of Colombo is about 90,000.

The average space per person is 2.8 square metres (30 sq.ft.)

Forty percent of the houses are under 15 square metres (150 sq. ft.) and a further forty percent under 25 square metres (250 sq. ft.)

About one household in three has "bedspace only",

one in three has "twice bedspace" and one in three has "three times bedspace"

One 2000 square foot house could contain 8 shanty houses and accommodate over 60 people at these densities.

Housing density is about 500 people per acre,

twice "high density" in Britain but half that in some city centres.

The total land occupied in Colombo is equal to a half mile square, about the area of the Fort.

Nearly all Colombo's shanty houses have wooden plank walls with roofs of cadjan or metal sheet.

There is a wide variety in plan arrangement and no apparent pattern of "design principles" beyond that of "diversity".

The contrast with "planned housing" is staggering in which the emphasis is on over twice the house area, equal distribution of space, "ideal plans", predetermined space use and uniformity for economy. It is not surprising that planned housing has left the shanty dwellers homeless throughout much of the world.

A WIDER VIEW

This section describes some of the attempts to solve shanty and low-cost housing problems in various parts of the world. Some are "first-hand" comments while others come "second-hand". The various people, organizations and other sources of information are described in "Acknowledgements".

The United Nations

The UN has made investigations in many Countries and has helped implement some pioneering projects. The World-Wide housing problem is far too great for direct financial help to make much difference but the UN continues to encourage pilot schemes" wherever possible, especially "site and service" projects. Its other role is to disseminate expertise through conferences and visiting teams of advisors. Such a team visited Sri Lanka in 1974.

The UN Colombo Master Planning Team has examined the shanty housing problem and reported its findings in the wider context of the Colombo Master Plan.

Dr. Joachim, Sri Lanka

Dr. Joachim has demonstrated that the cost of catching up on the housing backlog in Sri Lanka could be met from Public Funds over a ten-year period provided most other Capital Expenditure was curtailed. Most economists and politicians give a low priority to housing because it does not give a

return on investment "but Dr. Joachim suggests that there is a return through higher productivity from more satisfied better housed working people. He also argues that our concern must be with "housing", the complete living environment with all its services and amenities and not just with "houses".

Department of Town and Country Planning, University of Sri Lanka, Katubedda Campus.

Post-graduate students have studied housing conditions in various parts of Colombo and made an "analysis of housing stress" identifying the basic needs that are lacking.

They have suggested a number of planning policies and management measures which would lead to improved conditions in the most deprived areas.

New Materials

Much effort has been spent in many countries on the development of new materials and pressed bricks and tamped earth have been tried in Sri Lanka. Few of these experiments have proved successful and in Sri Lanka, the mild climate and the variety of materials available leaves people fairly satisfied with the actual construction of the house.

Relocation

Some countries have attempted, either forcibly or by offering inducements, to move shanty dwellers to new locations, generally outside city centres. Colombo did this on a small scale in 1972 to make way for Duplication Road by giving plots within the City and providing transport (three lorry loads per household) but there is not sufficient land for many such Schemes. Some countries have bulldozed shanty areas flat but the inhabitants have had to find somewhere else to live within reach of livelihood.

Low-Cost Housing

This has proved a mis-normer in most Developing Countries and in Sri Lanka, the rentals are 10 times greater than shanty dwellers can afford. The rent arrears have been reported in Sri Lanka as 50% and in some countries as 80% or more. Some shanty dwellers, when offered low-cost flats, are reported as accepting them, sub-letting them (illegally) and returning to the shanty town with the increased income. However cheap, the concept of "tightly packed unfinished concrete boxes" as at Narahenpita is very questionable in a tropical climate and where much activity traditionally outdoors and communal.

Space Use in Multi-Storey Flats

Few occupants in any countries use flats in the planned manner. The most common changes in Sri Lanka were the permanent use of the back door, sub division of the living room for extra sleeping, eating standing up in the kitchen and cooking on the balcony. Lack of ventilation and too much noise within hard areas were major complaints.

Aided Self-Help Housing

This programme helps middle-income earners to build relatively sophisticated houses. It is far beyond the financial resources of shanty dwellers but is relevant to this study in four ways. First, the programme has encouraged self-help activity successfully in some areas and similar methods of management may be useful in shanty improvement. Second, the possibilities of "core housing" have been partly investigated starting with a two room house which can be extended in up to four directions. Third, the importance of vegetation has been demonstrated at Handala where bleak houses became an attractive village within a year. Fourth, the programme has meant that some houses have become vacant for shanty dwellers to occupy.

Uda Walawe

This irrigation and development project in the south of the Island includes housing and colonization schemes. The River Valleys Development Board provided plots of land. They also constructed tiled roofs on brick columns standing on concrete bases within which new settlers had only to erect walls to complete their homes as shown in Figure 10. Most roofs still stand idle while others are used for storage, for a boutique and for a rice mill. Settlers have built cadjan huts alongside and one has built a substantial concrete bungalow nearby but nobody has built his house beneath the roof provided. The reasons given for not using the roofs included that they looked unsafe (they do), that they would be too expensive to maintain (tiles are expensive), that they are too high (the high eaves would let in rain and the walls would be too large and expensive) and that the Government has built the roofs and so they will eventually complete the houses to avoid wasting the money spent (perhaps the most cogent argument). How easily good ideas can go astray!

Figure 10

Roofs at Uda Walawe



Flats at Madras

Madras, India.

The Tamil Nadu Slum Redevelopment Board based in Madras has embarked on an ambitious seven-year plan to rehouse existing shanty dwellers. The Plan is founded on a two-sided agreement; the Board promised homes provided there were no newcomers to the shanty towns. Both sides of the agreement sound almost impossible but, at the half-way point, the Board claimed and could demonstrate an impressive record.

All shanty houses in Madras had been mapped and registered and the occupants photographed. The first new homes were in tower blocks but four-storey slab blocks followed. These were basically Western in style and construction, modified in plan and minimal in space, services and finishes. While their style may be inappropriate, the accompanying social and welfare services were impressive. In one example, there was a social worker "living in" a nurse giving children injections, a nursery, a shed for bullocks and carts and opportunity to earn extra money by hiring a sewing machine or making envelopes.

Chandigarh, India

This is an outstanding example of the failure of an ideal. It was planned by Corbusier on the lines of his "Ideal City", of the 1930's. Many poor people who are needed to non essential services cannot afford a house inside the City and have to commute daily.

From a massive shanty town on the City's edge where there are few services or facilities.

The visually famous State Government Buildings are separated by vast expanses of dust and concrete and lunches are cooked in the bicycle sheds.

Baroda, India

Professor Achwal directs an organisation which began by making studies of street and shanty dwellers and then produced designs for very low-cost housing which nobody believed could be built. They now build as well while continuing research and design. Their work and experience is worthy of detailed study.

South America

Sociologists argue that shanty towns are not squalid backwaters of idleness and vice but are self-improving suburbs whose members play a vital part in the economic development of cities. They suggest that the relative complacency of shanty dwellers is because those with leadership ability are capable of self-improvement and move out of the shanty towns. They warn that, should economic development slow down and the opportunities for self-improvement be lost, leaders will not be able to move on, will become frustrated and become a new urban political force.

The secrecy and skill of shanty dwellers in Lima is already defeating the authorities. Occupations of new land are planned by small groups like a military operation. They move in overnight to possess new land, erect their framework of their houses by morning and rely on numbers for security. The shanty dwellers have acquired such graphic names as "overnight house builders" and "parachutists".

Caracas in Venezuela rehoused 100,000 people in "Superblocks" in ten years but the intense construction activity and hope of a home drew 250,000 new people into the shanty towns the Government was trying to replace.

Sao Paulo, in Brazil, will grow to 14 million by the end of the Century if present trends continue and most people will be in shanty houses.

CONCLUSIONS AND CONCEPTS

The size of the housing problem in Developing Countries is far beyond the scope of international aid. The most that can reasonably be expected from the UN or Development Banks is advice and financial aid on selected pilot projects. Redistribution of global wealth or the "new economic order" may bring greater equality in time but the "wealth gap" continues to grow at present. Rural development or stronger urban controls might reduce slightly the rate of urbanization but extensive urbanization seems inevitable and perhaps a necessary part of development. Control of illegal housing and relocation outside urban centres has been generally unsuccessful because it tries to separate people from their livelihood. Central sites are not available in sufficient quantities in traditionally planned cities. Low-cost and aided self-help housing are far too expensive for shanty dwellers and the houses so built cannot hope to meet more than a small percentage of the need. Some policy changes and new ideas are clearly needed if the second generation of shanty dwellers is to be given genuine hope that the next generation will have better homes.

A pattern of cities

Most cities in developed countries are "concentric" with work in the centre surrounded by housing, as shown in the first diagram in Figure 11. Those who work in the centre

commute daily from the suburbs. As the city grows, the transport costs and the "hidden costs" of travelling time and stress increase until planners have to introduce development controls, decentralization inducements, green belts, satellite towns and expansion areas.

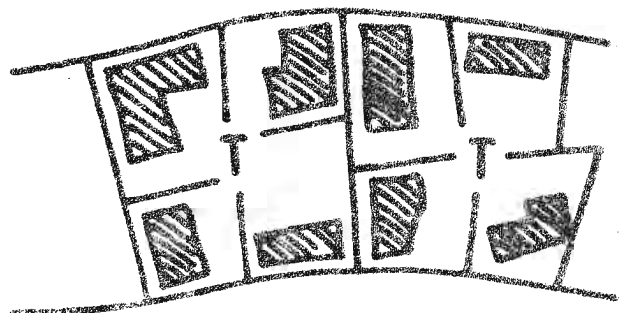
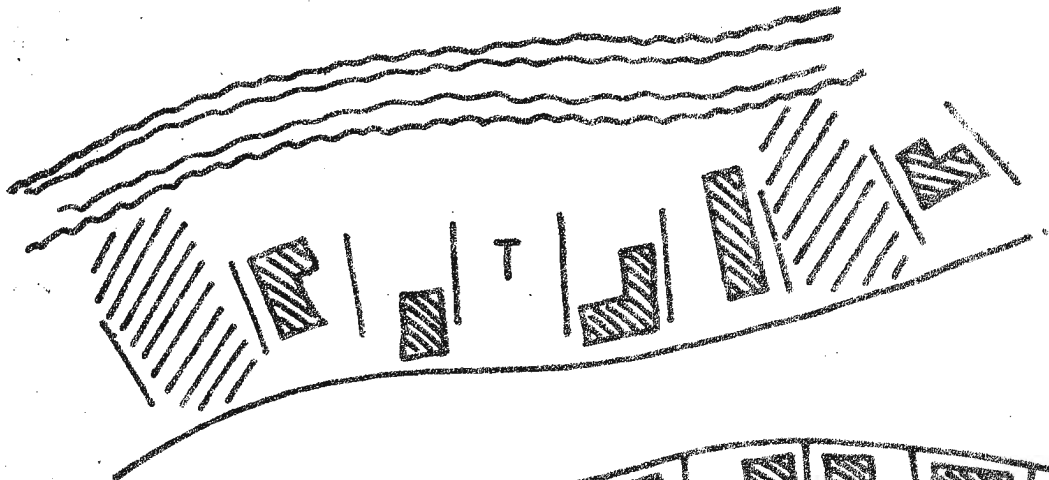
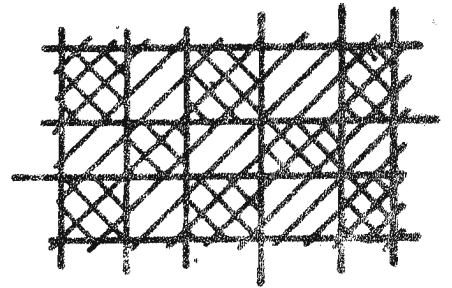
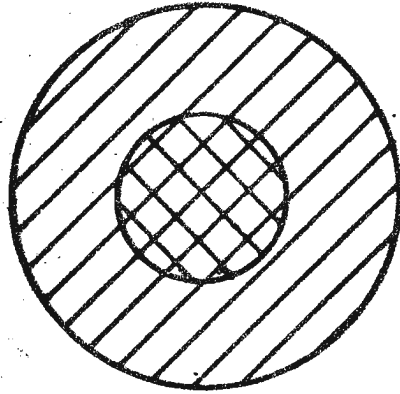
Many cities in developing countries have also adopted a concentric pattern but the rate of growth is now out-of-control. The rate of urbanization is so great, the cost of controls or inducements is prohibitive and the proportion of working people who cannot afford to commute is far greater in developing countries. Most of the working people must therefore live near the centre.

Attempts to change the distribution of wealth or reduce the cost of commuting have not been sufficiently successful in developed or developing countries. The Wanathamulla Survey showed that most people travelled short distances to work despite the facts that Wanathamulla is on the edge of Colombo and that bus fares are relatively cheap.

If other things are so difficult to change quickly, perhaps it is the concentric pattern that should change. Colombo's shape is distorted by the Ocean on the West and marshland on the East but it has, nevertheless, been conceived and planned largely concentrically around the Fort, Docks and Pettah (the old Dutch Market Centre).

Figure 11

Planning Concepts



Despite this, the facts defy the theoretical conception, the shanty towns are scattered throughout and a "checkerboard" pattern might be a more appropriate concept as shown in the second diagram in Figure 11. Land near the centre would be allocated, or re-allocated as it became available, for "intermediate housing", areas in which people would live cheaply at high densities close to their work and to the services of the City although Central Colombo looks and feels congested, there are large areas of warehouses and railways and many other functions which could be moved out over the next 10 or 20 years. Even without such movements, there are already many small and some large areas available for a start to be made.

Three types of "intermediate housing" development are described below under the headings of "improvements", "sites and services" and "framework housing". But first, it is necessary to deal with the basic objection to the checkerboard concept, that of "urban land values".

Urban Land Values

One of the main objections to housing in central areas is that land values are high and housing cannot provide a sufficient return on investment. But this is based on a concentric pattern where values rise steeply towards a single centre. A checkerboard pattern would provide lower value central areas. However, the crux of the matter is how "return on investment" is to be assessed.

It has been argued in this Study that both urbanization and poverty will continue. Poor people are living centrally because they cannot afford to travel. It follows that employers save those costs and can pay low wages. Shanty dwellers are therefore offering a service at a low wage and housing near the City's central amenities is some compensation for this. In economic language, the value of land for intermediate housing should be assessed not in terms of direct returns but in terms of the essential urban services rendered by those occupying the land. Use of central areas for intermediate housing may then become "economic".

Improvements

Putting in taps and straightening the canal to reduce flooding in areas such as Wanathamulla has been generally successful but the provision of toilets has been less so. They serve too many people, nobody bothers about cleanliness and they are too far from home.

The third and fourth diagrams in Figure 11 show toilet blocks serving groups of four plots, one on a canal bank and another on a more open area. The block would contain a toilet and tap. Just a base, water pipe and drain could be provided and groups of shanty dwellers would have to build the rest. The sewer and water supply would of course be a major cost. The canal bank diagram also shows open space for outdoor activities and for access to the canal and dumping during dredging.

Whatever improvements are made by outside bodies, the major potential of self-improvement remains untapped. The major obstacle to self-help is generally thought to be lack of security; the fact that the occupants have no right to the land, that their dwellings are illegal and that they could be forcibly evicted without warning. But the task of "legalizing" ownership is both controversial and complex.

Many people consider it wrong to legalize what has been done illegally. They argue that it would also invite further law breaking. But if granting ownership of the land is accepted, ownership must first be established which would put much of the land into the hands of shanty racketeers rather than into the hands of the occupiers. A survey of land and registration of owners would also be necessary which, as the Wanathamulla Survey showed, is no easy task. Rates would have to be collected unless the areas could be subsidized. If all this could be done, then shanty dwellers would achieve the same status as "full legal residents" and the same processes of buying and selling, compulsory purchase and compensation could be applied when further development of the area was planned. But all the complexities involved make a "fresh start" a more attractive proposition.

Sites and Services

On new sites or on sites that can be cleared, most of the above problems are simplified. Plots can be laid out and sold or allocated so that boundaries and ownership are clearly established. A service network can also be established producing a layout similar to the third and fourth diagrams in Figure 11 but initially without the houses. Unfortunately, simple plots of similar sizes and "economic" service runs result in layouts which are devoid of the haphazard variety, inefficient but exciting, that characterize unplanned housing.

While little may need to be done in Sri Lanka to develop new materials, much could be done to encourage traditional material manufacture and improve basic building skills. Even the simplest brick wall uses vast amounts of cement (which requires the import of some constituents) to make up for the low quality bricks (which involve entirely local materials, equipment and skills). Fuller production of pressed tiles and setting up workshops to fabricate better windows, doors, staircases and so on would provide both employment and the necessary components for better houses.

Particular attention should be paid to improve servicing, mainly by self-help and community projects using relatively basic skills and cheap equipment. Land drainage, sewers

and water supply are the obvious needs but simple incinerators and electricity distribution systems need development also.

The major obstacle is lack of land and the concept of Framework Housing attempts to use the ideas mentioned above at very high densities.

Framework Housing

Figures 12 and 13 illustrate a new concept in housing based on the facts discovered during this research study. It is given as one specific example that could be tried out in Colombo. It is close to an urban version of the "roofs at Uda Walawe" and could fail for similar reasons; an experimental project would be needed to test the idea in all its aspects: construction, servicing, environmental, social, management and economic. The example illustrated is a "concept" rather than a "detailed design" and many variations are possible; nevertheless, it is described below in detail because the success of the concept will rely on many matters of detail.

Any site of any shape from 110 square metres in area could be used. Sloping sites would restrict planning variety and marshly sites would need more expensive foundation and some filling and drainage. The Upper plan in Figure 12 shows a site of 32m x 17m.

Figure 12 Housing Framework

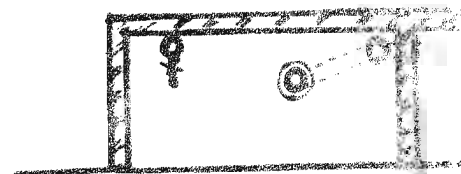
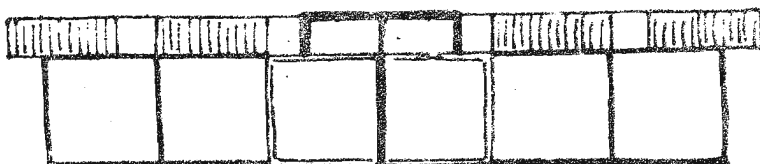
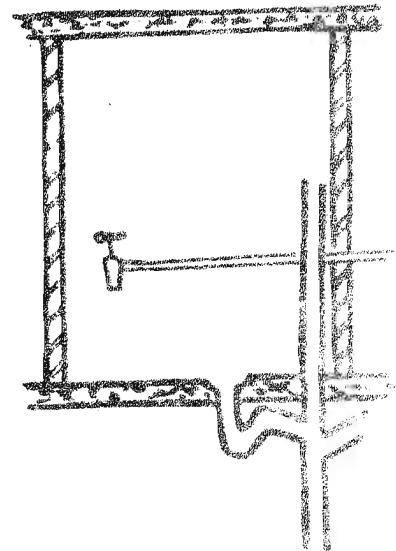
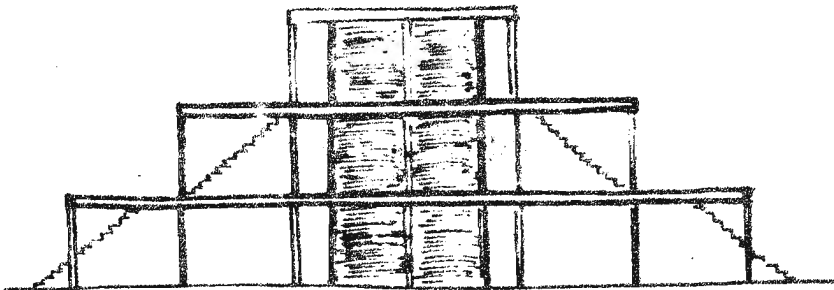
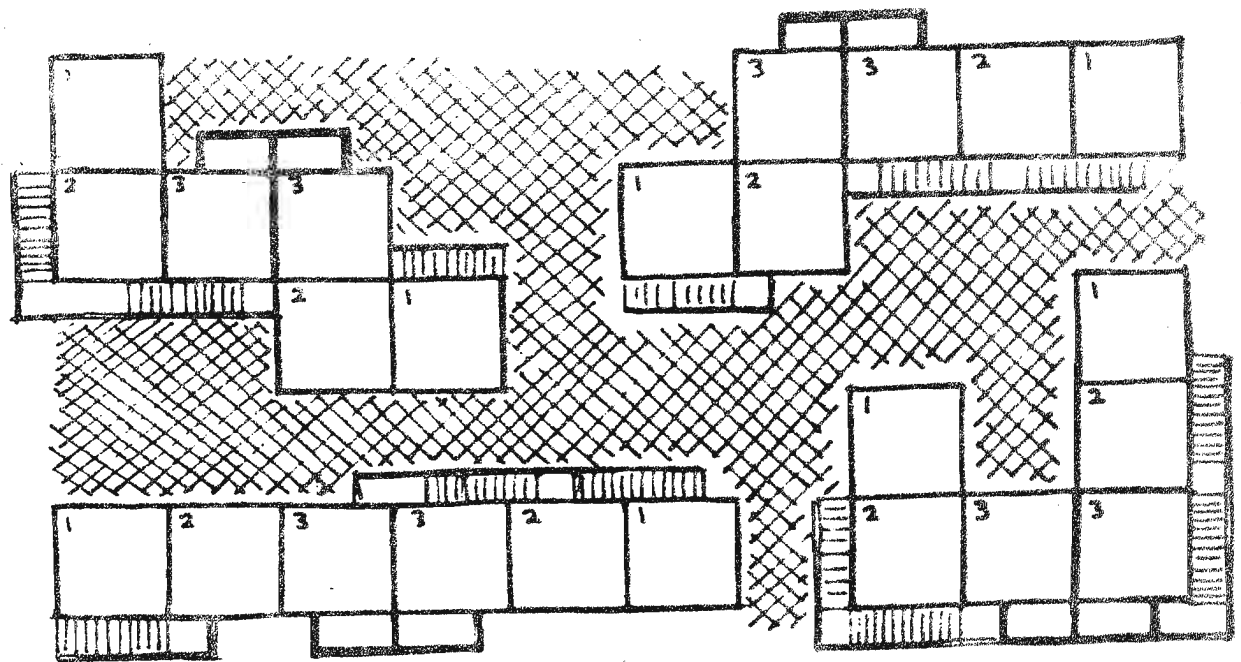
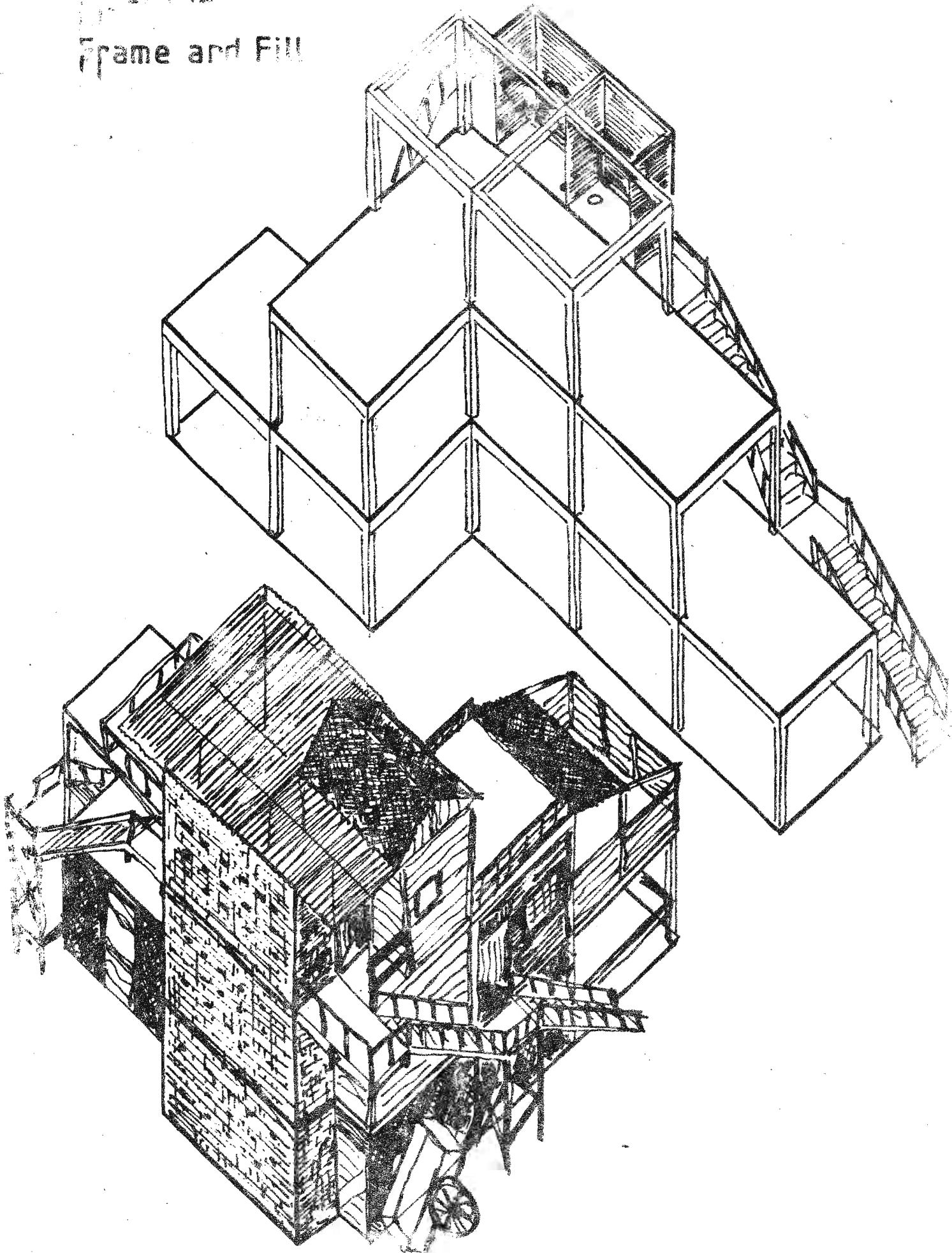


Figure 13

Frame and Fill



Only "frames" and "service towers" would be built. The "frame" is on a 3m square grid, six units long on the ground floor, four long on the second and two long on the third. The columns could be built from concrete or brick (which would be three times thicker than those shown on the drawings) and the slabs could be insitue concrete or concrete beams with precast concrete or timber floors. The top storey would be just a frame without a roof as shown in the upper drawing in Figure 13. There would be holes in all the frames and floors to facilitate fixing of additional roofing, walls, partitions and shelves.

The "service tower" shown in elevation and plan would be built of brick or timber with holes for light and ventilation. It would be 4m by 1m serving two flats on each floor and would contain water supply and drainage only. In each flat there would be a squat toilet, a tap and an asphalt floor. Electricity, if it were supplied later, would be on the other side of the flat for safety.

Each block would contain six flats, two with floor areas of 20 square metres and four of 29 square metres. In each flat, about 9 square metres (one Unit) might be kept partly open for cooking and for light and ventilation. Numerous plan variations are possible.

No stairs would be provided because they are so expensive in permanent materials. Occupants would probably use ladders at first and then build bamboo or timber staircases. Because the plan is "stepped", alternative escape in a fire is possible to the balcony below. Occupants would also be left to build safe guard rails to homes and staircases.

All blocks are similar to economise on construction but the "straight" block shown in elevation and plan in Figure 12 can be "bent" into ten other arrangements of which three appear at the top. With these variations and different stair positions, the housing layout would retain the variety of existing shanty towns which has been lost in modern "planned" housing. No building would be allowed beyond the floors which would provide a necessary and enforceable control on development. The density is three times greater than existing shanty towns, yet half the ground space is free for outdoor activities, light, ventilation and vegetation. In the plan shown in Figure 12, there are three open spaces of 6m x 5m and one of 9m x 4m and many little corners. This replaces the wide open spaces of Chandigarh with the many and varied small well-shaded spaces required in hot climates. Boutiques and workshops would be allowed and families with young children would be housed at ground level. These areas would initially look like "multi storey shanty towns" as suggested by Figure 13 but the greater security offered would hopefully mean that the occupants would slowly but steadily

improve their homes. The "economics" of the concept would require acceptance of Dr. Joachim's suggestion that the initial investment would be returned indirectly, at least in part.

The Future

This research has examined the existing shanty towns, reviewed various approaches to low-cost housing in Sri Lanka and elsewhere and suggested some ideas. "Improvement" and "Sites and Services" are old ideas but "Framework Housing" is new and is believed to be a very possible solution in Colombo. The studies have demonstrated that the towns, though poor, have all the attributes of more permanent communities and the occupants are far from equally poor and helpless. The "Framework Housing" would allow people to help themselves and each other by gradual improvement and community development while giving planners control over density and hygiene.

It is hoped that the "Framework Housing" will stimulate other ideas that can be assessed in the light of the facts discovered during this research study. If live projects follow, a large number of architectural students have knowledge and experience of the shanty dwellers' lifestyles and needs and should be able to apply their skills to "design for low-cost living".