

D. W. Richard
at R. 200

MODERN IDEAL HOMES FOR INDIA

BY

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Modern Homes. (2) Residential Buildings Suited to
India. (3) Cheap and Healthy Homes for the
Middle Classes. (4) Disposal of Domestic
Sewage and other Refuse etc. etc.

Member of the National Planning Committee
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TO
C. E. AITKEN, ESQUIRE,
Chief Engineer & Secretary
to Government of BOMBAY, P. W. D.

This Book is respectfully

DEDICATED

with his kind permission.

PREFACE.

The very cordial reception accorded by the public to both my English publications, *Residential Buildings suited to India*, and *Cheap and Healthy Homes for the Middle classes*, has encouraged me to compile the present volume. It was originally intended to bring out a revised edition of *Residential Buildings Suited to India*, which has, long since, been out of print, and a start was actually made with that view in mind. But on account of the very common use of concrete in building construction, and the advent of a number of new materials, since the publication of that book in 1931, not only have the domestic architecture and also building methods been revolutionized, but even our very ideas of living have undergone a considerable change. Then again, in the course of my travels round the world in 1936-37, to study the contemporary architecture and the building practice, I picked up a number of new ideas, which were to be incorporated in the present volume. The result has been that excepting the introduction and two or three chapters, (to which, also, a number of important new additions have been made) there is nothing in common with the old book. Most of the plans, in particular, are new and designed to illustrate the principles enunciated in the book. In order to bring out a variety, a few plans, designed by professional architects of outstanding reputation, are also added with photographs of their elevations. The descriptive notes are so arranged that they are just opposite to the plans commented upon. I hope this facility in reference will be appreciated.

A large number of my clients have been complaining from time to time that unless some efficient means of disposal of domestic sewage are provided, homes designed and built on scientific principles in towns and villages, are useless. For the benefit of such people, who form a large majority, it was contemplated to include a chapter at the end of the book, on two very efficient and cheap means suitable for Indian conditions. But unfortunately the war broke out in the meanwhile, which suddenly presented difficulties in the way of obtaining printing materials at reasonable rates. In order, therefore, not to try the already overstrained patience of the readers by a further delay in publishing the present volume, it is contemplated to publish these notes in a special supplement in the immediate future and offer them at a nominal price.

I must acknowledge the help I received in the compilation of this volume, from my friends, too numerous to mention here, by way of either encouragement, suggestions or lending of plans of their homes. Amongst them I must express my gratitude to Mr. B. B. Kamat for his ever willing, very valuable help and encouragement.

A special mention of my indebtedness must be made to the worthy architects, whose plans have been reproduced in the book. Their names have been invariably mentioned below those plans.

R. S. DESHPANDE,

CONTENTS.

| | | | |
|--|-----|-----|-----|
| Preface | ... | ... | iii |
| Contents | ... | ... | v |
| Bibliography | ... | ... | vi |
| Introduction | ... | ... | 1 |
| Estimate of rough cost | ... | ... | 9 |
| Avenues of economy | ... | ... | 13 |
| Selection of site | ... | ... | 20 |
| Orientation | ... | ... | 24 |
| The plan (principles underlying planning) Aspect, Privacy, Prospect, Grouping, Roominess, Furniture Requirements, Sanitation, Flexibility, Circulation, Practical Considerations | ... | ... | 28 |
| Analysis of a home, or the various activities of a home-life such as cooking, dining, rest and relaxation, sleeping, study, child-play, storage, concentration, recreation, toileting, reception, drying clothes, entering and leaving house etc. and the space for them | ... | ... | 42 |
| Grouping or synthesis of a home, or proper placement of apartments, which make a "home", such as verandah, drawing room, bedroom, kitchen, dining room, ladies apartment, store room, prayer room, bath room, staircase, comfort room, guest room, nursery, privy, toilet room, and garage | ... | ... | 46 |
| Modern Architecture | ... | ... | 76 |
| Furniture and Furnishing | ... | ... | 91 |
| Plants in room | ... | ... | 93 |
| Interior Decoration—theory of colours, harmony, contrast and discord | ... | ... | 95 |
| Colour schemes | ... | ... | 104 |
| Insulation or heat-proofing | ... | ... | 110 |
| Air-conditioning | ... | ... | 115 |
| Sound-proofing | ... | ... | 124 |
| Specifications of 'Ideal Home' | ... | ... | 126 |
| Introduction to plans | ... | ... | 127 |
| Plans—Ground floor structures | ... | ... | 129 |
| do—Storied Cottages... | ... | ... | 160 |
| do—Flats—2-room, 3-room, 4-room, 5-room flats and Flats de luxe. | ... | ... | 266 |
| Index. | ... | ... | 315 |

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By the same author

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pp. 362 pages, demy 8 vo size, price Rs. 4/8.

MODERN IDEAL HOMES
FOR INDIA

FOREWORD

Housing is one of the three or four prime necessities of life and house building is the oldest of Indian arts. As changes are taking place in the habits and standards of living of our people and new structural materials are coming into use, an up-to-date book on house design and house planning comes as a timely addition to our scanty technical information in this country.

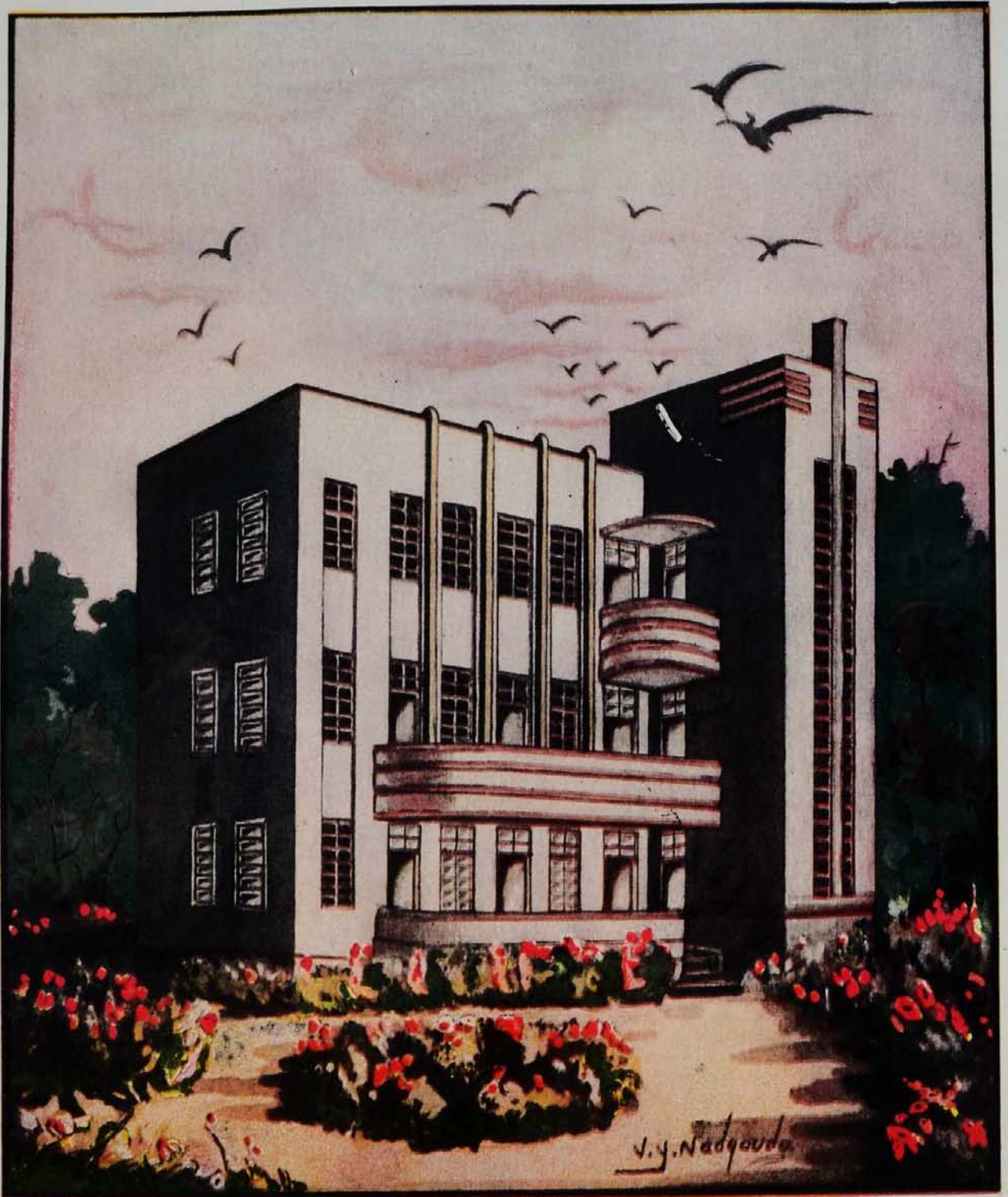
The book gives a large variety of plans and views to suit all tastes and purses. The author, Mr. R. S. Deshpande, had, before writing it, equipped himself for the task, first, by extensive practice in building Indian homes, and later, by travelling in Western countries and Japan to study modern house building technique in those countries.

The book should prove a welcome guide both to persons anxious to secure comfortable and attractive homes at moderate cost, as well as to contractors, co-operative societies and other agencies interested in house building projects on a large scale.

BOMBAY,
1st Nov. 1939.

M. VISVESVARAYA.

FRONTISPIECE



INTRODUCTORY.

To build a home is a primary instinct to be found throughout the whole animal kingdom. Rats and moles dig holes under ground. Ants build up ant-hills; birds build their nests—some of them with such an ingenuity as would put to blush even the 20th century architect. The mathematical accuracy and the sense of economy displayed by bees in the cells of a honey-comb are very striking.

Man himself is no exception in this manifestation of the primary building-instinct, in spite of the boast that he stands high above the level of other animals. One has only to watch his activities in childhood—the period he stands farthest from the “Civilised man” he loves to term himself. Whenever children play under a roof or on the sands, their most pleasant occupation will be found to be to “make a house” or to “play at keeping a house” with all sorts of improvised materials and make-beliefs. Recall, Dear Reader, the faint memories of your childhood and verify for yourself the truth about this building-instinct even in man.

Particularly in India is this instinct sanctified by usage. It is the peculiar trait of the Indian mind to look upon the ancestral home with an amount of sanctity. If he inherits none, he must build or acquire one. With him “No home” is “No status”. The status and the respectability of a man is largely gauged by his possession of a house to live in. Mere wealth, however immense, does not give him that status in society which even a man of slender means can command if he owns an humble cottage. So strong is this sentiment that people of all grades and professions—merchants, lawyers, doctors,—all love to invest all their savings, even though meagre, in building or acquiring a house, even though the prospects of a return may not be so bright as in other forms of investment.

Yet, in spite of this fact that so much importance is attached to one's own home, it is a pity that very few people give it the due thought and attention which this matter of vital importance deserves. Except in a few cities in which Municipal or Executive Authorities compel the owners by law to submit the plans of

proposed buildings no one ever attempts to do so, and even in the case of the plans submitted they are just sufficient to satisfy the Municipal requirements.

This apathy towards seeking systematic, scientific advice must, however, disappear. Of recent years, there has been a marked tendency of people to purchase a small plot of land on the outskirts of a city or a town and to build on it one's own cottage in preference to dwelling in dingy, stuffy, old, rented houses in the urban area. This is no doubt a hopeful sign; but what usually happens is that the overflowing enthusiasm of people prompts them to try their own hand at planning without the necessary knowledge, discrimination and experience, which the importance of the work demands. No plan is drawn, no estimate is framed, and sometimes the building work is started even without the necessary funds at the owner's disposal. The work of construction is entirely left to the mercy of the quasi-literate maistry or illiterate carpenter or to a class of contractors hardly equipped with any systematic training in their art. Most of the latter usually belong to the same category of people as maistries and masons, but have risen to a slightly higher level due to some turn of good fortune. Most of them, however, are generally equally incapable, more or less, to properly grasp the ideas of a decent living and to provide for the arrangements and comforts which a cultured man, with a delicate and refined sense of decency, demands. To make confusion worse confounded, laymen friends pay kind visits and dole out suggestions while the building work is in progress, though with the best of intentions, yet equipped with sheer ignorance: "Nine feet floor height makes the building look ugly; it should be at least 11 feet. Mr. So and So's bungalow looks like a palace with that height. Such things are done once in a life time. Don't spoil your bungalow for the sake of a few rupees" and so on. These "few rupees" in so many items go to swell the cost by 50 p. c. which the owner cannot then realise. But when the time for payment comes in, his eyes are opened, his enthusiasm gets a rude shock and often times the property falls into the hands of the creditor. Apart from the inflated cost which is the natural result of such a house, built under these circumstances, the house, or rather a "masonry box" with a tiled lid affording protection from the sun and wind — (not to say, "from rain" because

the roofs of such houses are often hospitable enough to welcome rain inside) — fetches very little value in the market when offered for sale.

There is only one way to avoid such a catastrophe ; viz., to get a suitable plan drawn and a complete estimate framed with the help of some architect who knows his job well. It is a “penny wise and pound foolish” policy to grudge spending a trifling amount for this very important matter. The preliminary design may be made by the owner to indicate his special requirements to the architect, but beyond that it is advisable to leave the details to his experienced and mature judgment. Still, on the other hand, howsoever clever and expert an architect may be, it is impossible for him to gauge correctly the peculiar requirements, the likes and dislikes, the prejudices and idiosyncrasies of his client. I have come across some doctors and professors who have eminently distinguished themselves in their own lines but have exhibited gross ignorance of even the correct idea of dimensions. An average person, if he but takes a keen interest and approaches the subject in a spirit of determination to study and choose the best, can easily master the art of house planning in a short time. He should first begin with measuring with a tape the dimensions of the rooms he is occupying, the doors, windows and all other details, so that he can at once determine what bigger or smaller sizes would exactly suit him. The next lesson is to actually visit a few typical houses of his friends and note the conveniences or otherwise experienced by them for his guidance.

A practical hint, in this connection, would, I hope, be not out of place here. If the house, which is going to be built, is calculated to give happiness to the family, one must take the counsel of the partner of his life’s happiness in respect of its planning. We give the lady of the house the high sounding title such as ‘Grihini’ or “Griha-Lakshmi” i. e. “mistress of the house,” “The presiding deity of the house” and still do not consult her even in respect of the kitchen arrangements with which she alone is concerned. It is a mistake to suppose that a woman cannot understand these things. On the contrary the term “Better half” given to her proves itself to be literally true in this respect. Ladies are very sensitive to appreciate the conveniences and especially to feel the inconveniences of a living

house. That is, par excellence, *their* sphere of life. Measured in hours they live in the house more than we do. You will be surprised to find what an amount of common sense your wife will show in criticising the plan of a house and making suggestions in respect of conveniences, delicacies and refinements of arrangements which we, of sterner sex, could scarcely think of.

Very direful is the result of this obvious omission. Its bitter experience comes to the lot of the unfortunate house-owner. Soon after the eventful day which he had so eagerly been longing to see, viz: the day on which the palatial building of his proud ownership is first occupied, he is constantly heckled by sarcastic criticism by day and dread curtain lectures by night, such as, e. g., "The bathroom is too small;" "the staircase should have been in that place;" "the sink would have been better in that corner;" "the smoke outlet does not work;" "there is absolutely no seclusion for worship or offering prayers in the whole house;" and so on. His eyes are now opened, his pride of possession melts away, his enthusiasm is crushed, the fool's paradise crumbles to the ground and he finds his life not worth living and though the inner sense of his vanity would not allow him to own defeat and frankly apologize, he repents for his folly in not having allowed his "better half" a part in the counsel which would have at least saved him from such searching criticism.

What does exactly connote good planning? When is a house said to be well designed? The answer is not far to seek. A house designed economically, which preserves the health of the inmates and adds to the comfort and happiness of the family may be said to be well designed. A good house must exactly suit the family, just as clothes do the wearer. The external embellishment, the overflowing, elaborate architectural features contribute very little to make a house comfortable. The value of a house designed for comfort will certainly be enhanced if it synchronises with external beauty. But a house with the best exterior may be found to be a failure as an investment when compared with a cosy, plain-looking cottage solely designed for convenience and comfort.

When we see all around us, we find that there is a general tendency, which is increasing every day, of people to leave healthy

villages and flock to industrial centres in crowded cities. This exodus has been caused by a good many deep-rooted causes, mostly economic, such as poverty, depression of agriculture, lack of educational, banking, marketing and medical facilities, habits of uneconomical living, attractions of city pleasures and enjoyments, and so on. This has resulted in creating a dearth of houses both in towns and villages — in towns because there is a house-famine and in villages because the houses which are deserted crumble to ground for want of care. The evil consequences of the house-famine which has affected every grade of society living in towns, are the inflation of rent and overcrowding of rooms, of which the latter brings in its train, high death-rate, especially amongst infants, mental restlessness, physical weakness, lung diseases, and the lowering of general vitality etc.

The abnormal rise in the cost of foodstuffs and clothing on account of the outbreak of the Great War, added fuel to the fire and made the position of the middle and lower classes still worse, in spite of the Rent Act, which came to their assistance for some time at Bombay and some other places to give them some relief. They could not but submit to the unreasonable demands of their landlords. But after some time when prices of foodstuff and clothing showed some improvement, they were prepared to take every opportunity of throwing off the yoke and be independent of their landlords by trying to build small cottages on the outskirts of towns. The Co-operative Societies' movement, inaugurated by Government, promoted their efforts by offering them loans at low interest if they formed themselves in to a registered Society. The efforts of the Development Department, Bombay, further stimulated them by offering concrete examples of cheap dwellings and it is now a hopeful sign of the time that people have realised that, instead of paying abnormal rents and living in the midst of unnatural conditions, they could, with a loan raised from Government, build, in the midst of healthy surroundings, cottages according to their own choice which will ultimately become their own, if they paid, monthly instalments for a fixed period, instead of monthly rents. It is very satisfactory that a number of Co-operative Housing Societies are fast springing up.

While endeavouring to promote one such Society, viz., the Saraswat Brahmin Colony, in Poona, of which I have the privilege of

being one of the prime organisers, I got a unique opportunity to study the problem at first hand and realise the difficulties which confront the laymen, who for want of facilities have to design their own houses and entrust the construction to the semi-literate maistry. I very much deplored this state of affairs and resolved to try to relieve the situation partially by (1) writing practical notes, preferably in vernacular, on building construction in a manner easily intelligible to the lay mind and (2) publishing a few typical plans of cottages suitable for Indian climate and social customs. The former took the shape of a book in Marathi which has been very enthusiastically received by the public and I am glad to state, is translated into other important vernaculars of India.* The present volume is the result of my attempt to carry out the latter part of my determination.

The first edition of this volume appeared in 1931. Therein, I had sought to deal mainly with plans of buildings, of which nearly 90 different specimens were given, and in the 100 pages preceding them, the principles underlying the scientific planning of domestic buildings were described; no attempt was made to deal with construction, nor with architecture. In respect of construction the reader was referred to my practical treatise on Building Construction mentioned above, while, in respect of architecture, ideas were suggested by way of a variety of elevations, though of a conventional character.

Ideas have, however, undergone a considerable change, since then, not only in point of architecture, but also of designing the interior of domestic buildings and furniture. This was brought about by the advent of novel building materials and new inventions. Then, again, the manufacture of indigenous cement of excellent quality on a mass scale and its efficient distribution and sale at a cheap rate by the Cement Marketing Association of India, coupled with the excellent facilities of transport offered by the rapidly increasing motor traffic,—all these have brought ferro-concrete construction to the forefront even in remote corners of the country during the past few years.

* **SULABH-VĀSTU-SHĀSTRA** or **MODERN BUILDINGS** and **HOW TO BUILD THEM.** **MARATHI** 3rd edition Rs. 2/8; **HINDI** and **GUJARATI** Rs. 3/-.

Side by side with this, the under-currents of a change in domestic architecture, almost revolutionary in character, have swept over all the Western countries; and how could India escape them? They were shot up by the leaders of different schools of architecture such as Le Corbusier in France, Gropius in Germany, Oud in Holland and others in other countries, who rose in a revolt against the traditional architecture. They dubbed it as "dishonest expression of academical falsehood" and shouted slogans to run it down:

"The so-called '*architecture*' does not exist only '*functions*' exist"

"The house is a machine to live in"

"The house must prove a good merchandise"
and so on and so forth.

There, again, came the theory of "Russian Constructivism", with the boldest and most revolutionary architectural designs with steel and glass and based on rigorous mathematics.

I must confess I was taken off my feet by the merciless logic with which they expressed their astounding views filtered to this country through books and articles in Western journals. Some of them were apparently so contradictory to each other that it was impossible to reconcile them. The result was that they left an impression of universal chaos, and incoherence—a conglomeration of fanciful ideas. This urged me to seek, if possible, a first hand knowledge of the modern architecture and the current practice of building homes in the civilised countries of the world. Thus it was how my Round-the-World tour of 1936 started.

I could hardly spare more than eight months for this purpose, still I made the most of the opportunities during this short period. Not only could I see and study contemporary architecture in the different civilised countries but was also lucky enough to interview some of the great architects and ascertain their views. As a result I was convinced that it was not a revolution which was sweeping over the Western countries, but a natural, inevitable evolution; that the various seemingly antagonistic theories propounded in the wordy battles were but different solutions emphatically put forward and that

only what is sound and durable both in theory and practice has come to stay permanently.

After my return from the world tour, I laboured for over a year in giving a shape to the ideas picked up abroad with a view to "Indianise" them i. e. to make them suit the climatic conditions and social customs of the people of this country. The reader will see that not only a number of new ideas have been introduced and added to the notes, but that most of the plans in the last edition have been replaced by altogether new ones, with plane, simple, cheap, but never the less, more artistic elevations. They embody all the best features, not only of the American, English, German, Danish, Swiss, French etc. domestic designs, but also of the Japanese, which could possibly be adopted in a tropical country like ours.

Before I conclude, a word, by way of explanation of the figures of costs quoted in the book would not be out of place. The cost must necessarily vary from town to town and from province to province. It must also vary with the material and fittings used. For working the figures out a few typical estimates of each class of buildings were framed with the rates of materials and labour obtaining at Poona at present (Jan. 1939). The rate per square ft. of plinth area thus arrived at, has been taken as a basis for working out the costs. To them some constant figures were added where necessary, for special features such as bay windows, nooks, turrets, projections etc. They **do not** include costs of site, nor of fencing, drains, electric fittings etc. I hope that they would serve as a rough guide at least, for any particular plan, and a sure and reliable guide, in comparing one design with another in respect of cost.

Rough Cost.

When the layman has decided upon the length and breadth of the house to suit his requirements as set forth in the foregoing introduction, the next question which confronts him is approximately to estimate its cost and see how it suits his purse. Very often the Maistry, whose help he seeks, has either got no clear idea about it or in his attempt to please his constituent, intentionally quotes a low figure. And, when the actual construction ultimately costs him double the amount, he blames the maistry, but the latter escapes all responsibility saying that the additions and alterations subsequently made by him (the owner) are responsible for the increased cost and that therefore no blame attaches itself to him. Though this may be partially true it is not wholly so. The owner now realises how he was be-fooled. In order, therefore, to save oneself from such a calamity it is, absolutely necessary that there should be some rough and ready rule to find out at once what a particular sized house is going to cost or what size of a house one can build within a certain amount, which one can afford to spend. The following rule will serve that purpose very well :—

Multiply together the length and breadth of the plinth (both in ft.) and find out the plinth area of the house. Multiply this by one of the rates given below according to the character of the structure specified opposite to them.

Note :—The rate per square foot of plinth area mainly depends, amongst many factors, upon the cost of labour and materials and may slightly vary according to the locality and also market fluctuations. Those, given below, have been worked out for conditions obtaining in Poona at present. In big cities cement and hardware materials and skilled labour are cheap but un-skilled labour is costlier than in the rural districts. For an ordinary building the cost on account of labour is roughly 35 per cent and that on account of materials 65 per cent approximately. Out of the 35 per cent required for labour, 49 per cent go to the un-skilled and 51 per cent to the skilled labourers. However, the figures of approximate cost arrived at, are sufficiently accurate for the purpose.

- (1) Medium dressed stone-in-lime masonry with cement pointing on the outside, or brick-in-lime masonry with cement plastering on outside in colourcrete ; lime plastering on the inside ; re-in-forced cement concrete (R. C. C.) posts, partitions, beams and flooring ; Bharat or similar cement tiled or polished Tandur paving in the drawing and dining rooms and Shahabad or similar slab paving on 3 inch lime concrete in other rooms ; half panelled and half glazed doors, fully glazed windows ; Roofing of Mangalore or similar tiles on teak wood ceiling or R. C. C. flat terrace ; height of floors 10 to 12 ft., that of plinth 3 ft ; all other work of first class material and quality... **Rs. 4/8.**
- (2) Rough dressed stone-in-lime masonry with cement pointing on the outside or brick-in-lime masonry with plaster in colourcrete cement on the front, and in lime on other exposed sides ; lime plaster on the inside ; R. C. C. posts, partitions, beams and flooring ; Shahabad or similar slab paving on 3 inch lime concrete in all rooms ; Mangalore tiled roof on corrugated iron sheets or R. C. C. flat terrace ; half glazed and half panelled doors in the drawing and dining rooms, plane planked in the remaining ; fully glazed windows ; height of floors 9 ft. that of plinth 2 ft ; All other work, strong durable and decent but 2nd class in quality.... **Rs. 3/8.**
- (3) Framed structure of round teak or R. C. C. posts with stone or burnt brick in mud masonry for walling ; cement pointing on the outside, mud plastering on the inside ; Shahabad or similar slab paving in the important rooms only, murum or mud flooring in the remaining ; roof of country round tiles, or Mangalore or Allahabad tiles, on battens, or flat mud terrace ; doors and windows all plane planked ; height of floors 8 ft. and that of plinth $1\frac{1}{2}$ to 2 ft. **Rs. 2/12.**

The above constants are applicable to single storey structures only. For storeyed structures four annas should be deducted from the above constants. e. g. suppose Rs. 10,000 are available for building

purposes. One can build a house with a plinth area of 2222 square ft. of class 1; 2857 sq. ft. of class 2; and 3636 sq. ft. of class 3.

Putting it the other way, suppose a building is to be constructed on a plinth area of 2000 sq.ft.

(1) With ground floor only, it would cost :

$$(1\text{st class}) 2000 \times \text{Rs. } 4/8 \text{ (constant)} = \text{Rs. } 9,000.$$

$$(2\text{nd class}) 2000 \times \text{Rs. } 3/8 \text{ (constant)} = \text{Rs. } 7,000.$$

$$(3\text{rd class}) 2000 \times \text{Rs. } 2/12 \text{ (constant)} = \text{Rs. } 5,500.$$

(2) With two storeys (The ground and first floor) :

$$(1\text{st class}) 1000 \times 4/8 + 1000 \times 4/4 = \text{Rs. } 8750.$$

$$(2\text{nd class}) 1000 \times 3/8 + 1000 \times 3/4 = \text{Rs. } 6725.$$

$$(3\text{rd class}) 1000 \times 2/12 + 1000 \times 2/8 = \text{Rs. } 5250.$$

Some times the rough cost is determined on the cubic contents of the building. For this purpose verandahs are supposed to be like rooms and the solid contents of the house are found out by multiplying the plinth area by the vertical height of the building from the ground level to half way up the roof.

This method of finding out rough cost is more accurate than that based on a rate per square ft. of plinth area, especially if the heights are measured from the bottom of foundations, as it takes into account the depth of foundations, the heights of plinth and floors, and the pitch of the roof. But it requires more time for making calculations.

In the case of terraced or flat-roofed houses, the height should be measured up-to the top of the parapet walls.

The rates thus arrived at are :—

| | | | Rs. | as. | ps. |
|-------------|-----|-----|-----|-----|-----|
| Class one | ... | ... | 0 | 4 | 10 |
| Class two | ... | ... | 0 | 4 | 6 |
| Class three | ... | ... | 0 | 4 | 5 |

Note:—It is worth noting that the bigger the sizes of rooms of a house, the lower is the incidence of cost and inversely, the smaller the rooms the greater is the cost per sq. ft. For, if a house, say a chawl (apartment house) for instance, has got small rooms, the number of walls is greater and with it, that of windows and doors is also more. The latter, in particular, go to increase the cost. Again, a reduction in areas of certain rooms does not always mean a proportionate reduction in the cost, because the number of doors and windows is not reduced ; it remains the same. Hence, to reduce the cost, a whole room or rooms must be omitted.

(1) (The class) $1000 \times 1.8 + 1000 \times 1.1 = Rs. 2100$
 (2nd class) $1000 \times 2.4 + 1000 \times 2.1 = Rs. 4500$
 (3rd class) $1000 \times 2.10 + 1000 \times 2.7 = Rs. 4800$

Some times the rough cost is determined on the basis of the volume of the building. For this purpose, the volume is assumed to be the room and the solid contents of the house are found out by multiplying the length and by the breadth and by the height and the result is divided by 1000 to get the volume.

This method of finding out rough cost is more accurate than that found on a rate per square ft. of built-up area especially in the height of the building. In the case of buildings, the height of the building is the depth of foundation, the breadth of the building and the length of the building. If it is required to find the rough cost of the building, the volume of the building is found out by multiplying the length and by the breadth and by the height and the result is divided by 1000 to get the volume.

In the case of buildings, the height of the building is the depth of foundation, the breadth of the building and the length of the building. If it is required to find the rough cost of the building, the volume of the building is found out by multiplying the length and by the breadth and by the height and the result is divided by 1000 to get the volume.

| | | | | | |
|----|-----|---|-----|-----|-------------|
| 10 | 1/2 | 0 | ... | ... | Class one |
| 5 | 1/2 | 0 | ... | ... | Class two |
| 5 | 1/2 | 0 | ... | ... | Class three |

Economy.

Whether rich or poor, a man always likes to see his house built with economy. In fact, it is the social duty incumbent on everyone who wants to build a house, to practise economy wherever it is possible to do so. On the contrary, it is economically criminal not to do so. However, it should never be carried to excess so as to weaken the structure. A strong and solidly-built structure proves to be cheaper in the long run. Only the rich can afford to pay the heavy maintenance charges of cheap and jerry-built structures, which is not possible for ordinary people. Economy must really begin even from very trifling things. A trifling, saved in hundred items, goes to make up a big amount. Below are given a few hints on how to practise economy:—

(1) The first and foremost suggestion for economy is to get an estimate of the house framed by an expert, in which the thickness and sizes of materials to be used are specified. It is a penny-wise and pound-foolish policy to grudge paying him his dues, which form a trifling percentage of the total cost. In its absence if undersized material is used the owner has sooner or later to pay heavily for it, if however oversized material is used it is not detected but it is a national waste. By specifying the correct size the architect would show avenues of saving Rs. 500 or even more and further make you care-free.

(2) The more the dimensions of length and breadth of a house approach each other, the less is its cost. In other words, an approximately square building is cheaper than an oblong one. To illustrate this, take the simple case of two houses, one measuring 80 ft. \times 20 ft. and the other 40 ft. \times 40 ft. Supposing the walls of both are of the same thickness (say 18 inches) as also the height of both is also the same viz. 20 ft. and taking only the outer walls, to simplify matters, the masonry of the first house is roughly:—

$$\text{Long walls } 2 \times 80 \times 1.5 \times 20 = 4,800$$

$$\text{Short do } 2 \times 20 \times 1.5 \times 20 = 1,200$$

6,000 cft.

and that of the 2nd,

$$4 \times 40 \times 1.5 \times 20 = 4,800 \text{ cft.}$$

Thus the masonry of outer walls only of the first house is 25 p. c. more than that of the 2nd.

Moreover, there are certain special advantages in a square house, over an oblong one, e. g., a square house is cooler in summer and warmer in winter than an oblong one, because the latter exposes greater surface to the elements. The roof of the square house looks better and is simple and less costly to construct. 3rdly, a square house, being more compact, the space occupied by corridors which are necessary for the preservation of the privacy of each room is much less in a square house than in an oblong one, and so on. All this, is true up to a certain limit, beyond which, however, either open central chowks (yards) or small verandahs have to be provided for lighting the inner rooms, in which considerable space is lost; again, beyond a certain limit the height of the roof of a square house near the centre, and also the length of the hip rafters and in consequence, their section and cost, increase beyond economical limits.

However, from the point of view of the comfort of the inmates a square house, unless a small and compact one, is not recommended in tropical countries. It may be suitable for hill stations especially in the winter.

(3) A storied building, having half the number of rooms on the ground and half on the first floor, is much cheaper than a bungalow or a ground-floor structure only, because the expense on account of foundations and roof for the storied building is nearly half of that for the ground-floor structure. Similarly, the expense for both on account of drainage channels on the ground and gutters below the eaves of the roof is also half. No doubt, the staircase requires some extra amount and scaffolding and hauling up materials for construction to an increased height is more expensive; but the saving caused in foundations and roof is much more than this extra expense.

Again, for a certain amount of accommodation, a ground floor structure requires a larger plot of land than a storied building. Where the site is very costly this consideration alone out-weighs all others. Besides, it is no small gain, particularly in crowded localities, that the rooms on the upper floor get a freer and purer breeze, which is a blessing in summer in a hot country like India.

This principle, however, could be stretched upto a small attic room i. e. a low three storied building, beyond which, the cost again increases, because the foundations and walls of a three or more storied building require to be of extra strength and hence they are more costly.

(4) For the middle-class people, there is no better way of effecting a considerable economy, than by restricting the height of floors. Ordinarily 8 ft. or $8\frac{1}{2}$ ft. height is sufficient. It is in some houses kept 12 or even 14 ft. which is not only unnecessary but a waste. It is likely to be argued that more height means more cubic contents of air, which is no doubt true, but hygienically it is not the greater cubic contents of a room but the means provided for renewing the air by providing through ventilation in it, which is of more importance, for this, cross ventilation i. e. windows, in one wall for admitting fresh air and similar ones in the opposite wall for driving out the vitiated air, are required.

Another argument likely to be advanced in favour of larger heights of floors is that the building looks bold and prominent, but it should be remembered at the same time that the higher a building, the greater is the weight which its foundations have to bear and the more have its walls to resist the thrust of high winds. It is wrong that the artistic beauty of a building depends upon its height. It depends on the treatment of the proportions of its exterior parts towards each other and the grace of its outline.

By reducing the height of floor from 10 ft. to 8 ft. the saving effected in masonry is 25 per cent., there is also a saving in the cost of a shorter staircase and a saving in the effort of climbing it. The latter point is of great importance from the point of view of the aged, infirm or ailing member in the house.

It is not, however, advisable to try to effect economy by curtailing the height of the plinth. A high plinth contributes to preserve sanitation and health of the family and, hence, as far as possible it should not be reduced to less than 2 ft. However, 4 or 5 ft. height of plinth, which is often times kept (unless it be in a damp locality or for accommodating a cellar) is a waste, which the middle or lower class people cannot afford.

(5) Another means of reducing the cost of a building is to build the outer walls thick enough to protect the house from the heat of the sun and raids of thieves and to build all the inner ones of half or one brick thickness ($4\frac{1}{2}$ inches or 9 inches) with intermediate posts of wood, steel or R. C. C. to support the weight of the upper floor or floors and roof. It has been now possible to build R. C. C. partitions of any thickness upto a minimum of $1\frac{1}{2}$ inch. It is observed in a good many houses that 15 inch brick walls or many times 18 inch stone walls are built, where half or one brick partition walls could have very well answered the purpose. The main object of a partition wall is to afford privacy; any extra thickness beyond that required for that purpose, is therefore a waste.*

(6) Local usage should be adopted, as far as possible. Maximum advantage should be taken of the material and labour locally available, e. g. if stone walls are insisted upon where stone is scarce and hence bricks are locally used, or if Moulmein teak is insisted upon where good country timber is plentiful and cheap, the work is bound to be costly.

(7) Division of labour and specialization are great points in saving money, particularly when the work is being done departmentally. Masons who are used to dressing should be employed on dressing only, and those to setting on setting only. An artisan of high wages should not be required to do the work of an un-skilled coolie. This is a very important point which is generally overlooked, e. g. if a mason getting Rs. 2 a day is employed on the work of pointing masonry joints, perhaps he may do even less work than young boys who usually do that work on a daily wage of annas 8 or 10 and who have specialised themselves in it. Another point to be borne in mind is, never to allow a highly paid artisan to be handicapped for want of adequate assistance; e. g. for want of an additional woman-coolie getting 4 to 5 annas per day if a mason employed on Rs. 2 per day is required to do her work partly, viz: mixing mortar, carrying bricks, stones etc., two rupees, are sacrificed to save five annas. Similarly, a bullock cart is often engaged on Rs. 2 per day for carrying certain

*For making the partitions sound-proof please refer to the author's Sulabha Vastu Shastra or How to build Modern Buildings.

material over a short distance; the cart-man has to load and unload it, single handed. During the interval he is doing it the high waged cart has to stand still; and it is no wonder if the out-turn is far less in comparison to the amount spent.

(8) A good deal depends upon the season in which the building work is commenced. In winter the days are short and it is not possible to start the work earlier than 8 A. M. Besides, the progress of work in the first hour or so is not satisfactory on account of cold. Again, the work has to be closed by 5 P. M. as the labourers have perhaps to wend their long way home before dark, thus with a respite of two hours in the noon the actual working period amounts to 7 hours, where-as if the building work is commenced by about the close of winter the working period, from 7 A. M. to 7 P. M., with the same meal-time respite is 10 hours; thus a saving of 23 p. c. in the cost of labour or nearly more than 9 p. c. of the whole work is effected.

(9) If work is done expeditiously (of course, without undue haste), it is done at a much less cost than if it is allowed to linger on. The overhead charges of establishment are less and the interest on the capital outlay during construction is less. Anticipate all likely difficulties and try to solve them early in good time. For this, it is desirable to chalk out a programme not only of the whole season, but also a detailed one, of every 2/3 days in advance and try to stick to it.

(10) If doors and windows are kept of one uniform width, the joiners who have to work on uniform sizes, find it much easier and finish it more speedily. Again, fewer centerings are required for supporting lintels or arches over them. In other words standardization of sizes and materials is very helpful in reducing costs.

(11) It is usual to rake out joints of masonry and fill them again with lime or cement. By so doing not only is there a waste caused, of materials and labour but the structure is weakened, because it is not possible to make a good joint of fresh cement or lime, with the mortar which has already set; again, the joints filled afterwards are likely to be neglected in respect of watering. The proper method is to rake out the joints when just fresh and fill

them up with lime or cement ; in this arrangement the mortar raked out is not wasted and the joints automatically get the water which is sprinkled on the masonry. A still better and the most economical way is, not to rake out the joints at all, but to finish them neatly in the first instance and rub them hard with a mason's trowel the next day, saving double labour and material thereby.

This suggestion is applicable to plastering even with a greater force. Instead of wasting time in finishing the joints and again raking them out after some days prior to plastering, it is economical to leave them rough or rake them while making in the first instance.

(12) Settle, once for all, the plan of the building, stick to it and never make any changes or alterations except under the advice of experts who will consider the effects of such alterations on the work already done, the extra cost involved etc. and guide you accordingly.

(13) Plain and simple architecture, not only looks well but is also very economical. Bay windows, ingle-nooks, too many corners in the walls and too many breaks in the roof are bound to increase the cost.

(14) If it is intended to add another floor in course of time, it is advisable in the interest of economy to construct in the first instance, a flat or terraced roof at an additional cost of about 10 p. c. of expenditure on the item of roofing. In that event the top of the terrace would ultimately form the floor of the upper storey and the parapets when raised would become walls. Nothing would thus be wasted, whereas, if a tiled roof is required to be dismantled for the same purpose, not even 40 p. c. of the material is found to be serviceable, all labour being wasted, besides.

(15) If the sinks, bath rooms and w. c.s are so placed that all the sanitary fittings come near each other, a considerable amount is saved.

(16) A considerable saving may be made by buying materials at the proper time and in the best market and by maintaining a continuous supply of them at the job.

(17) On small jobs, in particular, work could be done more cheaply by using what are called 'stock sizes.' For instance up to a span of 11 ft. or at the most 12 ft., steel joists of $4\frac{3}{4}'' \times 1\frac{3}{4}''$ — 6.5 lbs. per foot run, are very cheap. If the span is increased even by 6 inches the next suitable size of joists is $7'' \times 4''$ — 16lbs. per foot run, which costs considerably more, even though its spacing may be increased.

Selection of Site.

Two different view points, which are in principle antagonistic to each other, govern the consideration of this very important matter. The one is of a class of builders, who may be rightly called speculating builders. They do not want to build for their own use but for that of others, and therefore do not so much care for the internal arrangements and conveniences of houses as for the immediate maximum return on the capital outlay. Their tendency is to select a locality, which though unimportant and not much in demand at present, is likely to rise soon into importance. The sites at such places are very cheap in the beginning but when they develop they fetch amounts several times their purchase value.

For the benefit of these people it may here be suggested that such localities may take years to develop or in some cases may not develop at all. It all depends upon several factors not controlled or controllable by any one man or some times a group of men. It requires an uncommon shrewdness and keen foresight, which very few people possess, to judge those factors correctly. It is, therefore, advisable, because involving no risk from the investment point of view, to choose a street which has already developed. There, we know the situation in its reality. The class and sort of people inhabiting that part, the rental value of buildings obtaining at the place, whether the latter is increasing or decreasing, and so on. Thus though the return may not be so great, it is a sure source of income. Again, from the point of view of investment, if the building is not required for one's own residence, it is prudent not to build on a commodious scale. If instead of building one spacious house suitable for one rich family, several small independent flats or cottages suitable for middle or poor class families are built, there are very few chances of losses resulting from empties.

The other view-point of looking for selection of a site is, for one's own residence or for that for a collective one—either industrial or co-operative housing. The considerations for the latter are slightly

different. Those which are common to both are given here. They are in respect of (1) physical features (2) soil conditions (3) sanitary requirements and (4) practical conveniences.

(1) The site should be on an elevated ground which is advantageous in two ways (a) the out-look is wider and brighter and (b) it affords facility of drainage. Particularly rain water flows away from the building as soon as it falls on the ground and the immediate surrounding area is left dry. A low lying site, on the other hand, is likely to be damp and unhealthy especially in the rainy season.

Rocky surface affords good foundations and also does not absorb any water but it gets hot by day and does not readily cool down by night especially in summer. Again, if any excavation or levelling of site is necessary it presents difficulties. Laying of drains or excavation of gutters cannot be done satisfactorily except at prohibitive expense. Besides, it is not suitable for a garden or for growing trees.

Soft murum at surface with hard murum or rock within 3 or 4 ft. is the best soil; next best are gravel and sand. They easily drain off rain-water. But the possible rise of subsoil water level in them is an undesirable feature, unless the site is lying high. Besides, there is a danger of their absorbing impurities from defective drains, cess-pools etc. contaminating underground supply of water. Moreover, sandy and gravelly soils tend to make the house hot. In this latter respect clay is better and if firm, gives a good foundation; but if it is black cotton soil, it is the worst in this respect, requiring special expensive treatment of foundations and subsoil drainage.

Trees grown in the neighbourhood, if thick, tend to keep the temperature equable and lend a charm to the landscape.

In the neighbourhood of the sea, the difference in the extremes of temperature is very small and there is a pleasant breeze blowing towards the land by day and away from it by night as the land gets hotter by day and cools sooner by night, than water. The sea breeze is very exhilarating as it contains ozone. But the air near the sea is always humid which induces perspiration causing discomfort, languid-

ness and enervation as it is often very sultry and oppressive. There is another disadvantage of sites in the neighbourhood of the sea, viz., the breeze which carries with it very thin spray of salty water acts upon iron and causes it to rust. Trees and gardens also do not flourish in the neighbourhood of the sea for the same reason.

From the sanitary point of view there should be no nallas, stagnant pools of water, old quarries, nor tanks and wells in a dilapidated condition in the neighbourhood of sites. If the wells are in a good condition with a copious supply of pure water, their existence adds to the value of the site.

The site should not be one on a reclaimed ground i. e. ground which was once a depression and filled up afterwards with some animal and vegetable refuse. In the first place such a ground absorbs water, becomes waterlogged, and very often the stuff putrefies giving out foul gases, most detrimental to human health. 2ndly there is a likelihood of the nuisance of flies breeding in the refuse in the ground. 3rdly, there is always a risk of an uneven settlement of the foundation and all the dangers to the building consequent upon it,—a state which can be remedied only at a prohibitive cost.

A busy street which, though from a business point of view, may be desirable, is quite unsuitable for residential purposes, since the nuisance of dust caused by heavy vehicular traffic is positively harmful and the constant noise created thereby, deprives one of rest, especially during sickness.

Pens of cattle, cesspits, lime or charcoal kilns, tanneries, ginning factories etc. giving out smoke, foul odours and objectionable noises, should be avoided even in a distant neighbourhood. Lofty buildings and tall trees obstruct the breeze. The latter should be under one's control, so that they could be pruned or lopped off at any moment without trespassing on the rights of anybody else.

A good and sufficient supply of drinking water should be close at hand. In rural districts, it is an ideal condition to have one's own well. If it be a public one, its water must be beyond any chance of being polluted even at any future date.

From a practical point of view, the proximity is obviously beneficial, of a railway station (not very close, as otherwise sleep is disturbed—a very important point in sickness), a public but not a very busy street, a Post Office, a Hospital, a Bank, a School, and the Market. Of these it is absolutely necessary for the middle and lower classes to have the school not very far off.

It is necessary in the interest of permanent happiness of the family to have a good neighbourhood.

A free-hold site is infinitely superior to a lease-hold one. Before finally settling the bargain, the legal aspect of the question should be scrutinised with the help of a lawyer.

It is advisable to make provision for an additional space of land, so that, it should be easy to add a wing afterwards to prevent congestion.

Orientation.

Proper orientation means that setting or facing of the plan of a building, which allows the inmates of the house to enjoy to the utmost, whatever is good and to avoid whatever is bad, in respect of comfort in the elements of nature, such as, the sun, wind and rain. Attention to this important factor, particularly in the tropical countries, is of great moment. The word "orientation" has been used here in a broad sense. It implies not only the direction of the main front of the house, but also the back and two side facings also.

Good orientation means proper placement of rooms in relation to the sun, wind, rain, topography and outlook and at the same time providing a convenient access both to the street and backyard.

According to the Hindu orthodox principles a building should not, as a rule, face the South. But the wise men of old have provided an exception to this rule viz. that there is no objection to this, provided there is a house or a row of houses on the opposite side facing the north. In most of the western countries of Europe an aspect, which gives the maximum sunshine, is preferred. In those latitudes, the sun never goes over head i. e. is always to the south of the zenith. Besides, the climate of those places being very cold, the warmth of the sun is most enjoyable. Hence, they provide for a southern aspect which gives them the maximum sunshine throughout the year. Here, in India and other tropical countries, what is sought for, is just the opposite. We want to devise means to reduce the sun's heat to a minimum especially in summer, when its rays strike us vertically or nearly so.

The sun's action in causing heat is mostly direct by day. But by night it is entirely indirect. Stones, bricks and tiles etc., of which the walls and roof of a house are composed, absorb sun's heat by day which they slowly radiate by night. While doing so the air in contact with them is heated which is the real cause of discomfort by night. Hence, proper orientation must protect the house from both i. e. sun's direct heat by day and the indirect one by night.

Let us first consider the direct heat by day. The temperature of a place, though no doubt modified by several local influences such as, proximity of a sea-coast, hills, valleys and sandy deserts etc., or also by the elevation above sea-level, soil, vegetation and woods etc., is mainly governed by the latitude of the place or, which amounts to the same thing, the altitude of the sun above the horizon of the place. The mean daily altitude of the sun is highest in tropics or the torrid zone and decreases as one goes either northward or southward towards the arctic or the antarctic zone. The total heat absorbed depends, again, on two factors (1) The intensity and (2) the duration. The aim of proper orientation, must be, to admit the required amount of sunshine into the house in the morning when it is very pleasant, and the intensity of its heat is less, and to minimise its duration in the afternoon and evening when its rays are again likely to enter the house. In the noon time the sun is generally overhead in the tropics and therefore its rays are not likely to enter the house.

The sun's rays are potent to kill germs of diseases, but for that purpose severe heat is not necessarily required. The morning sun not only does it satisfactorily, but lends cheerfulness in addition, coming as it does, after the chill and darkness of the night. The reason of it is, that there is full light, but very little heat in the morning sunshine. The cause of the less heat is three-fold: (1) The morning sun is inclined at a low angle with the horizon; its slanting rays, being spread over a larger area, bring to each square unit of surface less heat and thus diminish its effect. (2) Also, the oblique rays have to pass through a greater thickness of atmosphere which has already cooled down by the night, and again, (3) the air in the morning is charged with water vapour which allows the light rays to pass freely but absorbs the heat rays in their passage. As the sun rises, its rays fall more and more vertically and heat becomes more and more concentrated. The moisture in the air also slowly disappears and the heat rays are less and less absorbed. In the afternoon and evening, even though the rays are again slanting, the air being dry, heat rays which are no longer absorbed, are intensely felt. That is why the evening sun is not so pleasant and charming like the same in the morning, and therefore is abhorred to a certain extent.

Thus we see that a certain amount of sunshine inside the house is not only desirable but is welcome. However, when we have just enough of it and it grows severe in heat, it should be shut off. Mere closing down windows for this purpose is not sufficient, because in that case, it will still heat the walls, and their radiation will make the rooms on that side quite uncomfortable. Hence, we must so set or face the building that the sun's rays will be effectually excluded without closing windows in the late hours of the morning, especially in summer.

By facing of the building is meant placing of such rooms on that side which are mostly occupied during the daytime, and providing large windows in the walls on that side with projecting chhajjahs or sunshades at their crest in order to regulate the sun. These should be located at such a height and should project so much beyond the wall that as soon as the morning sun rises a certain height and becomes hot its rays should be automatically cut off by the projection. However, the sun is welcome and enjoyed much longer in winter than in summer. The ideal would, therefore, be accomplished if the sunshades are so designed that they are capable of being raised or lowered, and also rotated about a horizontal axis at varying angles, so as to keep them in any desired position and at any desired inclination according to the season.

If a certain amount of sunshine is allowed to penetrate into the house during early morning hours, it is bound to do so also a few hours in the late evening; to effectually exclude this and render it harmless, deep verandahs on the south and west side, have to be provided.

We have discussed above how it is possible to regulate the sunshine, but it is not the only factor contributing towards comfort. Air in motion or what is called breeze, and aqueous vapour or the relative humidity in the air are equally or perhaps more important than heat. It is the general experience that in spite of a low and equable temperature of sea-coast places, a still atmosphere which does not materially help evaporation, causes greater discomfort at those places, than a comparatively high temperature, in dry, arid plains, accompanied by a breeze. A high humidity causes perspiration

and if the atmosphere be calm and still, which does not cause evaporation from the surface of human body, what is called 'sultriness' is the result.

The direction of the prevailing wind especially in summer, when it is most needed is between the West and South. The exact angle depends upon a number of local influences which need not be discussed here; to derive the maximum comfort from the breeze, the bed rooms which are occupied by night must be located in its direction, but if they are directly exposed to the after-noon sun, they are heated and the radiation of their heat by night, as we have seen above, will warm the breeze and make the rooms hot and uncomfortable. Hence, deep open verandahs both on the South and West are necessary.

To recapitulate, for proper orientation (a) place all the rooms which are usually occupied by day on the North and East and (b) place the bed rooms on the South and West and provide deep open verandahs to protect them from the heat of the after-noon sun.

The Plan.

As a general rule, the shape of the plan is governed by the configuration of the building plot, and its nature—whether compact and closed or extended and open—is influenced by the climatic conditions of the place.

Thus at places where temperature, either very cold or very hot is the deciding factor, the plan needs to be compact and closed. For example, on a hill station like Simla, on account of the extreme cold obtaining there, a closed, compact plan, a square or a rectangle approaching a square in shape, with an inner central passage to serve the rooms, instead of outside verandahs, is a very convenient one. Similarly in the plains, at Allahabad for example, the extreme heat in the summer is the governing factor and it makes obligatory to design a house with one or two central lofty apartments, ventilated and lighted by means of clerestory windows below the ceiling. Round these apartment are grouped other rooms, and beyond these rooms are built verandahs on the West and South, to shelter the walls of these rooms from the direct rays of the after-noon sun. During the hot days the outside hot air is excluded by closing the apertures, so that the inner rooms, particularly the central apartments remain cool.

In places on the sea-coast at Bombay and Madras for example, on the other hand, it is the moisture and not heat which mainly affects comfort. The object here is to expose as much area of the house to the outside air and admit as much breeze into the rooms as possible. Hence, an open, extended plan resembling the letters L, E, U or H with large windows in outside walls is very suitable. Further, there should be as much open space in front and around buildings as possible. Areas of rooms should also be larger, it does not matter if the height is curtailed.

At places other than these i.e. the places which are situated neither on hills nor on the sea coast, and which do not have the climatic conditions similar to those on the plains, there is neither extreme cold in winter nor extreme heat in summer, and unless there is a large

surface water like that of a lake or a river in close proximity the weather is comparatively dry. At these places the extended plan, not only makes for comfort but also for the preservation of health.

A number of varying factors affects the considerations of planning a domestic building. Hence, no very hard and fast rules could be laid down for general application. No two sites could possibly have identical conditions. Individual requirements and idiosyncrasies, which could never be alike, lead to a number of varieties in it. The situation of the site, whether in town, suburb or in the country, plays an important part in the determination of the plan. That, again, differs according to the amount of accommodation required, by reason too, of its alternative treatment whether a "detached," "semi-detached", 'flat', chawl, a cottage, or a bungalow and so on. Even in a town it may differ according to the street, neighbourhood, aspect, surroundings, also rental value and restricting by-laws of the local authority.

In spite of this variety certain features which govern the theory of planning are common to buildings of all classes intended to be used for residential purposes. They are enunciated below :—

- (1) Aspect, (2) Privacy, (3) Prospect, (4) Grouping, (5) Roominess, (6) Furniture requirements, (7) Sanitation, (8) Flexibility, (9) Circulation and (10) Practical Considerations.

(1) *Aspect*.—By aspect, I mean the peculiarity of the arrangements of the doors and windows in the outside walls of a dwelling, which allows it to enjoy to the utmost, the gifts of nature such as sunshine, breeze, view of the landscape etc. This is a very important consideration in planning. It is a truth, universally admitted, that one's thoughts are moulded by the surroundings; that outside influences play an important rôle in the development of the human mind. If they are pleasant and cheerful, people living in their midst are contented and happy; if, on the other hand, they are dull and dismal, they cast a gloomy shadow on their minds. It is, for this reason, those people of humble means living in a small cottages, who stand most in need of the two factors viz., Aspect and Prospect.

A building must be designed to suit the site with all its varying aspects. Aspect not only provides comfort but is requisite from the hygienic point of view as well. The value of sun's rays cannot be ever-estimated. They are potent destroyers of organic poisons of spreading diseases and lend a cheerful and genial air to the rooms. With a careful disposition of windows, it is possible to admit sun's rays into any desired rooms. A kitchen should have an Eastern aspect so that, the morning sun would purify the air in it and it will remain cool in the latter half of the day; the bed rooms should have a S. E. or S. W. aspect; the drawing room, N. E. or S. E. and so on.

(2) *Privacy*.--This is next in importance in the design of domestic dwellings. If they lack in this respect, it is a deplorable fault which cannot be compensated for by a host of its other merits. Privacy is of two kinds: (a) The one is in respect of screening the interior of any one room from the other rooms of the house and also from the main entrance, while, (b) the other is the privacy of the whole house from the high-ways and by-ways. The latter is comparatively easy to secure by carefully planning the entrance and screening it with trees or creepers trained on a trellis. But the former requires a careful thought in planning. The internal privacy of a domestic house could be maintained by (A) Proper grouping i. e. disposition of various departments and parts of the building in their relation towards each other, which, particularly [in economic and compact planning, requires great skill on the part of the architect. (B) Proper disposition of doors. For instance, if a door is fixed in the centre of the shorter wall of a room, the interior of the whole room is exposed to view, whereas if it is fixed in a corner of the larger wall, the larger part of the room is screened. (C) The mode of hanging door and (D) Provision of a small corridor or lobby. All these methods have been illustrated in the following pages with concrete examples in the notes describing various designs.

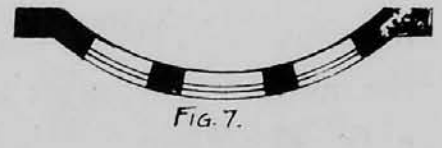
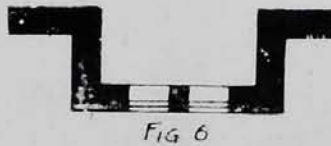
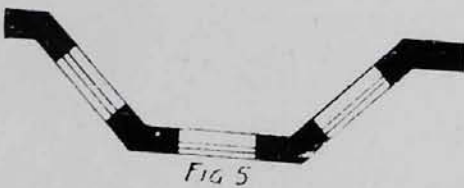
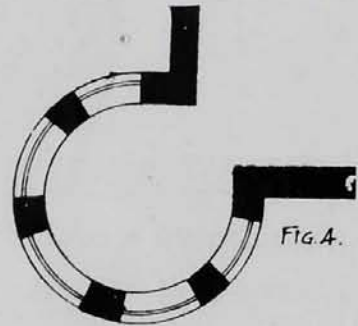
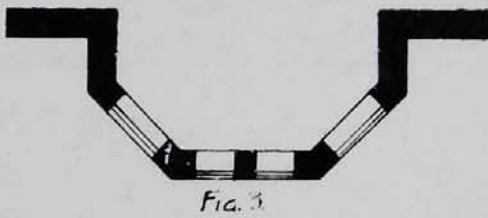
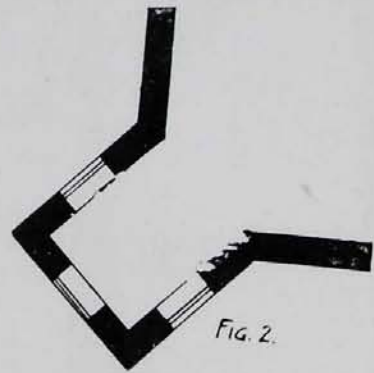
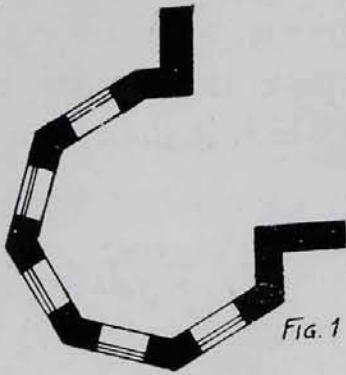
Privacy is of supreme importance in the following rooms in particular: bed rooms and all rooms in which sanitary arrangements are usually made such as toilet rooms, water closets and earth closets, urinals, bathroom, etc. The Kitchen department also should be kept

out of the view of the passers-by. As far as possible every room (except perhaps the drawing room) should have an independent access to it. Again, services such as bathroom, toilet and w. c. should have an independent passage to them from every room and the real skill of the architect lies in so disposing of the rooms with respect to the position of the services that a minimum space is occupied in these passages. This is called compact planning which is the very essence of economical designing.

'Privacy' is quite different from 'Seclusion'. The latter is sought to be secured in a worship room, study and library. A business man's or a manager's office is strictly private, though in the interest of business it cannot be located in a secluded corner; on the contrary it must be situated in a prominent place easily accessible to the public and situated in the centre of the various departments.

(3) *Prospect*. — In its proper sense "prospect" has a reference to the impressions that the house will make upon a person looking at it from the outside. It includes taking full advantage of the beauties of nature in the landscape by revealing to a stranger certain pleasant features and also by concealing from his eye some undesirable ones in the main outlook of the house. It must, not only be attractive in external appearance, but must possess also such qualities as comfort, cheerfulness, security, labour-saving, up-to-dateness. It must also prove a good investment. The sense of pride that one's own house has got not only a smart, pleasing appearance but a certain individuality which differentiates it from the houses of others and the effort to maintain that individuality which occupies part of one's time are potent factors in the amelioration of life of the poor who have otherwise continually to struggle against odds and end in life. Undue prominence, however, should not be given to this feature and it should not be the only or even the principal desideratum in designing the elevation of domestic dwellings, particularly for housing the middle or poorer classes. Just a small projection here, a bay window there, casually provided to break the dull monotony at a small extra cost, which, considering the benefits it gives, is not only justifiable but necessary. This should not, however, be treated as an extra item in the estimate and considerable money spent over it. Bay windows not only fulfil

this requirement but in addition, help in giving breeze, light and sunny aspect all the year round. Some of the forms of bay windows are shown below :—



(4) *Grouping.* — Grouping means the disposition of rooms in respect of their relative positions towards each other. If a building fails in this respect no amount of care taken in all others, is of any avail. The dining room must be close to the kitchen; the latter, again, must be away from the drawing or the main living room; otherwise, kitchen smells and smoke would detract from their usefulness. Services must be nearer to, and independently accessible from, every bed-room. The w. c. s, etc. must be far removed from the kitchen and dining room, and so on. This subject has been treated in detail later on in a special section under “grouping”.

(5) *Roominess.* — Roominess is the opposite of crampedness. It has a reference to the effect produced by making the best of small

proportions of rooms, by deriving the maximum benefit from the minimum dimensions of a room ; or to accomplish economy of space and at the same time avoid cramping of the plan. It looks so simple at first sight, but is really so difficult an art, that it often taxes the brains of the architect. A room whose walls are disproportionately high, looks much smaller than it actually is. Similarly, if the length of a room exceeds $1\frac{1}{2}$ times its width, it produces an effect of crampedness. A square room looks smaller and in respect of utility it is really so, as compared with an oblong one of the same superficial floor area. For example, if a small table is placed in the centre of a room, $10' \times 10'$, the small space equally divided on all its four sides is much less useful than the extra space left on two sides of it in a room measuring $12' \times 8\frac{1}{2}'$ which has got practically the same area. Every square foot of the area under roof costs 3 to 5 rupees. Hence, the maximum advantage must be taken of every nook and corner of the house before thinking of making an addition to the plinth area. Plentiful provision of wall cupboards should be made ; even the narrowest space under the flights of stairs should not be disregarded. It should be enclosed and turned into a useful store room. The space in the walls below the window-sills down to the floor level, could be used as a cupboard. This latter arrangement provides a cupboard at a very cheap rate, because no extra lintel or arch is required for this. Provision of such conveniences together with one or two lofts below the ceiling in unimportant rooms and a few wall-shelves supported on brackets, would render it unnecessary to set apart a separate store room in small cottages.

(6) *Furniture requirements.*—This matter, though of a considerable importance is often most neglected. Bed rooms must be designed with due thought and attention to the prospective position of the beds. Otherwise, the latter have to be cramped up somewhere in it, either in a position exposed to view, or opposite to a window facing a strong draught of wind. Even now, I can vividly picture before my mind, the house of a friend, visited sometime ago. It was elaborately treated in respect of rich external decoration, but the sitting room was too small to accommodate a small table in the centre with sufficient elbow room all around it. Another room could not accommodate a bed in

any position without coming in the way of either a wardrobe or a door, or a window. It is best, therefore, to show in the plan the positions, not only of beds, but also of heavy pieces of furniture such as sofas, almyrrahs and Chesterfield suites and even of pegs. It is necessary to exercise forethought and imagination in this respect.

(7) *Sanitation*.—Sanitation is of very great importance for a dwelling, because, on it depend, the health and the happiness of the inmates. Sanitation embodies provision for ample light and ventilation and due attention to general cleanliness and sanitary conveniences.

Light.—Absence of light has a deleterious effect even on plants, which, if placed in a dark room, soon lose their lustre and often times, droop and die. People who have to work in mines, cellars and other dark places look pale and anæmic. This is due to the fact that sun light direct or diffused acts directly upon the corpuscles of the blood and makes it flow vigorously with its natural bright red hue. Sun's light, not even direct but diffused, is found to be potent to destroy germs of tuberculosis. Hence, too much stress cannot be laid on getting light into the house as profusely as possible. There should not be a single corner in the whole house which is not sufficiently lighted. Particular care must be taken to light passages and stair-cases—the places where there are chances of collision and accident taking place. As far as possible long and narrow passages which are difficult to be sufficiently lighted should be avoided. If they are at all unavoidable, sky-lights should be provided in addition.

Cleanliness.—This includes also the means provided for cleansing. In India water carriage and sewerage systems have developed only in a few large cities. There, it is comparatively easy to keep the premises clean; but in other cities and towns and in all rural districts this matter is very much neglected. In this connection the following extract taken from Dr. Poore's Rural Hygiene will be found to be very useful. In country districts every cottage ought to have a bit of garden—about $\frac{1}{2}$ of an acre or more, and adopt the following system of sanitation :—

“(1) All excrement should be kept out of the drains; for, by doing this the putrefaction of the solid is prevented and the purifica-

tion of the liquid by filtration through the earth is effected with ease which is proportionate to the thinness of the fluid.

“(2) All solid matter should be removed every day from the immediate neighbourhood of the house and buried in the top layer of cultivated ground. This surface layer is full of living organisms which rapidly disintegrate and oxidise any substance deposited in it, until in a very short time—in summer, within less than a week in tropical countries like India—the filth becomes fertile “humus” or mould. Household slops should be poured on to the surface of the garden and the mistake of attempting what is called subsoil irrigation must not be made.

“(3) Earth closets with moveable pails should be outside the dwelling house, approached by a covered passage, with a cross ventilation. Sifted garden mould, taken from the top layer and dried in a shed—not by a stove—is most suitable for use. If specially constructed, as in Denmark, Sweden, and Norway so as to separate liquid from solid deposits and, if kept from household slops and other liquids, earth closets are, not only free from nuisance, but will provide valuable manure.

“(4) With regard to other solid refuse, the rules must be—

(1) Whatever is capable of rotting must be put in a heap to humify.

(2) Whatever is not capable of rotting must be burnt.

“(5) As for domestic slop water, it must never be discharged from the house below the level of the ground. The coarser impurities must be strained out by passing it through filter of gravel or cinders and in its transit to the filter bed it should be kept freely exposed to air in its entire course. If this is done, the exposure to air, sun, heat, cold and drying winds, hold putrefaction in check, and render impossible, the escape of foul gases into the house. The key to success is the separation, in every possible way, of solids from liquids.”

Dust is a great enemy of health and its proper importance is not adequately understood in India. Most of the diseases are spread by it ; hence, one should strive to minimise the chances of accumulation of dust and other objectionable matter. This could be done in the following ways ;—

(1) No mouldings, even skirtings and cornices, should be allowed, particularly on the inner surface of walls. (2) Ledges, nooks, crevices and all unseen spaces which could possibly give dust a lodgement, should be avoided. (3) All edges and corners should be rounded. (4) Angles made by junctions of walls with floors and ceilings should be rounded. (5) Non-absorbent materials like glazed tiles should be provided in the w.c.s. and kitchens for flooring and skirting all round of walls. (6) Trellis work in verandahs should have large apertures to facilitate cleaning, and railing of galleries and balconies should be of a plain and simple design for being easily cleaned.

Ventilation.—In providing windows for ventilation, particularly in chawls and flats, the habits of the people likely to live in them should be taken into account. Over-ventilation does no harm, while under-ventilation is full of it. Hence, there should be a tendency to err on the safer side by providing more ventilation than absolutely necessary. In designing chawls and flats a provision should be made for sufficient ventilation even though the windows may be closed for fear of draught as is the wont of the people occupying them. This could be done by providing floor ventilators in the walls facing an open space. They should be about 18 inches long and 5 inches high, closed by fixed venetians or “hit and miss” sliding shutters as shown

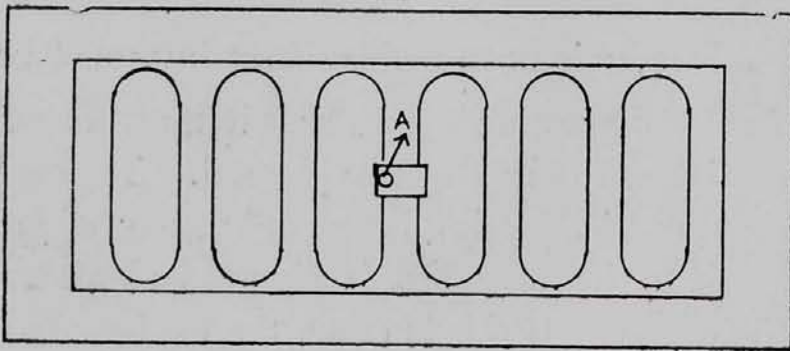


Fig. 8

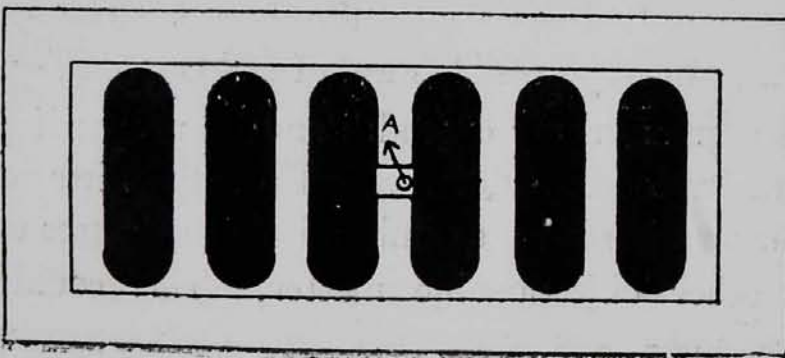


Fig. 9

in the sketch (see fig. 8 and 9). Whenever there is a high wind which is likely to cause an exposure to a person sleeping on the floor (which is the practice in many parts of India) the movement of the button A, one inch either way, could partially or wholly close the apertures. In addition to these, ridge ventilators, near the ceiling, are required. For these, either bull's eyes or clerestory windows should be provided a little below the ceiling; or better still the main windows should be carried to within 6 inches or a foot below the ceiling. The theory is, that the lower strata of air in a room which are warmed by the human breath and to a certain extent by the radiation of heat from human bodies, becoming lighter by the warmth, rise to the top. Unless efficient means like windows near the ceiling are provided for driving them out, they are likely to cool down, become heavy again, and descend, and have to be breathed in again. They are injurious to health because, they are devoid of oxygen, which has been already used up.

Ventilation means much more than simply supplying fresh air to a room. It also connotes the evacuation of the vitiated air and the maintenance of a movement of air in the house.

Movement or lack of movement of air, is conducive to a feeling of well being or discomfort, leading, in the latter case, to serious results. Lack of movement of air leads to increase in temperature, increase in humidity, which lead to hindrance of evaporation from the body surface, heat accumulation and finally heatstroke.

For a thorough ventilation one large window situated in the centre of an outer wall is not sufficient, but there should be another window or windows in the opposite wall.

This is called "through ventilation." In order that the air in every nook and corner of a room should be renewed, 2 or 3 apertures distributed over the whole wall, exposed to an open space, are preferable to one large window fixed instead, on it.

The so called effect of "stiffness" in a crowded room is caused not only by the partial exhaustion of oxygen and the presence of an undue amount of carbonic acid gas in it, but more by the fact that the human exhalations are warm and contain an amount of water

vapour. They are, moreover, charged with microscopically small particles of organic matter (part of which also deposits on teeth) which gives a foul oral smell. In addition to this the humidity and warmth, caused by the breath, induce perspiration on bodies of people occupying the room, which also adds to the stink and all these contribute to cause that well known feeling of 'stuffiness.' Hence, the function of satisfactory ventilation must be fourfold to create (1) a sensation of comfortable coolness to the body (2) freedom from bad smell (3) reduction in humidity and (4) proper supply of oxygen. All this must be secured without producing a perceptible draught.

The relation of window area to that of the room and the cubic capacity of space to be allowed per head are described while dealing with bed rooms under "grouping."

(8) *Flexibility*.—This means making a room, originally designed for one specific purpose, serve other overlapping purposes also. For example, in the houses of small middle class families, which cannot afford to employ a cook, the kitchen should be so designed as to serve both the purposes of cooking and dining, even though there may be a separate dining room in the house. For instance, the school children want their meals served early so as to enable them to attend school in time, or Saturday early-movies require the evening meals taken early. However, either the meals may not be fully ready, or though ready some finishing touches may have yet to be given to some articles before they are ready to be served. By the arrangement of the kitchen designed to function in both the ways, the housewife can conveniently serve the articles which are ready and at the same time give the finishing touches to the others. As another instance, children require from the first creep to about the fourth year some space for their play as far as possible under the supervision of the mother, and the supervision is most effective when the child is the least conscious of it. This is possible either in the dining room or a verandah adjoining the kitchen, if these are specially designed and located so as to serve these overlapping activities. A house planned on scientific principles must within a small space provide for innumerable similar activities such as listening to radio, child home work, entertaining guests, relaxation or prayer in a space away from the hubbub of the house, festive occasions such as the arrival of the first baby, holiday

dinners, birthday feasts, wedding banquets, religious congregations and so on—all these and many others have to be provided for within a small space, within a short amount, and this is only possible if special attention is given to flexibility.

However, some activities are conflicting with others. Therefore, it is next to impossible to provide perfect flexibility even in large houses. For instance, the child—play is an important and necessary activity, but it is not permanent. Besides, as the child grows stronger and older, its play consisting of running, jumping, playing a horse, or a railway engine with its whistle or an electric engine with its siren, blind-man's-buff or even a football match, occupies not only the space in the entire house, but the premises around and sometimes even the streets and is necessarily noisy and boisterous and therefore what is right for the child is often an annoyance and a veritable nuisance, particularly to the older members of the family who want a calm and quiet atmosphere for their relaxation or prayers.

When it comes to finding out a practical solution, a compromise has to be effected. In respect of child play the dining room if close to the kitchen or the verandah adjoining the kitchen should be a little more spacious and there should be a large window or a door at a convenient place to enable the operator in the kitchen to supervise their activity. For more grown up children a large terraced roof with sufficiently high parapet walls or a safe and strong railing is an ideal place at least for 8–9 months of the year.

In respect of other activities folding partitions are the best solution. They make it possible to meet not only the seasonal, but even the daily needs of the family. I have actually seen a number of houses in France and Germany in which the internal walls were only light partitions, which, having no structural function to perform were removable, enabling several bed rooms to be made at night and the same to be converted, by day, into a large hall.

There are two ways to meet the demands of festive occasions or religious or social congregations. One is to combine the drawing and dining room by a removable partition between them and the other is to dine in the open air. For this a convenient access should be

provided from the kitchen to the yard, or the garden and the space should be screened from the public gaze.

This and the next important subject viz. circulation, would be dealt with again along with the discussion in the chapter on "Synthesis of a Home" and a number of practical instances would be given in the plans and commented upon in the notes on the constructional outlines of plans.

(9) *Circulation*.—In order to preserve the privacy of every room and also not to disturb any member of the household doing his or her work, a straight, short and separate passage is required. This passage which is the means of circulation should be direct and well lighted. Circulation is of two sorts: one, horizontal i. e., on the same floor and the other, vertical or, from one floor to the other, either below or above it. As the staircase is the only thoroughfare for the circulation from one floor to the other, the latter is perhaps more important. Again, there must be a proper circulation provided not only outside rooms, but also within rooms. The latter means that the shape and size of rooms and also the design and arrangement of furniture must be considered.

Bad circulation within a room detracts considerably from its usefulness and if there is no good circulation in a house much of the pleasure and comfort is lost. It is a criminal negligence on the part of the designer if one has to enter another's bed room in order to reach a bathroom or his own bed room. Particularly the sanitary services and the staircase must have an independent access from every room.

In places where there are no drains on the water carriage system an independent access to bath rooms and privies must also be provided from the outside for the scavenger.

In houses with five bed rooms and above there should be an independent stairway for the servants other than the main one.

(10) *Practical*.—The following few hints in connection with planning would, it is hoped, be appropriate at this place.

(1) Strength and stability coupled with convenience and comfort, should occupy the first place of importance, and embellishment, the next.

(2) Simplicity and effect of strength lend lasting beauty and grandeur to a building which petty plaster mouldings and vain decorations do not. If a moulding is cracked or the edge of a corner knocked off, it is difficult to thoroughly repair it. Colours fade away and unless frequently renewed at a great recurring expenditure, the building on the contrary looks ugly.

(3) One should always bear in mind that a house is called an immovable property and built to-day is calculated to last for several generations. One has, therefore, no right either to practise false economy and erect a weak structure which fast depreciates in value requiring continual repairs ; or, on the other hand, build, under false ideas of dignity, a costly structure by incurring a heavy debt beyond one's means of repayment.

(4) In the years to come a man may perhaps have to add a wing or extend some part of the house. Provision for this should be made while building in the first instance, so that some part already built, may not be required to be dismantled at the time.

(5) Though a person is at present hale and hearty and perhaps in the prime of his life, while building a new house, he should remember that old age with its attendant infirmity, is sure to overtake him, and sickness, which human flesh is heir to, may attack him sooner or later in course of time, as it always does in 9 cases out of 10. Hence, it is always prudent to have one room preferably on the ground floor designed mainly for comfort which will also be a hospital room for the old and sick member of the family and in times of health and happiness, will prove to be a luxury. This question has been dealt with later on in this book while discussing "grouping" in the next chapter.

Analysis of a 'HOME'.

It is proposed in this chapter to analyse a 'HOME' according to its different functions and see what apartments should be allocated both in small cottages and large houses, to fulfil them.

The word "HOME" connotes far more than a house giving a mere shelter for protection from the elements. It is a centre of social life ; a place of health, comfort and happiness of the entire family in all the stages and conditions of life, viz. infancy, childhood, man-hood or woman-hood and old age,—also in health and in sickness ; a place where the body and mind of the young children are nurtured so as to fit them for shouldering their responsibilities as future citizens and so on. Hence, in order to merit the title of HOME, it must provide adequately for the following life activities of the family :-

| <i>Function</i> | <i>Space allocation</i> |
|---|--|
| (1) <i>Cooking.</i> ... | In small cottages a room for kitchen inside a house. In large houses a cook room preferably away from the main house and attached to it by means of a covered passage. |
| (2) <i>Dining.</i> | |
| (a) Morning tea and breakfast ... | Kitchen or the adjoining verandah. |
| (b) School children's hurried meals ... | Kitchen. |
| (c) Family meals. | A separate dining room. |
| (d) Small parties ... | Combination of dining and drawing room. |
| (e) Festive occasion ... | Courtyard or garden. |
| (3) <i>Rest and relaxation.</i> | |
| (a) Conversation ... | In small cottages the front verandah. |
| (b) News and other light reading | Stair case hall or the drawing room. |

- (c) After-noon tea In large houses : lounge or staircase hall or the drawing room.
- (4) *Sleeping.*
- (a) Indoor sleeping in winter and monsoon.. (a) Bed rooms.
- (b) Out-door sleeping in summer ... (b) Back verandah or roof terrace.
- (5) *Study.*
- (a) Children's home lessons Front verandah or dining room in small, and a separate room in large houses.
- (b) Doing work brought home from office Bed room or attic in small cottages. Study room or library in large houses.
- (c) Serious reading or study do.
- (6) *Child play.*
- (a) Confined—as in the case of babies Dinning room or a verandah close to the kitchen in small cottages, and nursery room in large houses.
- (b) Free—as in the case of grown up children ... Roof terrace or courtyard.
- (7) *Storage.*
- (a) Pantry ... (a) A small store room attached to the kitchen, in small cottages, a separate large store room in upcountry houses.
- (b) Larder for dairy products ... (b) A wall cupboard (with wire gauze shutters in front, and air bricks, behind) in the kitchen in small houses, a refrigerator in large houses.
- (c) Cupboards ... (c) Wall cupboards in dining room, kitchen and lobbies,

- | | |
|--|--|
| (d) Closets or ward- robes | (d) Wall cup-boards or separate closets in bed rooms, and front entrance. |
| (e) Lumber room ... | (e) A small cellar or separate room attached to out houses in large establishments. |
| (f) Coal or fuel ... | (f) An underground cupboard with shutters flush with the floor in a lobby near kitchen or dining room in small cottages and a separate fuel shed or a cellar room in large houses. |
| (8) <i>Concentration.</i> | |
| (a) Thinking ... | An attic room or a bed room in the small house and library in large ones. |
| (b) Prayers or reli- gious worship ... | A secluded closed alcove preferably not far removed from the kitchen, or dining room in small houses, a separate small room in large ones. |
| (9) <i>Recreation.</i> | |
| (a) Listening to radio... | Drawing or living room in small houses. Lounge or drawing room in large ones. |
| (b) Boy's handicrafts ... | Back verandah or a separate shed outside depending upon the nature of the craft. |
| (c) Girl's music ... | Dining room. |
| (d) Ladies needle- work and home stitching | Dining room in small houses. The lounge or a separate ladies apart- ment in large houses. |
| (e) Gent's hobbies ... | Allocation of space depends upon the nature of the hobby. |

(10) *Toileting.*

- (a) General make up ... A corner with a looking glass in the dining room or ladies' apartment in small cottages, and a separate dressing or toilet room in large houses.
- (b) Bath room ... A small room adjoining kitchen on the ground floor in all houses and one separate general bath room on the first floor, particularly in large houses.
- (c) W. C. & Urinal ... Inside the house one on each floor if there is a water carriage system available. Otherwise detached one outside the house.

(11) *Reception.*

- (a) Casual short-time visitors ... Front verandah, lounge or drawing room according to the status and relation of the visitor.
- (b) Guests ... The front verandah or the drawing room in small cottages. Guest or study room or library in larger houses.

(12) *Drying Clothes.*

- ... Open yard by the side of or behind the dining room and kitchen in fair weather seasons. A few Dandies hung from the ceiling in the back verandah or dining room in the wet season, in small cottages and a separate rear yard in large houses.

(13) *Entering and leaving the house.*

- (a) Main entrance ... In front verandah.
- (b) Back entrance ... In the back verandah or kitchen.

In large houses there should be not only a separate entrance for the servants, but also an independent small staircase leading to the lobby.

Grouping or Synthesis of a Home.

In the foregoing chapter we analysed the HOME according to the different functions into various apartments. It is now proposed to show how all these apartments are to be grouped or assembled to make it a real HOME. Upon the way in which the various rooms or appurtenances are arranged depend very largely the comfort and health of the inmates. This statement is particularly applicable to the smallest cottage. The more limited the space, the more necessary it becomes to utilise, to the best possible advantage, every available inch.

From the discussion in the last chapter it would be clear that the maximum accommodation required by an Indian family consists of the following appurtenances :—

(1) a Verandah (2) a Drawing room (3) Bed rooms (4) Kitchen (5) Dining room (6) a Ladies apartment (7) a Store room (8) Worship or prayer room (9) a Bath room (10) a Staircase (11) a Comfort room (12) a Guest room (13) a Nursery or Children's room (14) a latrine (15) a garage.

Detailed discussion of grouping of all these will cover the requirements of families of all grades of society.

(1) Verandah.

A verandah, or at least an open terrace, is almost an essential feature of an Indian home as it serves many purposes. Firstly, it is used for keeping shoes, sticks, umbrellas etc. directly as one enters the house; and also for storing prams and cycles. 2ndly, it serves the purpose of a waiting room for a stranger or a visitor before he is ushered into the reception or drawing room. 3rdly, it serves as a passage giving an independent access to other rooms of the house, thus preserving their privacy. The fourth purpose is its use as a sitting out place in the evening or by night after dinner, enjoying some light reading or post-prandial talks with friends in a flood of cool breeze. In the

cottages of people of humble means this is often the main sitting room. The fifth and the most important purpose served by a verandah is, that it protects the walls of the house on that side from being heated by exposure to the sun's rays. This it does in two ways; firstly, by sheltering or screening the wall from the sun's rays and 2ndly, by offering to them a buffer or a sort of cushion of air, which is a very bad conductor of heat. Thus the air entering the rooms behind it, is first cooled down to a considerable extent, before it enters the room.

To secure comfort, verandahs on the South and West are indispensable, but if funds permit, they should be provided also on the East and lastly on the North. The latter is rather a luxury than a necessity. If exigencies of money do not permit to provide them on the South and West side, there should be one especially on that particular side on which the bed rooms require protection from the heat of the after-noon sun especially in summer. Not only are verandahs necessary on the ground floor, but also on the upper ones.

When a verandah is required only for mitigating the heat of the summer and not for the purpose of serving as a waiting room, an excellent arrangement is to have a cheap structure built of wooden ballies or posts supporting a trellis above, on which is trained a vine creeper. The thick foliage which the vine gives forth in summer effectually excludes the sun and cools the hot breeze, and in winter, when its foliage is thin it allows the warmth of the sun to be freely enjoyed. The vine has a luxuriant growth and if well manured and trained it would cover the trellis not only on the ground floor but on the first floor also in a couple of years and would last for many years.

Verandahs are very often specially placed on the East or South-east and so designed, that they should be flooded with the morning sunshine and afterwards when the shutters are closed the sun's heat is, to a certain extent, 'trapped' inside. Such verandahs are called 'Sun-traps' and are most enjoyable in cold climate. The sun's rays have got the power to kill all noxious germs and give healthy and cheerful appearance and purify the air. For this purpose some times special "Sunbaths" are constructed in Western countries.

If a verandah is designed simply for the sake of a passage or corridor giving an independent access to certain rooms, it need not be more than 3 or 4 ft wide. Any width more than this for this purpose is a waste. If, however, it is to be used as a sitting or waiting room, its width should be $6\frac{1}{2}$ ft. as a minimum, (although 7 to 10 ft. would be better), in which case one can conveniently spread a camp cot and lounge on it whenever desired. Any intermediate width serves neither of these purposes satisfactorily and hence, is practically a waste. There is a disadvantage also from a deep verandah, in as much, as its roof is likely to darken the room inside and make it look dull and gloomy, unless, rooflets (also called 'gables') are provided.

A verandah more than 12 ft. wide is uneconomic. In order that a verandah should shade the walls of a building during greater part of the day, it must not have openings of greater height than $\frac{2}{3}$ of the floor width. For a 12 ft. height it is 8 ft. and for a 9 ft. height, 6 ft.

7 ft. height of verandah is suitable, for it admits the maximum air and light at a low level, and affords shade and ventilation above through apertures just below the ceiling level. If the depth of these apertures is restricted and length kept sufficient they afford better ventilation and more light without admitting sun's rays. Depth of aperture should be less than the thickness of the wall.

Projecting balconies, which are also a sort of verandah are useful, particularly, when opening from a landing of a staircase. After winding on a few steps when one has got a feeling of slight exhaustion, these balconies serve as a resting place where one can breathe fresh air and enjoy a view of the landscape, and are good in that respect. But when they stretch out from windows in private houses, particularly in an urban locality where houses are not far removed from each other, they do not serve any better purpose than an additional relieving feature in the elevation of the building, which adds elegance to it. It also protects the room inside from the piercing rain, which purpose could be equally served by suitable bonnets over the windows. But this is secured at a sacrifice of considerable amount of money for a small doubtful advantage. From another point of view, they do a positive harm to our

neighbours viz., they seriously interfere with the privacy of the neighbouring houses. No one would naturally like to be watched by his neighbours from a projecting balcony.

(2) Drawing Room.

Every cottage, whatever its size, should contain at least one spacious room, call it by whatever name you like, a 'drawing room' a 'parlour' or 'a main or living room.' To the Indian it is almost indispensable. Many and varied are the purposes served by it. It is mainly used as a reception room, as also for holding social functions. It is required to be used as a dining room on special occasions like marriage, feasts etc. ; or on holidays when a number of friends are invited to dinner, the drawing room is required in small cottages for boys and girls of school going age to study their home lessons. It is at times required to accommodate occasional guests who are never wanting in a middle class Indian family ; It is also required as a congregation room on occasions of some religious discourse or some such festivities and so on.

The minimum size for a drawing room should be 15 ft. \times 12 ft. It should be well ventilated and lighted with large windows preferably starting from the floor level. The doors especially the one at the front and the other at the rear, should have a minimum width of 3 ft. so that pieces of heavy furniture could be easily moved in and out. The position of heavy pieces of furniture such as tables, almyrrahs, suites, sofas etc. should be invariably shown in plan and the positions of wall cupboards etc. should be accordingly fixed. This simple matter, if neglected at this hour, is likely to cause a great inconvenience afterwards.

As regards the position of the drawing room in an Indian home, it is best situated on one side in the house with an entrance from the front verandah. Amongst Europeans it is usually placed near the front door. In that position it occupies a central place which though convenient to the style of living of the Europeans, causes inconvenience in Indian families. It interferes with the free movements and actions of the ladies working in adjoining rooms. Amongst Mohammedan

and other communities, where privacy in an exaggerated form, viz. Purdah, is still in vogue, the drawing room in a central position causes a positive inconvenience. ?

Mouldings of any sort, even cornices and skirtings on the inside of the drawing room, or in fact, of any room, to give a decorative effect should be scrupulously avoided as they present an ideal breeding place for germs of disease. The picture rail, too, is better forgotten.

Very often, a wooden plank about 6 to 9 inches wide is fixed, flush with the plaster surface all round the drawing room, horizontally at a height of 3 ft. above the floor level and polished well. This is for protecting the plaster of walls which is likely to be damaged by the backs of chairs striking against it.

As far as possible, pegs should not be fixed into the walls at random, some clothing or other is bound to be hung from them which looks unseemly. If necessary, a set of a few pegs should be fixed to the wall in a corner for the purpose.

Often times the drawing room of the usual size proves to be too small on some of the special occasions mentioned above. To meet such an emergency, a double drawing hall is sometimes provided. For this, the partition wall extends a foot or two from each side, over which an arch is built. The space below the springing of the arch is closed by a movable or sliding, thin, wooden partition which can be closed or opened at will, so that one big room could be made out of two.

A skirting of black japan, coal-tar or a paint of dark, chocolate or slate colour, a foot wide all round the wall above floor, not only looks well, but is sanitarily good and allows the floors to be freely washed with a disinfectant in water without staining the distempered surface.

(3) Bed Rooms.

These are the most important rooms in a house. One spends more than $\frac{1}{3}$ of his life at rest in sleep here. Amongst Europeans

two persons are commonly supposed to occupy one room without constituting a case of overcrowding. Thus if there are 5 or 6 persons in a family they require a house with three bed rooms.

It is a pity, that on account of poverty and ignorance of the importance of ventilation, little or no attention is paid in India to this most vital question. In many places, especially among the poor classes residing in villages, the number of occupants of a bed room is determined by the possible number of mattresses which could be spread on the floor from wall to wall in the room. Four, five, or even more persons are in the habit of sleeping in it. Of course, in many parts of India cots or charpois (four legged coir-matted wooden cots) are a luxury which even the middle classes cannot afford to enjoy. In farmers' huts, even young calves and dogs are allowed to occupy a corner of the same room. The one or two small windows (if such holes, in wall, deserve the term,) that there may be in the walls, are also closed for fear of draught.

Many of the rooms are occupied by more than one family! The rent of these rooms is from Rs. 10 to 12 per mensem in Bombay; the average monthly wages of this class are Rs. 30 per mensem. The result of all this could be very well imagined. The low vitality, the very high death-rate, anæmia, tuberculosis (particularly in females) and high infant mortality etc. are all directly traceable to the overcrowding in bed rooms. The farmers, who have to work all day in the open field, get pure air by day and thus have got this relieving feature partly to compensate for the overcrowding in bed rooms by night. But the mill hands and other labourers who have to work the whole day in an atmosphere congested with smoke, and who do not get a chance to breathe in free air also by night, fall an easy prey to disease. In old times, Agriculture was the main industry of India, which required the majority of people to do work in the open air, and that preserved their health. In this industrial age, people are leaving agriculture behind them in the villages and are flocking to industrial centres in cities, which have attracted large numbers even from the middle classes who follow pursuits of clerical or other allied nature. Males go out of doors during at least a part of the day, but females have to spend all their time at home doing domestic work, which has resulted in

lowering the general standard of vitality amongst them. It is futile to expect that the children born of such mothers who are the future citizens of India, would be strong and healthy. Therefore, if India wants to live amongst the nations of the world, she must solve this problem of housing the middle and working classes satisfactorily, and the sooner she does it, the better.

The minimum window area, required by the municipal by-laws, $1/10$ is of the floor area. But this should always be exceeded. In domestic buildings a minimum of 350 cubic ft. of space for an adult and 200 c. ft. for every child under ten, should be made while designing bed rooms. Besides this, a suitable allowance should be made for every piece of furniture. However, the quantity (square ft. of window area) and quality (cross and through openings) of ventilation is of greater consequence than either the floor area, or the cubic space allotted per head.

The above considerations will give some clue to the sizes of bed rooms. From a practical point of view $15' \times 12'$ has been found by experience to be a good size for a bed room in the houses for the middle classes.† As has already been stated, an oblong room is more convenient, particularly as a bed room, than a square one and that no room should be less than 100 sq. ft. in floor area.

Bed rooms should be placed on the side of the direction of the prevailing wind and if this happens to be west, the wall on that side should be protected from being heated by the sun's afternoon rays by the provision of a deep verandah on that side. The ideal conditions are, that the sun should shine in the bed rooms for some part of the day, preferably in the morning, and a free breeze should ventilate it by night.

A small bath room combined with a dressing room attached to bed room, is more or less a modern necessity in the houses of the well-to-do. However, in small cottages, it is desirable to so arrange the bed rooms that the services viz., bath room and the w.c. are easily

† But if there be efficient cross ventilation through fan lights even though the doors and windows may be closed by night a smaller size would do for a bed room.

and independently approachable from every bed room. In the designs given in the following pages, a special attempt has been made in this respect.

Some storage space is absolutely essential in bed rooms. Portable wardrobes not only occupy some floor space, and the cubic contents of the room, but it has got a top surface which collects dust. Besides it is difficult to keep the cramped space below the wardrobe, clean. A cupboard built into the wall is free from all these disadvantages besides being cheaper. One or two such built-in cupboards in places where they would not come in the way of beds are very convenient. A chest of drawers also could be provided built into the wall below such cupboards.

Another and still better arrangement is to construct a hollow wall of plywood or similar material to serve both as a partition wall and a closet, one of which could be provided on either side in each bed room. This is a very common practice in Japan. The rooms in the Japanese houses are literally empty. All their things including clothing and even bedding is stored behind these sliding partitions which are often of paper. The Americans have copied this. They are sometimes built not in walls but independently in a corner of the room, where if their depth is sufficient, they serve also as dressing rooms. Details of such closets are given elsewhere while discussing about storage space.

The rules to be observed while planning bed-rooms are firstly that the bed should be so placed that the air can freely circulate all round it without causing a draught to be felt; secondly that the door, when opened shall screen and not expose, the bed. For this, a single leaf door is better. Thirdly, sufficient window space should be provided without over—doing lighting to cause a glare. It should be remembered that every bed room is a possible sick room, and that for a person ill in bed, the glare of a window directly opposite his eyes is very trying. Fourthly, that the bed room should accommodate a reasonable amount of living room furniture without coming in the way of a window or a wall cupboard, since, unlike in Western countries, bed room, in Indian families, are also used as sitting room,

(4) Kitchen.

If the room for the kitchen is a spacious one, there is no need of a separate scullery for the Indian manner of living. As far as possible, the kitchen should be in a separate block cut off at least 10ft. by a covered passage from the main building. However, with this arrangement it is not possible to keep an eye on strangers entering the front door. Besides the ladies feel the isolation of their sphere of life (wherein they practically spend their whole time, from the rest of the household, and sometimes resent it.)

For the Indian manner of living, especially in the cottages of the poor, there is no necessity of a separate dining room if the kitchen is a little more spacious. For this purpose the room should be rather oblong ; 10' × 15' to 18 ft. is the best size. The length should be at least 1½ times the width, so that, the actual portion used for dining is far removed from the heat of the chulla range.

There should be as many wall cupboards and shelves in the kitchen as could be accommodated without interfering with the strength of the walls. One of them viz. that for the larder should be situated in a cool corner and should have shutters of perforated zinc sheet or fine wire meshing with "air bricks" behind, for a thorough ventilation. This would be useful for storing milk and its products such as curds, butter, ghee and the like. The kitchen shelves—whether in the cupboards or outside, should be loose for easy removal and cleaning.

There should be at least two windows with half glazed and half fine wire mesh shutters—one for lighting the chullas and the other for lighting the other part of the room. The provision of half shutters of perforated zinc sheet or fine wire meshing is necessary for the purpose of ventilation and prevention of flies entering the kitchen. Flies are vehicles of disease germs and must be vigilantly guarded against, by making suitable provision for the purpose.

The improvement of the kitchen has made great strides recently in the western countries. It is considered to be a workshop for the preparation of food, and by careful arrangement is made so compact

and yet so efficient that it now occupies less than $\frac{1}{3}$ of the space formerly provided for the kitchen and scullery together. The scullery has now altogether disappeared. The mistress or the maid standing in the centre of the small kitchen can reach the various apparatus arranged round the walls on tops of tables and in rows of cabinets provided with trays, drawers and shelves etc.

Why should we not have a similar arrangement? Our kitchens at present are the very embodiment of drudgery. Firstly, our cooking range rests on the floor, in which position it does not get any draught of air from the bottom. The result is that a lot of smoke is caused. Usually there is no outlet provided for the smoke and where it is provided, it is not based on scientific principles, with the result that the smoke not only spreads in the whole house and darkens everything it comes in contact with, but often times if the kitchen is not properly oriented it enters the eyes of the housewife squatting in front of the chulla and makes her drudgery still worse.

Then, again, cooking is done in a squatting posture in which, if one sits long for hours, pain is caused in the back. For reaching every little thing the lady has to get up every now and then as there is very little storage space as compared with the modern western kitchen, she has to make unnecessary trips to and fro. Even the sink is not close by to be reached easily from her sitting place.

Cooking in a standing position, on the other hand, simplifies everything. It necessarily requires the chulla range to be installed at a higher level, which allows easy draught of air from below. This arrangement affords a considerable cabinet space below the range, makes the sink very easily accessible and increases the storage space enormously. Because cabinets could be arranged all round upto a height of 6 ft. There is a still further very great advantage in this arrangement viz., it minimises the risk of the saree catching fire,—a tragedy all too common in its occurrence which takes a heavy toll of life every year in India.

I introduced this system of doing cooking work in a standing position in my own home, and have also persuaded several friends to adopt it and thus am in a position to speak from experience that

though ladies offer some resistance in the beginning to this deviation from the age-old tradition, still after some experience they come round to find great ease and comfort in it.

The equipment in a modern kitchen should include the following; a refrigerator; wire gauze trays for fruit and vegetables, a china sink with inclined drain boards on both sides; racks for cooking pots and utensils, china and glassware and cleaning compounds; a coal, coke or charcoal oven; a covered bin below the sink for garbage and other refuse; a towel rack and a clock. Some of these e. g. a refrigerator are possible only in the homes of the well-to-do. However, the entire kitchen should be scrupulously clean, and should have all the means of keeping it clean and should present a cheerful appearance; in short, it should be promiscuous by the absence of even the last vestige of drudgery, as the inevitable lot of the housewife.

If cooking is to be done in the conventional manner of squatting on the floor the chullas should be located below an arch 4 ft. wide, 1'9" deep and 3 ft. high at the centre above the floor level. There should be a hole about 8 inches in diameter at the top of the arch as an outlet for the smoke. This hole should be plastered smooth on the inside while still the masonry work is in progress. This should end at the top in a chimney which should be carried at least $2\frac{1}{2}$ ft. above the ridge.

There should be a small sink near the chulla in the opposite corner with a *Nhani-trap* fixed in its bed. The bed and sides of the sink should be lined with glazed tiles or polished shahabad or katni slabs and if that is found to be too costly the sides should be lined with cement plaster and the bottom with glazed tiles with a good slope in the corner towards the *Nhani-trap*. A teak draining board on each side of the sink is desirable the larger one on the right-hand side for the cleaned things.

The kitchen should be placed as far as possible in the corner opposite to the direction of the prevailing wind. In the Deccan, the North-east corner is found to give the best results and South-east the next best, the object being, that the smoke and strong smells emanating from the kitchen, should at once escape out of the house

through windows in the outside wall, instead of spreading into other rooms of the house. As an additional precaution towards the latter end, the kitchen should be separated, if possible, by a small lobby; and the doors opening from the kitchen into other rooms, should have no ventilators or fanlights, so that when these doors are closed the kitchen smells are effectually shut out from the living rooms of the house. If the kitchen room is cross-ventilated most of these smells would disappear.

The partition wall between the kitchen and dining room could be made partly or wholly of a deep cupboard with shelves and drawers above and below and fitted with double doors, one of which might have fine mesh wire shutters to keep out flies. This arrangement would, not only, provide a considerable storing space, but would effectually exclude kitchen smells also.

(5) Dining Room.

If the kitchen is sufficiently spacious, even a verandah on the rear side closed with a dwarf wall 3 ft. high and a trellis work above, will serve the purpose of the dining room in small cottages. When a separate dining room is to be built it should be located as near the kitchen as possible to save unnecessary walking. Provision of one or two cupboards and a few $\frac{1}{2}$ inch galvanised iron pipes, galvanised steel wires or at least long bamboo poles fixed horizontally in wooden blocks fastened to the opposite walls a foot below the ceiling, for drying wet linen, in the rainy season and a wash basin in a corner for washing hands after meals make the arrangements in the dining room complete.

In small cottages the dining room serves many useful purposes. It is the main sitting room for the ladies, it serves as a childrens' play-room also for doing their home lessons, as a room for the girls to practise music and so on. Hence, it is desirable that it should be well-lighted and ventilated and should command a good aspect.

However, in the comparatively large houses of the upper middle class families as there are separate rooms for the above activities the dining room is not much used except for dining and therefore, may

be reduced in size, particularly if there be an open terrace in front properly screened by means of a hedge or a creeper and shaded by evergreen trees. Dining in the open air has got its own charms and may be enjoyed at least during eight months of fair weather.

If the dining room opens on to the drawing room just a folding screen or a cloth curtain or a folding partition would make a combined room for use on special occasions. The folding partition should be such that the leaves could fold flat against the side walls like a pack of cards.

(6) A Ladies' Apartment.

By far the largest part of the day is spent by the ladies and young children indoors. The active man, whose duties for the greater part of the day call him out of doors, soon forgets his fatigue and has his strength for renewed activity more thoroughly restored where a healthy home awaits to welcome him. For those who have to spend more time indoors, either through duty, or necessity, the greatest care in all the details of a wholesome dwelling are most peremptory. The strong man, after free respiration in fresh air out of doors, may pass with immunity through foul or damp air, or sit for a considerable time or even sleep in a close, dingy room. But such is not the case with those who stay at home. Delicate women, susceptible youth and tender childhood suffer most.

Then, again, the ladies' apartment is, in most cases likely to be the lying-in room of the mother or the child's first nursery. All the requirements, therefore, such as sufficient direct sunlight, equable temperature, sufficient air space with means of constantly renewing the air—requirements which make for health and comfort should be provided in full measure in this room.

(7) Store Room.

This room or pantry is also a necessity in houses for the middle classes. In very small cottages roomy wall cupboards and a loft, either in the kitchen or in the dining room, serves the purpose of a store room. One or two underground cupboards (described on p. 62) would

be very much appreciated in small cottages in particular. The store room should, as far as possible, be situated near the kitchen and should have a stone paving so as to preclude the possibility of rats entering and making their home there. Rats, not only, do a lot of damage, but also carry, on their body, the potential danger of fleas affected by plague. The store room should be well lighted and ventilated and there should be a row of shelves all round. The lowest row should be at least 9 inches above the floor level so that the floor could be easily cleaned and washed of all dirt. For an ordinary family a store room of about 10 ft. \times 6 ft. should be adequate enough.

In rural districts a bigger store room is required to store staple food grains etc., which are available at a cheaper rate during the harvesting season. Besides, a fuel room or a coal cellar spacious enough to store fuel sufficient for the requirements of 4 months of the monsoon season, is required in addition.

In addition to this, some space for putting bicycles or a perambulator is very often required in the cottages of the middle class people. A corner of the front verandah or the space below the flight of stairs is suitable, if the latter be situated not far from the front entrance.

An efficient home must have not only "a place for every thing" but also "everything in its own place".

The houses of the traditional type provided a very large space — a big hold-all — both in the basement floor and in the attic or the loft just beneath the sloping roof, where one could dump any thing and every thing — the heavy things could go into the cellar and the lighter ones into the attic. But the modern trend disfavours close and dingy cellars and the flat roof of modern houses deprives us of the attic space also, and hence the problem arises.

With normal families, there is always a heap of lumber which though not quite useful, is not quite useless either, and cannot, therefore, be thrown away — some storage space has to be provided for it. Normally when we begin to plan, a store-room, we have before our

eyes, the storage of provisions such as wheat, rice, tea, sugar, charcoal etc. and that is all. In urban districts the purchases of the provisions are made weekly (or sometimes monthly) and, therefore, a large store-room is looked upon as a waste of space and money. But if we sit down to make an inventory of the things we have actually stored in our house, we shall be surprised to see how many and how odd they are — things which we never dreamt we ever possessed !

Even if we take a scrupulous care to eliminate things from time to time as they go on accumulating, still there are a number of things which must legitimately find a place in the home. Here is a small list which is by no means exhaustive :

(a) *Articles of the nature of clothing* such as,

Overcoats, raincoats, umbrellas, canes, hats, shoes, boots, slippers, sandals, and the entire clothing — formal and ceremonial, both of the males and of the females.

(b) *Articles of the nature of food stuffs and provisions* such as,

Wheat, rice, cereals and other staple food grains, tea, sugar, condiments, fruits, vegetables, dairy products, meat, eggs, soaps, oils, charcoal, kerosene oil,, bread, butter etc. etc.

(c) *Articles of frequent use requiring a special storage* such as,

Family medicines, sports equipment such as tennis or badminton racquets, fishing tackle, golf-clubs, polo or hockey-sticks, guns etc., children's toys, disinfectants, house cleaning equipment such as, brooms, brushes, mops, vacuum cleaners etc., daily and special Pooja equipment; china, glassware; toilet equipment; tools and implements; utensils and cooking equipment of daily and occasional use etc.

(d) *Articles of value* such as,

Jewelry, costly, ceremonial dresses especially of the ladies, silver ware etc.

(e) *Heavy and bulky things* such as,

Cycles, perambulators, tents, sewing machine etc,

(f) *Articles of the nature of "dead" storage, such as,*

Furniture and utility machines needing repairs, travelling equipment, trunks, cabinets etc.

(g) *Surplus stock such as,*

Pipes, fittings, books, furniture, screws, nails, pegs, tools etc. things not immediately useful but with which one is loth to part.

Definite allocation of storage space must be provided for all the above while planning a home. Those requiring frequent use must be within easy reach.

It is not practicable to state here with precision, where and what sort of storage space should be provided for each of the above items. That depends upon several factors such as, individual habits, accommodation and nature of plan and so on. It is therefore, proposed to set down here below in a general way the possibilities of providing storage space in a home.

In the kitchen a number of built-in wall cupboards or prefabricated removable cabinets could be provided. If cabinets are provided they should be ranged all around the kitchen leaving a space in front of windows only, shelves, trays and drawers could be arranged inside these cabinets.

A large closet with preferably sliding shutters in the entrance or verandah with a shelf with holes for canes and umbrellas, hooks and hangers for overcoats and raincoats, and shelves at top inside the closet for hats and a mirror at a suitable place. (This arrangement is far better than the traditional hat-stand.) A similar small cabinet about two feet high should be separately provided inside but near the entrance for shoes, sandals etc. at floor level.

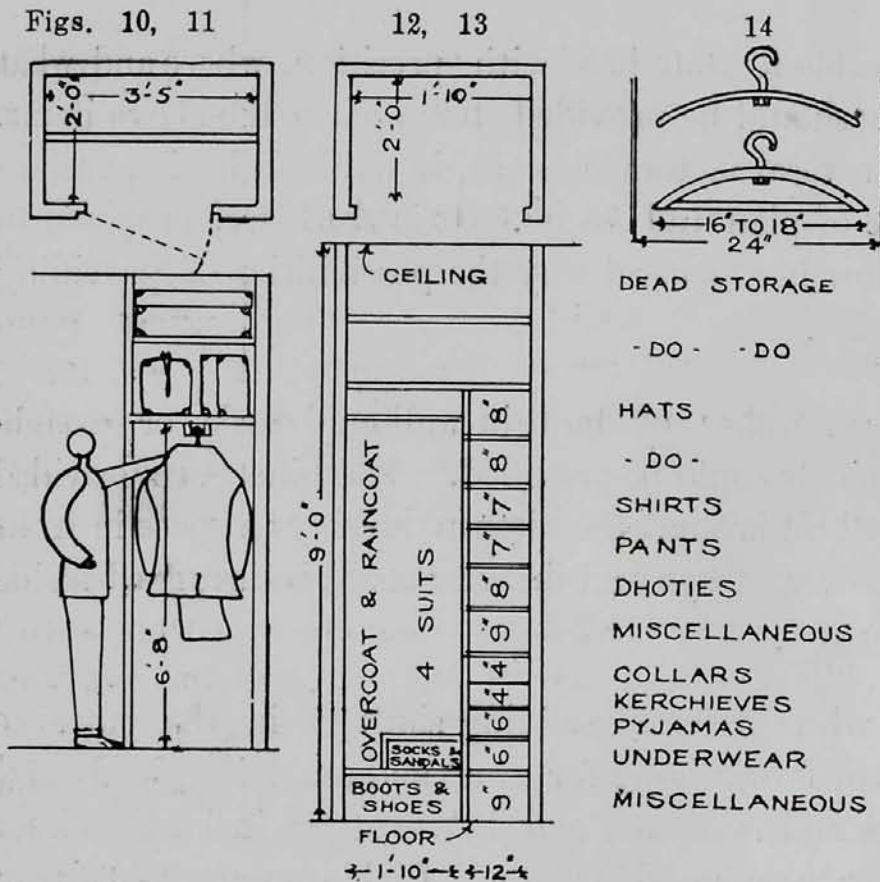
A steel or wooden stand for bicycles should be provided in the motor garage. The space below the staircase should be suitably enclosed and utilised for articles of "dead" storage and if the staircase is near the entrance even bicycles and pram could be stored there below it.

A loft should be constructed on the top of the garage at a height of 7 ft. above the floor level. This would provide a considerable storage space.

A small pantry adjoining the kitchen is very handy as a provision store.

Lofts could be built at a height of 7 ft. above bath rooms and W. C. also.

Built-in wall cupboards could be provided below windows upto the floor level, and if the shutters are of sliding type they would not interfere with the carpet while being opened.



Similar built-in small cupboards are possible above the doors upto the ceiling for "dead" storage.

Under ground cupboards of a small capacity—say 3' × 4' × 1½' deep could be provided in the passage in the centre of the pantry with

wooden hinged shutters flush with the floor for storing charcoal.

Closets of ply wood or similar material should be provided in lobbies and at every odd corner or a recess that would be available, for accommodating trunks and suit cases at the bottom and family linen such as bed sheets, pillow cases, towels, dusters, napkins, etc. on shelves.

Similar closets for clothes should be provided—two in each bed room, even at a small sacrifice of some space out of the bed room,

which considering the convenience they afford, is no sacrifice at all. These closets would altogether obviate the necessity of several fittings in the bed room, such as shelves, racks, pegs etc., and if judiciously planned would serve as sound proof partition walls as well.

Figs. 10 to 14 Show such closets suitable for bed rooms. The coat-hangers shown in fig. 14 on the right hand side are usually 16" to 18" long. So one measurement of the closet (either depth or width) should be minimum 22" if not 24". The closet on the left hand side (figs. 10 and 11) is 24" at right angles to the face of the wall and 3'-5" wide. The space for over coats and coats is 6'-8" high and above that are two rows of shelves up to the ceiling for storing travelling kit. Figs. 12 and 13 show another closet with the door removed to show the pigeon holes for storing details of clothing.

(8) **Worship or Prayer Room**

Of late, very few people can afford to devote a special room for this purpose especially in cottages in the urban area, for many reasons. The chief amongst them is, that one finds very little time for this purpose in the midst of a modern busy life. 2ndly, space is very much restricted and thirdly, there is paucity of funds for building on any more area than what is absolutely necessary. In the up-country places all these things are favourable. There is any amount of leisure ; site is unrestricted in extent, and the building materials and labour are comparatively cheaper. If a provision of this room is desired, it should be situated in a secluded part of the house, free from disturbance of any sort. It should be well ventilated and lighted, but there should be an arrangement to make the room partially dark when required. Slight darkness particularly combined with seclusion tends to increase the solemnity which is very much desirable in this room for inducing concentration of mind. An alcove in the dining room would be quite suitable for this purpose.

If a small special room is to be allocated for this purpose, it should be on the ground floor and not far removed from the kitchen or dining room, because, in the midst of busy modern life, the duty of the " Puja ", except when there is a retired member in the family,

is relegated to the ladies, who have more time to spare and who are also more religious-minded by nature.

Apart from this space some other quiet, secluded place is normally required in a home for reading, for attending to work brought home from office and some times for discussing some private personal matters between any two members of the family ; or for interviewing an unexpected visitor, who if ushered in the midst of friends or guests being entertained, would himself feel embarrassed and might also interrupt the mirth and pleasure of the party. A library or a study room is very convenient for this purpose. But in the absence of either of these, just a small enclosed corner or alcove in which two men can comfortably lounge, will be sufficient.

(9) Bath Room

The main bath room should be on the ground floor and near the kitchen. If a hot water boiler is to be kept in the bath room a minimum size required for it, is 6' × 10'. If used only for bath purposes 5' × 8' is a sufficient and convenient size. There should be two windows in a bath room — one for ventilation, situated at a height of 6½ ft. above the outside ground level and another at the usual low level with frosted glass shutters for admitting light but maintaining privacy. It is convenient in small cottages to keep the height of the bath room low (say about 7 or 8 ft.) and to provide a loft above it for storing fuel or any other articles of lumber. The loft should be well lighted and ventilated and it should have a hinged door of expanded metal to keep rats out.

The Indian way of taking a bath requires some part of the floor (say, 3' × 3' preferably that in a corner) to be lower in level by about 3 inches than the remaining and a smoothly dressed stone 15" × 15" and about 6 inches high, fixed in the centre for squatting, while taking a bath. The entire floor of the bath room should have a flooring of polished Shahabad or Tandur slabs and walls all round should be lined with glazed tiles to a height of at least 3 ft. or, if its cost be found to be prohibitive, the floor should be paved with Shahabad or some other kind of slabs and the sides with cement plaster. As far as possible lime in the form of mortar or calcareous composition of

flagstones, should not be allowed at least in the sink or the lowered part of the floor, as urine, which contains an acid, acts chemically on the calcareous matter, and unless copious water is poured for flushing immediately after use, it causes a bad stink and wears the stone away. Even trapstone paving is preferable in rural districts, though from a sanitary point of view a smooth surface cannot be constructed on to it so easily. A Nhani trap should be fixed in the bottom of the sink towards which the floor should slope. In no case should water be allowed to stagnate near the house. It causes not only damp, but also breeds mosquito-larvæ.

The provision of a corner—shelf at a suitable place for keeping a soapbox; a towel rack; another corner--shelf 9 inches above the floor level with perforations for draining off water from wet and soiled linen, a shower-tap, if feasible and necessary, and hooks or a set of pegs for clothing make the arrangements in the bath room complete.

Whether water is heated in a boiler or in an open copper pot placed on a chulla, a smoke outlet is a necessity; still to preclude the possibility of the smoke entering the house, the main bathroom should be located in a place opposite to the direction of the prevailing wind and should have no ventilators over the doors opening into other rooms from the bath room.

Though a bath room attached to every bed room is a luxury which only the rich people can afford, there should be, in addition to the main one, a common bathroom, which guests and other occasional visitors, could use without encroaching upon the privacy of the family. If bed rooms are located on the first floor, there should be a bath room also there, with an independent passage to it from each bedroom.

The additional bath room on the first floor near bed rooms is scarcely used for bathing purposes in middle class Indian families, for which the general bath room on the ground floor is normally used. However, it is advisable to provide all the bathing facilities also here for use when a rush is expected on the general bath room on account of the advent of a number of guests. This should, however, be essentially planned as a toilet room and should have, besides all the toilet requisites, a white glazed urinal in a corner. It is a bad

practice to use the sink in a bath room for this purpose. There is a pattern of urinal in the market, embodying flushing arrangement, which is very suitable for Indians and useful for both males and females.

It is a mistake to include a w. c. inside a bathroom. It should always be in a separate closet or compartment with an access independent of the bathroom.

(10) Staircase.

The staircase is the main thoroughfare of intercommunication between the floors and as such is of very great importance. But generally there is a tendency with people, of effecting all the economy of space in this particular respect at a sacrifice of considerable comfort and a risk of frequent accidents. If the upper floor is exclusively devoted to bed rooms, the staircase could be located at any convenient place inside the house. But if some of the rooms on it are to be used as sitting rooms as well, which outsiders may occasionally visit, the position of the staircase must be such as will afford it an entrance independent of the other rooms on the ground floor. That is why many people like to post it in the front verandah. If it is situated in the latter place, another staircase on the rear side, for the use of ladies, will add much to the convenience and privacy of the household.

In order that a staircase may be comfortable it must satisfy the following requirements :

(1) It should be airy and well lit.

(2) The stairs should be easy and comfortable. There are two rules for guidance to determine the mutual relation between the tread and riser : one is,

$$\text{tread (or the width of the foot rest)} \times \text{riser (or the height of the step)} = 66 \text{ inches,}$$

and the other is.

$$\text{tread} + 2 \times \text{riser} = 23 \text{ to } 24 \text{ inches.}$$

Note :—The limiting dimensions are, that the riser or height of step should never be more than 8 inches and the tread or the width of the foot rest, less than 9 inches. 6" riser and 11" tread are very satisfactory dimensions ; 6½" and 10" are the next best. These will be appreciated by old people and invalids who find stairs in general difficult to negotiate.

(3) There should be at least 6½ ft. clear head-way above any step.

(4) The width of the stairs in a winding flight should be at least the same as in the straight one.

(5) The stairs should be sufficiently wide (3½, if not 4 ft.) so that two people should be able to stand abreast comfortably and pass by each other. It also easily permits pieces of heavy furniture to be carried to the upper floor. This precept, however, in Indian cottages, is honoured more in the breach than in the observance. 3 ft. is the minimum width required even in the smallest cottages.

(6) As a rule a staircase should not have triangular or winding steps at all. Not only do they tax the ingenuity of carpet layers, but they cause a positive harm. Firstly, people going down the stairs are much more likely to slip on the "winders" than on the straight steps and secondly, if they slip they fall down a large number of stairs which is likely to make the fall a serious one. Young children are very susceptible to this in particular. It is therefore prudent to leave no chance for possible risks by spending a few rupees more and altogether avoiding winders *even at the sacrifice of an easy riser*. If for exigencies of space they have to be there, they should be rather at the beginning of the flight near the ground, so that, if a fall does occur at all, it should not be a severe one.

(7) As far as possible the height of the risers should be uniform. A difference of even ½ inch in the height of one single step, though not quite apparent to the eye, is at once susceptible to one's legs and causes one to startle and perhaps to stumble.

(9) Each flight should have not less than three steps at least, and as far as possible the number of stairs in each flight should be uniform.

(10) The staircase should, as a rule, be fire-proof, especially if there be only one.

(11) Not more than 10 steps should come together in one flight. Otherwise the climbing becomes tiresome. But this may not always be possible.

(12) A staircase just in front of a house gives a poor appearance. Aesthetically a geometrical staircase (one having three or more flights at right angles to each other or winding but square) is good. It also affords easy facilities for lighting and its "well", or the central hollow portion, forms a good position for a lift. But it involves a danger in case of an outbreak of fire, as it provides an air chamber and a sort of chimney which causes the conflagration to spread. Moreover, it totally blocks the descent under those circumstances. A winding stair case if centrally situated in a house affords the best means of ventilating the house, and simplifies air-cooling.

(13) As far as possible the staircase should start in a separate lobby even though small.

(14) The railing should be quite simple in design so as to facilitate cleaning. A dwarf wall at least 3 ft. high with ply wood panels is attractive, simple and economical.

In flats and tenement houses in particular, unless there is a separate emergency exit, the staircase should necessarily be fireproof.

In large houses a separate stair case, although a cramped one with its upper landing in a lobby, for the use of servants is necessary.

(11) Comfort Room.

You may be strong and stout, and your entire family enjoying excellent health, now, at the time of building your house; but you should not lose sight of the rainy-day too. There is every chance of yourself or some one of your family falling sick, some time in future. Again, it is likely that there might be some aged or an infirm person in the house dependent on you—why, you yourself cannot escape old age in course of time. Hence, it is prudent to have in view one room

mainly designed for comfort of the aged and the sickly, which can be properly called a "hospital or a sick room", but at the time of building a new house in the expectation of health and happiness, the word may sound rather inauspicious or freakish, hence, to follow M. Coue and make it *suggestive*, let us call it a "Comfort Room." For being really comfortable, it should satisfy the following requirements:--

(1) It should preferably be on the ground floor to save the sick or the aged person, the troubles of going up and down the stairs. If there be any lift for the purpose, then the 1st floor, which is healthier, is preferable; still there should be an easy staircase in addition, without any winding steps, for use in times of a possible break-down of the lift.

(2) A bath room, and a w. c. where there is a water carriage system, or a commode arrangement where there is a conservancy system, should be quite close to it, preferably in an ante-room.

(3) The room should be so situated that it will be flooded by the morning sunshine, and will also get a free breeze by night. A south-east corner would be appropriate for this reason, with a verandah on the south.

(4) In the cottages for the middle classes it should not be far removed from the kitchen, so that it should be possible for the ladies to attend or render prompt service especially to the aged who are usually not in need of a constant attendance. Still, it is advisable to have another room, close to the comfort room which an attendant could occupy, if and when necessary.

(5) There should be windows for ample light and a thorough ventilation, with blinds for obscuring light whenever necessary. Most sick persons find strong light unbearable.

(6) The room should be rather commodious; 15' x 12' is a good size, but that depends upon the size of the cottage to be built. The floor should be of such material as will permit of easy washing and cleaning with a disinfectant.

(12) Guest Room

A spare room even in a small cottage is welcome at all times. Not only can it accommodate an occasional guest, but it can be used for a number of other purposes as well. For instance, when there is no guest it can be used as a library or a hobby-shop or for any other purpose which requires a quiet atmosphere conducive to the concentration of mind.

The ideal place for the guest room, if the budget permits, is in a separate detached guest house, with a small verandah and a bath room or at least a toilet room attached to it.

If this is not possible, a room inside the house itself should be allocated. The special requirements of this room, besides being well lighted and ventilated, are that it should be as far as possible independent of other rooms except the drawing room into which it opens, and the front verandah and that it should have an independent access from it to the general bath room and w. c unless a special toilet room is attached to the guest room. Further, it should be sufficiently commodious to hold a bed, a writing desk and chair, and a davenport or at least a Chesterfield chair.

(13) Nursery or childrens' Room

A child is the most cherished member of the family,—be it rich or poor. A home without children is no home at all, it is a dreary wilderness.

Nowhere is the right to enjoy perfect health, to be more jealously guarded than in the nursery. The neglect of sanitation here saps the cheerfulness of childhood and ruins all the fair prospects of youth.

Children thrive best with free and frequent access to the outer air and light; so, any arrangement that makes it difficult for children to get out into the open should be avoided.

By far the great majority of middle class families cannot afford to allocate a separate room for the nursery. However, some space

for the child is very necessary and as far as possible it should be under the eye of the mother working in the kitchen. In such small houses, therefore, a room or even a verandah adjoining the kitchen would be very suitable for this purpose. The floor of this room or verandah should extend so as to form an open terrace for use when the child requires a larger space. Those who are favoured by fortune to do so, should set apart the best room in the house for the exclusive use of children. It should have very efficient means of cross ventilation without causing a perceptible draught. The light should be sufficient but not such as would cause a glare.

In order to be cheerful the nursery should have a sunny aspect, with large low windows and cheerful outlook. The windows should project beyond walls so as to form small balconies with hollow concrete boxes at ends in which flowering shrubs could be grown. There should be a strong and safe railing round the balcony three ft. high.

It is in the nature of active childhood to be noisy and often boisterous, which should not be checked. The door should be provided with double shutters if necessary, so that their noisy activities should not interfere with the comfort of other inmates.

It is a wrong notion that because a child is small, a small room would suffice for it. It is, in fact, just the opposite. The child is very active, it breathes much faster, it spends nearly 12 hours or even more, out of 24, continuously in the bed room and as its tissues are continually undergoing growth and development, it requires more quantity of fresh air.

Sleep—"tired natures' sweet restorer"—is very essential for the child and should be undisturbed even by day. For this purpose, the bed should be shielded both from light as well as from noise.

The chairs, tables and other furniture in the nursery should be of special design to suit the requirements of the young child; the tables should not be more than 2'—3" high. The stooping habit and "short-sight" are contracted by the child for want of properly designed chairs and desks. Even if the child has to play, let it arrange the

toys on the top of a low table and play with them either standing on the floor or sitting in a low chair. Those who can afford a separate nursery room can certainly afford to provide the above amenities.

Coloured pictures protected by varnish against dirt and moisture should be hung on the walls just above the top of a dado 3 to 4 ft. above the floor so as to be within easy reach of the child. (By the way, children love bright colours.) The dado should be of a darkish colour—say, dark grey, slate or dark chocolate so that children can draw figures with a chalk stick as if on a black board, at their will.

Our first notions of home start from the nursery. With the above elements of comfort, children should be made to feel that food, rest, quiet and pleasant ease belong to this place, where nothing but ease and love would be expected from the ever greeting mother. This kindly attention with orderly, clean and cheerful atmosphere, not only makes childhood happy, but leads to strength, good nature, trust, courage, characters, and virtue.

(14) A Water Closet and Toilet Room.

In cities and large towns where underground drainage is constructed, the w. c.s can be flushed with water and as they remain free from noxious smells they could be built close to, or even inside, the house. Still they should be separated from the adjoining rooms by means of a small lobby or at least a blind wall.

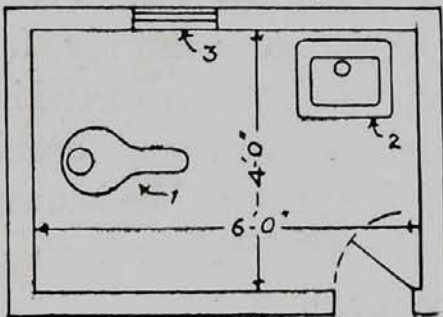
In country districts and small towns there is usually ample space round buildings, and therefore either earth closets, or water closets combined with septic tanks are very suitable. The days of latrines on the basket system are now numbered, firstly because, the system has been found by experience not to work satisfactorily on sanitary principles and secondly, because, the sweeper class is being awakened to a sense of self-respect and to their rights as human beings and would give up the scavenging work in not a very distant future. Earth closets are very easy to maintain in a clean state and yield a very valuable manure. Their only disadvantage is that they must be outside the house though they may be quite close by.

Septic tanks can now be very cheaply and efficiently constructed. If the water supply is sufficient, the closet can be built even inside the house and if the supply is meagre it is advisable to build it like an earth closet outside, though quite close by. The requirement of a septic tank is that there must be an open space of at least 10' to 15' \times 50' (depending upon the nature of the sub-soil) available near the house.

The minimum space required for a w. c. is $2\frac{1}{2}' \times 4'$ and if a lavatory basin (either of pedestal or wall-bracket type), and a shaving mirror are to be provided in addition, the minimum size should be $4' \times 5'$. However, this minimum should always be exceeded.

Figs. 15 and 16 show a small closet with all the necessary conveniences provided in a space of $6' \times 4'$.

Fig. 15



1. W. C. Seat.
2. Pedestal type lavatory basin.
3. 2' \times 1' window at 5' above floor.
4. Shaving mirror.
5. Glass shelf.
6. Tumbler-holder.
7. Soap-box.
8. Tooth-brush holder.
9. Towel rack.

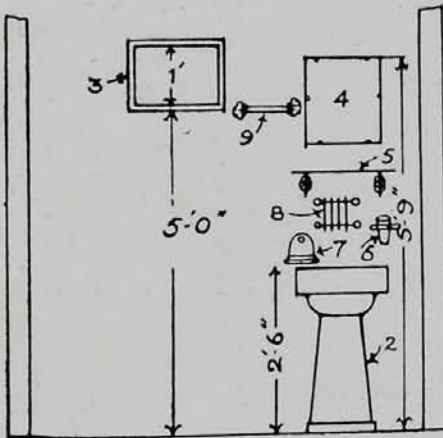


Fig. 16

Strictest privacy is required in these rooms not only in respect of sight but also of sound. The former can be achieved by so hinging the door (which should be single-leafed) that when open it should screen the seat. Sound insulation can be effected by constructing the partition walls of a hollow type.

The lights coming inside the bath and toilet rooms should be diffused, by means of an opaque bulb or opaque glass cover,

(15) Garage.

Man is conservative by nature. Just a few years ago in the days of the horse-drawn coach, in order to save the house from the smells and flies due to the dung in the stable, and the tramping noise of the horses, the stable was logically built away from the house in a corner in the back yard. Even though the automobile replaced the old horse-drawn coach, we still build our garage in the same corner. But as the motor garage is free from the nuisance of flies and bad smells, and also from the noises of tramping etc. we have now come to realise, though late, that if the garage is built to form a part of the house not only would it not cause any nuisance, but on the contrary it would be a great convenience, because, one need not, in that case, have to walk over in rain to reach the garage. Secondly, being quite close and handy, one can look to its upkeep much better, and thirdly, after a return from shopping the mistress can bring in the purchases directly from the car into the kitchen. For the latter purpose the modern trend is to build the garage near the kitchen and to provide a door from it opening into the kitchen or into the back verendah, if the automobile is owner-driven. A garage built inside the building is much cheaper than one outside, because one or two walls could be saved.

There is a possible argument against this practice, viz. that as the automobile contains inflammable petrol, there is the risk of the house catching fire. But, of late, buildings in concrete are mostly fire-proof, and if a few special precautions be taken such as providing cross ventilation and avoiding the use of a combustible material like wood in the construction of doors and windows of the garage, the fear will be minimised.

In America various devices are employed for automatically opening and closing the door of the garage from outside. One method is to focus the beam of head lights on an "electric eye" on the outside of the garage which operates a lever to open the door. Another method is to transmit a code word by short waves from a radio installed in the car itself, which secures a response from a receiving set inside the garage and a switch is automatically operated. In the third method the driver operates by hand while seated in the car itself a switch placed along side the drive-way and the switch works the gear; and so on.

By building the garage as part of the house, so much space in the drive-way is saved, which could be utilised in extending the garden area.

The modern trend of the automobile design is to increase the wheel base, though the width of the car (or the length of the axle) has remained practically the same. The minimum inside dimensions of the modern garage are therefore, $8' \times 18'$; $9'$ or $10' \times 20'$ would be ample to provide for future designs if space is restricted.

Ordinarily more than 7 ft. height of ceiling is not required for a garage. It would therefore be in fitness of things if a loft of fire-proof material is constructed above this height in the garage for dead storage.

'Modern' Architecture

It is very difficult to define "Modern Architecture", because, it claims no characteristics of its own, beyond being simple and in harmony with modern ways of thinking and modern ideas of hygiene. Nevertheless, when we say "Modern Architecture" we don't merely mean the present day architecture, but a certain definite style of architecture rationally related to the circumstances of modern life. Whatever the critic may say, nobody can gainsay that the modern architecture is full of life and energy.

It was not more than twenty years ago that a group of continental architects, such as, Le Corbusier in France, Behren and Gropius in Germany, Oud and Dudock in Holland, Frank Lloyd Wright in U. S. A and others in other countries, almost simultaneously started a revolt against the meaningless ornamentation of the various traditional styles or orders of architecture, and initiated an altogether new style, almost revolutionary in character, against the debased practice. This new movement got a stimulus in the post-war times. The drain of wealth during the Great War caused such an economic pressure that people were hardly left even with the barest means of maintenance. All the new houses which came to be built after the close of the war were absolutely plain structures, providing just a shelter from the inclemency of weather. People could not afford to spend on ornamentation. This acted as a powerful incentive to these architects who in spite of gradual improvement in the economic conditions, continued a wide propaganda with great vigour provoking thinking, amongst people, on a rational basis. The movement was dominated by the personality of the great artist and propagandist, Le Corbusier, whose revolutionary ideas expounded with merciless logic in a series of articles and books aroused the whole world to a revolt against the traditional architecture. Here is his extreme theory : that the so-called "architecture" does not exist, only "functions" exist. The "art of building" is a misnomer and should be replaced simply by "building",—that the architect, like the engineer, is concerned only with the organisation of functions

without any regard as to whether the result would be beautiful or otherwise. That only a "well being" exists in the sense of a building which functions with the minimum expense and maximum profit. That a good house is that which proves a good merchandise and so on.

As another cause of the rapid development of the Modern Architecture may be mentioned the advent of novel materials and new inventions. Amongst them Ferro—concrete might rank first. This new pliable material has got immense possibilities which have not yet been fully explored. It is now possible to support large buildings on thin pillars, a long way apart. Chajjahs, canopies or verandah roofs can now project a long way without any support. *Jalis* or grilles of various ornamental designs which were very costly, have become very simple if made of concrete. Leak-proof terraced roof which is an outstanding feature of concrete buildings has now come within easy reach of the middle classes. Not only does it look more elegant, but also provides double space—inside the house and on the roof also, either as a roof garden or as a place for sitting or sleeping in the open air for 16 hours at least out of 24, which is a great blessing in a tropical country like India. The massive brick or stone walls can now be displaced by thin walls of R. C. C. thus making savings in money and in valuable space.

Colourcrete cement, which is a material of very recent introduction has been further helping, in enhancing the beauty of modern buildings.

There is ply-wood and other similar thin sheets which, though all of them are not so suitable in a tropical country like ours, enable us to cover large surfaces without extensive frame work. They can be used for facings of walls also. There are, besides, the several new materials such as, chromium, and stainless steel, which successfully resist the atmospheric influences. Then come, the neon lighting tubes and glass. The latter, the cleanest material, has come into a universal use, not only for panes, large window sheets, table-tops etc. but also for furniture, walls and staircases. Bakelite, again, is another material manufactured in various pleasing colours by a synthetic

process, which like glass, is acid-proof, smooth, and clean, and yet lighter and more elastic. It is used at present for locks and handles of doors, electric fittings etc. but has bright prospects in future for more universal application. A number of several other new materials can be quoted which have played an important part in altogether revolutionising the conventional architecture.

The *Esprit Moderne* essentially consists of functionalism and simplicity and devising new methods of construction to suit new materials. Functionalism is the quality in a building of being nothing but itself i. e. maintaining or asserting its own individuality. A steam ship, an aeroplane or an automobile is beautiful not because of the elegance of its shape, but because, it is most adapted to its purpose. Similarly, a building must possess functional beauty. A school building for instance, must look like a school and must provide all the conveniences of a school and as such, must possess a style of architecture of its own, quite different from that of a hospital, of a residential building, of a hotel, of a railway station, or of a palace. This principle has a very wide application in the Modern architecture. The exterior of a building is logically determined by the plan and interior arrangements which are considered first strictly in relation to their function or purpose. Every little thing, whether in the exterior or interior must justify its existence at that particular place. Whatever materials are used, the construction is allowed a free and honest expression and no attempt is made to disguise it. No ornamental devices are allowed either in the interior or in the elevation, unless their existence is dictated by the necessity of its purpose in relation to structural elements. The architect has to make the most of proportion and mass and must bring out beauty by adopting simplicity of shape and grace of outline. He must make his whole building into a sort of a pattern and in this pattern no necessary things would come amiss and no unnecessary things would find a place. For example, the tendency of the old fashioned architects was to conceal a chimney stack or a water tank by placing it in the midst of a turret; or conceal even the roof behind an ornamental parapet wall. The modern architect would show these boldly and make perhaps new interesting and real special features out of them in his pattern.

Traditional architecture concerned itself with two things: (1) adopting symmetrical fronts and (2) copying Nature. Both these do not appeal to the rationally minded modern architect. He laughs at the idea of providing a window or a stair case at great expense on the right hand side, not because it would serve some useful purpose or is dictated by necessity, but only because there is a window or a stair case on the left hand side with which it should balance in the front elevation. He views it from the points of economy and purpose, and as neither of these are served, he rules it out altogether. His argument is that copying nature may be all right, but that it should not be done blindly. That even Nature is not blind but rational. It is true that most animals present a symmetrical front. But there is some special object of nature in doing so, viz. out of the important organs if one gets out of order or falls into abeyance, there should be another to do the function. Again, if it is argued that symmetry is adopted to copy Nature, then why do so only partially i. e. with respect to the front only? Nature is thorough, because if a median line is imagined in animals, the functions allotted to all the members on the right hand side of the body are, in most cases, similar to those on the left hand side also. Thus, not only two eyes, two ears, two hands and feet etc. are provided symmetrically, but also two lungs, two kidneys etc. Again, if we are out for copying Nature why restrict ourselves to the animal world only? The plant life tells quite a different tale. We find there that Nature is distinctly opposed to symmetry. The trees set forth branches at random; No two leaves or even petals of a flower are alike — in fact there is nothing stereotyped in Nature, on the contrary she is fond of a rich variety, and the latter is the result of varying circumstances — different environments, through which the Nature's product has passed. Why should we not, then, adapt our architecture to suit new ideas of design, new materials and new methods of construction?

It is the habit with some people, whom I should call national bigots, to speak of "our magnificent architecture in the hoary past", "Our architectural traditions", "the heritage of our ancient architecture of which we must feel proud" and so on and so forth, and express their regret that the present day engineers and architects do

not attempt its revival. However, they do not know that if we try to do so, we shall be deceiving ourselves. Firstly, what they have before their eyes as "Indian architecture" is not purely Hindu architecture at all. There are in it various distinguishing features of Byzantine, Persian and Mugal styles also. Secondly, the "Indian architecture" is suitable for temples, mosques, palaces etc. and not for domestic buildings, which form by themselves an altogether different category as far as their architecture is concerned. Thirdly, to copy productions of historical periods is not to maintain traditions of those periods at all. They were suitable for those times only. Plagiarism, again, amounts to a confession of incompetence.

We have for generations been false to the fundamental principle of true and good architecture viz. truth, and fitness of purpose, until the advent of the Modern architecture. It is only when we enter the garage that we are in contact with reality for a short time. So many changes have taken place, in our food, dress, habits and social customs, so many new discoveries and inventions have been made, such as railways, telegraphs, telephones, television, gramophone, radio, electric appliances, aeroplanes, air conditioning etc. that our entire out-look of life is metamorphosed and still if one of our eighteenth century ancestors were to descend from the heaven, amidst us, he would see the same architecture and the same methods of construction as he was practising !!

To revert to the subject of new construction, piling bricks or stone on top of foundation, for walls is now relegated to the past. The modern architect supports his floors and roofs on thin pillars a long way apart, making the walls to serve as panels or partitions with no structural function to perform. For insulating them against sound or heat, he devises means with new materials, and thus he is able to provide very large window surfaces in the panels for admitting light and ventilation, which, the old-time architect regarded structurally impossible.

The modern house is judged by its utility and convenience, by the comfort it provides and the success with which it meets with our needs, and not by its superficial decoration. If designed on strict principles of Modern architecture, it also fits into the surrounding landscape, of which it becomes a part and parcel.

It will be seen from the above discussion that the assertion sometimes made that the Modern Architecture represents a complete divorce from traditions is altogether wrong. Rather it is more in keeping with the fundamental principles of true architecture than the conventional architecture which we have long been accustomed to. It certainly does break with false conventions and debased practices.

Modern Architecture does not stop at altering the fabric of the house, but its influence extends to the furnishing and decoration also. Chairs, tables, beds etc. of very plain, simple, unobtrusive design, but nevertheless cheaper, stronger, more comfortable and more sanitary because harbouring little or no dust on the plain unornamental surfaces, have come into common use. The furnishing is determined by common sense — which is the essence of good taste and by fitness of purpose — which is the basis of all sound design. The evolution of the modern kitchen in the western countries, so as to be more efficient with less labour, is also the direct result of the move towards the new architecture.

The Modern Architecture seems to transcend not only the limitations of time and space, but even national traditions and bias. It is not the property or patent of any particular body or any one nation, but a universal art offering boundless scope for development.

The Modern Architecture is most suited to our country. In the first place, it is in keeping with our philosophical ideal viz. "plain living and high thinking". Secondly, in a land of sunshine with a contrasting effect of light and shadow, bold, clear-cut features with smooth, sweeping lines present a more effective appearance. Thirdly, plain, smooth surface (whether in the exterior or interior of the house, on walls or furniture which is one of the characteristics of the Modern architecture) allows much less chance for dust to deposit itself in a tropical country like ours; and, lastly, it is the poor man's architecture, because, with the growing development of the indigenous cement industry, cement promises to be even cheaper, and the other material viz. the aggregate, especially sand and gravel, required for concrete can be had merely for the collecting in the countryside. Thus the modern architecture caters equally for the needs of the rich

as well as of the poor. It is up to the architects to rise equal to the occasion and make the most of the opportunities which are hidden in the womb of the immediate future.

Landscape Gardening.

Landscape gardening is the art of planning the drives, walks, lawns, gardens, shrubs, flower-beds etc. so as to form a beautiful setting for the building. This subject is of equally great importance as the architecture of the building itself. The plants and plantings are subject to frequent changes, but the garage and other buildings and also the drives, walks and shady trees will remain, in all probability, as they were first planned. Hence, landscape gardening demands a careful thought at the hands of persons of good taste and training, and must be planned together with the building.

Landscape planning assumes a special importance in cities, because the plots are small and valuable and therefore every inch of the ground must be utilised to the best advantage.

The purpose of landscape planning is two-fold: (1) to design such surroundings or settings as would enhance the beauty of the building in the eyes of the passer-by, just in the same way as we provide a suitable back-ground and a frame for a picture to set off its art, and (2) to create cheerful environments round the building, so that they should react on the minds of the inmates and give them a pleasurable sensation at every glance.

Everything around us directly affects our senses. Even an infant, feels delighted at the sight of a beautiful flower. When we hear a melodious note, we involuntarily feel pleasure, if it be discordant we feel displeasure. We glance out of the window a hundred times a day. Should the scenery be beautiful, every glance will give pleasure which, when multiplied a hundred times must prove an important factor in favourably moulding our minds.

The modern trend in the civilised countries is to lay greater stress on utility consistent with beauty, rather than on beauty alone. Thus, it is customary to plan the front yard just to provide a sufficient

foreground and to form a good-setting for the building and to plan the backyard more elaborately so that the family can derive pleasure amidst cheerful surroundings and full recreational enjoyment there in the midst of the privacy afforded by it from the highway and the byway.

The subject is so vast that it is not possible to do even partial justice to it here. Hence, it is proposed to enunciate a few main principles only.

The Front Yard.

Cleanliness and a neat, tidy and well-trimmed appearance of everything, particularly in the front yard goes a long way in creating a soothing and restful impression at first sight.

While planning the landscape garden whether in the front or the back yard, cost of maintenance should not be lost sight of. The treatment particularly of the front yard should be simple and beautiful by the general artistic layout rather than by ornamentation difficult to maintain.

Though it is necessary to specify the minimum distance between the street edge and the building line, the exact minimum should not be adopted. A slight variation is desirable to break the monotony.

Any enclosed area appears larger than the same if open, because with definite boundaries all round, it forms a unit, whereas, an open area forms a part of the larger space around it and by comparison with it, looks smaller.

The horizontal angle of vision for objects at close quarters is about 45° and so in order to command the full view of the width of a building, the minimum space in front must be at least equal to the width of the building.

The vertical angle of vision is less than the horizontal and, therefore, tall buildings need deeper front space than their height, so as to enable the passers-by to have a full view without moving the head to see it as a single architectural unit.

There should be a shady tree or, one or two shrubs round the front corners and not in the middle. In this position they provide a sort of frame to the picture of the building and soften the hard junction between the vertical lines of the walls and horizontal line of the ground.

It is a mistake to plan the home in the centre of the plot especially if the latter be small, because, by placing the building on one side of the axis, the space left on the other side can be very usefully employed either for beauty or utility.

The entire atmosphere around the domestic residence should be homely and informal and therefore, a strict observance of symmetry in the landscape design is not desirable particularly on small plots, where the effect of crowding of details due to symmetry would be more marked. However, there should be a sort of balancing effect brought out in the front. For example, if there be a thick hedge on the left hand side of the plot, instead of leaving a blank on the right hand side, it should be balanced by a shrub or an arbour.

If a building is too tall in proportion to its width, it should be so built that the broader side should face the street and if this be not possible without sacrificing convenience, the effect of height can be considerably toned down by constructing an earth terrace in front and on the sides of the building almost to the height of the plinth, and planting grass on it.

If a building is likely to appear too low in proportion to its width facing the street, constructing a basement floor on the front side is one remedy, and if that be not feasible, increasing the height of the plinth by a few inches more would considerably help to increase the scale of height. Adopting narrow and tall windows almost up to the ceiling, omitting the string course at floor level and bringing out some feature or features with vertical lines in the front—even a few narrow vertical stripes in paint, would have the same result.

The main entrance of the house, which is the centre of main interest in the picture of the building, should not be placed on one side, and if considerations of convenience require it in that position,

then another feature, such as a bay window on or near the other end, or a group of windows in the remaining area, should be created to balance the façade and divide or distribute the attention on a larger area.

Placement of the Garage.

The garage, with its concomitant drive-ways is an important factor in making or marring the land-scape effect of a yard; so its position in the plot must be carefully considered.

If it be placed too far towards the rear there are three disadvantages: (a) much space is wasted in the drive-way, (b) the distance for backing the car to reach the street and reverse the direction is too long on a small plot which cannot afford to provide a 'Y' turn near the garage and (c) it interferes with the privacy of the back yard, which is very essential for the family needs as an out-door sitting place on a lawn or under a shady tree, by the movements in or out, of the present-day class of people as motor drivers, who should be kept at a distance.

If the garage is built on a side close to the building, it interferes with the light of the rooms opposite to it.

Therefore a position for it on one side just behind, or a few feet over-lapping the back end of the building is better.

A still better position is inside the building on a side, with a room or terrace on its top. This effects a saving in one or two walls and also of ground space as part of the walk can be joined to the drive.

If the garage is built on one side of the plot a minimum distance of fifteen feet has to be left between the building and the plot boundary—3 ft. for the hedge, one foot for a grass strip, 8 ft. for the drive-way and 3 ft. for shrubs in the front corner between the house and the drive-way.

Drying Yard.

Every family normally requires a space to accommodate a minimum length of 50 ft. line of clothes for drying. The space behind

the garage is very suitable for this as it is inconspicuous and compact—just 4 or 5 close rows of galvanised steel wire stretched in a space of 10' × 5' are quite sufficient.

Terraces

A terrace of roughly dressed stone slabs laid in earth with wide joints for grass to grow on, is suitable for more natural surroundings e. g. near a pool of water, or next to the lawn. If neatly dressed paving slabs are laid in either cement or lime for the terrace, the latter proves very useful close to the house as an outdoor sitting place or play ground for children. A terrace after all is a connecting link between the house and the out door life in the garden. An open terrace close to the house should be invariably shaded by a tree or a row of trees.

Lawns

Lawns are not so successful in a tropical country like India as in the Western countries, where they remain fresh and green all the year round. A well-trimmed and properly maintained lawn is an expensive luxury, but whenever one such is made and maintained, it is very pleasant and cheerful to look at; it proves an excellent broad space for out-door enjoyment, a play ground for children and the object of pride for the whole family. If its purpose be for the recreational enjoyment of the family, it should be constructed on the rear side with high boundary walls, hedge or latticed fence for seclusion and privacy from the neighbouring plots. It should be in one long stretch unbroken by any shrubs, walks or even flower beds. If any details are desired, they should be arranged on the edges, but not in the middle. If a walk must be provided across the lawn it should be made of roughly rectangular slabs laid in soil with wide joints so that the grass growing in the joints maintains the continuity of the lawn. For real enjoyment the lawn should be as spacious as the plot of ground would permit. If a lawn is only intended for the sake of beauty, and not for outdoor sitting place, it should be in the form of a sunken panel of grass.

Hedges.

Hedges of ever-green plants give an air of cheerfulness to the surroundings, and afford very good privacy, but the minimum

thickness for the latter purpose is 3 ft. A long unbroken stretch of a hedge emphasizes length and serves the purpose of an excellent background for the flowerbeds. Hedges are the least expensive of all the plantings in a landscape garden. There are a number of evergreen shrubs suitable for Indian climates, which make an excellent shrubbery hedge, though some of them take a considerable space even though the shrubs may be planted in two staggered lines. A single line of shrubs scarcely affords the necessary privacy. If economy is desired in the hedge space, latticed fence of steel-wire, reed and similar material, or trellis work of split bamboos or teak wood with creepers of ever-green variety trained on them are recommended. They occupy less than six inches of space.

If a shrubbery is planted to form a hedge the corner shrubs should be slightly larger and taller just to break the monotonous wall like effect in long stretches.

Plantation about the building.

The main object of the plantation about the building — whether of large trees, or shrubs and plants is to provide a background and a frame to the picture with the building as the central *motif*. Therefore, the variety and disposition of the planting should be such that they should reflect the interest from themselves on to the building. They should be subordinate in the picture — subordinate to the central interest. Small plants with coloured or ornamental foliage are very useful, if attractively arranged, in emphasizing a certain feature in the architectural composition of the building, such as the entrance, a bay window, a balcony etc.

While selecting shrubs and plants, attention should be paid not only to the colour and foliage, but also to their height when full grown and they should be allotted their proper place accordingly.

A large variety of plants is not in good taste, particularly in small yards. The entire composition should be dominated by two or three varieties only, not far different from each other in colour, which then serve as a simple, but definite back-ground, and then a

number of other varieties may be used in small amounts as a sprinkling to emphasize the general scheme.

Flower beds.

The flower beds should never be in narrow strips of 2 or 3 ft. as is usually done, A minimum width of 5 ft. should be adopted. The mass effect of flowers is very striking.

Flowers look better from a distance, particularly when a suitable background of a hedge or a creeper is provided. Therefore they should not, as a rule, be planted in small isolated plots at close quarters. Edging flower beds by a controlled dwarf hedge of a colour to match gives the garden a polished appearance.

An ideal place for flower beds is on the side of the house in front of the living rooms so that they present a cheerful appearance to the inmates peeping through the windows and also to the passers-by looking from the street.

The walks between the flower beds should have a minimum width of 4 ft.

The proper arrangement of the flowering plants with respect to their height, back-ground, and colour so as to form a most pleasing design is the key to success of a flower garden.

Every garden lover wishes that he should possess plants that bloom all the year round. There are a number of such perennially blooming plants; but they do not satisfy all the requirements. Some of them are too tall to be used except on boundaries; others have a rank spreading growth and therefore are not suitable for flower beds; still a few others have flowers which possess an unpleasant smell and so on. But even these bloom more in one season than in another. It is therefore advisable to make a list of plants blooming in the three different seasons viz. the monsoon, the winter and hot weather and to plant them in inter beds overlapping each other inside a large flower bed in such a manner that when the bloom of the monsoon variety begins to ebb away, the winter flowers should begin to appear in the inter beds

either in the front or behind, a suitable colour combination having been previously thought out.

Accessory details :

There are a number of accessory details which lend a charm to the landscape garden such as fountains, statues, seats, pergolas, arbours, summer houses, bird-rests, bird-baths, pools, sun-dials etc. Most of these, particularly fountains, statues, summer houses and pergolas are not suitable for small gardens. If they are to be used they must be thoughtfully designed. More stress should be given on simplicity and graceful form rather than on decoration. A massive but comfortable concrete seat is cheap and almost permanent. It should be screened by a tree against afternoon sun and for preventing it from absorbing heat and radiating it after sunset. In respect of privacy it should be secluded by means of a high hedge or a brick or concrete wall from the neighbouring plots and should be so placed as to command a view of the best part of the garden. In short, it should be inviting.

A pool serves several purposes. If elegantly shaped in design and properly framed by means of flower plots etc. it is a centre of attraction. It affords a storage of water for plants. It may also be used for growing water lilies. Thus it proves a great asset of a landscape garden even in a small plot. Care must however, be taken to see that the water is frequently renewed and that no mosquitoes are allowed to breed.

Vegetable garden :

Scarcely a house-owner may be found who does not want a vegetable garden, even though a small one on his plot. But he need not be disappointed. By good planning it is possible to reserve a small space for it even on a small building plot. It should be remembered that for the normal needs of an ordinary family even a few square ft. of space perennially under vegetables are sufficient if well manured and cared for. It is a fact beyond doubt that our food — whatever be the province — is deficient in green leafy vegetables which are very necessary for the proper building up of the body. We could at best grow this stuff for our needs even on the smallest plot.

Fresh vegetables, which are full of vitamins, are very wholesome and tasteful. Moreover, vegetables grown in one's garden, particularly with one's own labour carry a special relish about them and therefore, it is worth while trying them on the part of every property owner.

If a building plot is long and narrow, a portion, on the extreme rear, of its full width could be very easily utilised for this purpose. If it be short and wide, a long but narrow strip on one side behind the drying yard may be set aside for that purpose. The vegetable garden may be profitably surrounded by a hedge with creepers which yield vegetables such as beans, pumpkins, snake gourd etc. Some of these creepers yield fruit perennially for the kitchen.

Furniture and Furnishing

By far a large number of people crowd their rooms with furniture collected at random without any regard to its fitness, comfort, or even form. There are others with a reputation for being persons of artistic taste, who, too, equally crowd their rooms with pieces of furniture of a costly type. That furniture may be better fitted for a show room, but for home use the pieces are utterly unsuitable and incongruous. When these people think of furnishing their homes, they rush to a furniture shop, pay a high price and strike the bargain of their entire requirements in a few hours. It is no wonder if they have to repent for their choice afterwards, because, they did not consider the matter from the point of view of their specific requirements. As a matter of propriety every piece must be planned to fit the walls and spaces and the sizes of the rooms it is to occupy. The pieces of furniture should be few, but well chosen as regards their beauty, strength and utility.

The design of furniture should be dictated by common sense and good taste. The object of furnishing a home is to give comfort to the body, pleasure to the mind and to conduce to the preservation of health. A chair, for instance to be comfortable should have a sufficiently spacious seat and should amply support the back ; to satisfy the requirements of good taste and to please the mind it should have a graceful form, and the colour of the body and of the cushion should be in keeping with the general scheme of decoration of the room. In order to be conducive to sanitation, it should be free from any carving, which does not make it comfortable, but only increases the cost and further acts as a depository for dust and dirt. Its legs should be strong and plain and not twisted or curled. Its seat should not be covered with velvet (which catches dust, and is difficult to clean) but with leather — real or artificial or some such material, having a pleasing colour and a plain surface.

Similarly in the matter of choice of furniture for the drawing and bed rooms, health, comfort, fitness and durability should be the guiding principles. For the requirements of health, every piece

should be light, so as to be easily removable, or if bulky, should have means to permit the floor below being cleaned and washed. They should, for this purpose, be preferably supported on castors which would allow them to be moved aside, so that not only the floor below, but also the wall behind, may be cleaned. They should have not only no carving but not even small recesses on which dust is likely to collect.

In the bedrooms, built-in wall cupboards or clothes-closets are to be preferred to movable wardrobes as the latter occupy a considerable space and also present a flat top. If the walls are thin, built-in wall-cupboards are, of course, not possible and clothes closets (please vide page 62) carried to the level of the ceiling will be infinitely superior.

For those who can afford, dining on tables is infinitely better than dining on floors in a squatting position. Tables eighteen inches in width, designed in lengths to suit the particular size of the dining room with a minimum gangway of three ft. between two rows for two servers to move between, are more suitable for the customary Indian manner of dining than one wide dining table with chairs on both sides of it. The tops of these tables may be well polished to show the natural grain of the wood or be lined with paper of pleasing designs and then covered with thick plate glass, which makes them very easy for cleaning and washing every day. The Dining chairs should have straight back to give a firm support while eating, and should have no arm rests if the dining room is restricted in size. The seats of some of the chairs should have means for adjusting the height to suit children of different ages. The floors of the kitchen and dining room should be of a material of a smooth and non-absorbent surface such as polished Tandur, Katni or Shahabad slab or at least of cement concrete. The junctions of walls and floors should be coved i. e. slightly rounded. Then again, the junction of three surfaces, (for example, the corner of the floor where two walls meet) is very difficult to clean. Here a triangular piece of a tile or metal should be vertically fixed into the surface of the junction.

The use of bakelite and glass in the furniture is a very great advance, particularly as a covering on tops of tables, teapoys, shelves

or window-sills etc. Similarly furniture with a frame work of pipes of stainless steel, or chromium plated ordinary steel, is also very good. They look elegant, do not rust and are very easy for cleaning and handling because of their light weight.

The old venetian blinds, which collected dust and were difficult to clean, though once very popular, have already gone out of date now, and with a further advance in cheaper methods of airconditioning, not only the cloth curtains in windows which collect dust in their folds, but the entire present-day design of windows would be altogether changed. The shutters hinged to the frame for the facility of being opened and closed would be replaced by sheets of thick glass fixed permanently to the walls as the function of the window would no longer be to supply air, but to supply only light.

Further, in respect of furniture, as in everything else, shams and pretensions should be avoided. They are bad in taste, bad in art and bad in moral sense. Few persons would believe that a concrete stair case painted like marble is of real marble.

With all the improvements that are being made every day in various trades relating to furnishing material, and by exercising common sense and good taste and with a careful regard for use and suitability and avoidance of all that is sham and false, we may make our homes not only comfortable and healthy, but artistic and beautiful as well.

Plants in Rooms.

In Western countries a decorative effect is obtained by cultivating plants in flower pots and arranging boquets of flowers on tables inside the rooms. This is a very good thing, and should, by all means, be universally adopted in our country. Not only do they give an appearance of freshness and liveliness to the room, but also help to purify the air during day time. Their action on air is, on the whole, the reverse of that of animals.

It is true, that plants respire like animals, breathing in oxygen and giving out carbonic acid gas. But, this process of respiration is

very slow and is hardly perceptible during night. On the other hand, the respiration during the day time is very insignificant with the reverse process of assimilation, in which the green matter in the leaves actually decomposes the useless carbonic acid gas under the influence of light and gives out a large amount of oxygen for the benefit of animals. On the whole, the presence of green plants inside the house is very beneficial. The air inside the house is charged with a certain amount of smoke which contains some elements such as sulphur compounds, particularly in the house where gas is used for cooking and lighting purposes. These are detrimental to the plant life. There are only a few plants such as a few varieties of cactus, some palms, and a few ferns which possess the power to resist these evil effects.

Apart from the physiological effect as explained above, of plants inside the house, in respect of purifying the air, the psychological and moral effect on our minds is certainly invaluable. Every glance of ours at the fresh foliage of plants or at the pleasant delicacy and cheerful colours of flowers, is accompanied by an involuntary pleasurable emotion, which stimulates even the depressed mind. It is a common experience that a child even before the age of reason, stops crying at the sight of a beautiful flower and instinctively spreads out its hand to catch it. Our environments have so much to do with the shaping of our lives and disposition. Then why should we not make them cheerful if it could be done without much labour and expense ?

Thus it is possible to make a small conservatory or a fernery on a side of the verandah, or on the open terrace on the rear side where children play. It is possible to make hollow concrete boxes in the extension of window sills on the outside and to grow flowers in them. It is also possible to make boxes for plants of concrete in the top-layer of parapet walls of terraced roofs for roses and other flowers. A garden of small beds of flowers in earth spread on top of terraced roofs and shrubs grown in boxes could be successfully made on top of terraced roofs, which would be most enjoyable for poor families who cannot afford the luxury of a garden in the cottage compound.

Interior Decoration and Colour Schemes.

Colours exercise a powerful influence on the human mind. Physiologically they act upon our optic nerves through the media of our senses. People in robust health may not feel their effects immediately, but the weak, invalid, and the sensitive are very susceptible to their influence. If they are in harmony, a sensation of cheerfulness and pleasure is caused. If, on the other hand, they are discordant or harsh, an irritation of nerves even amounting to headache is the result.

The psychological effect of colours on the human mind is perhaps more important than the physiological reaction. It is well-known that certain forms of insanity can be cured by the action of coloured lights. The psychological effect owes its origin to certain ideas or sentiments associated with certain objects having particular colours. For instance, in Europe, the sun-shine even by mid-day is never so bright as even that for a couple of hours in the morning on a winter day in our country and therefore, is very cheerful and enjoyable. The yellow colour suggests to them the mild sun-shine in their country, and therefore, all the ideas such as those of cheerfulness and happiness are attributed to it. The dress worn on funeral occasions is black, amongst Christians and some other communities, and thus the black colour is regarded as mournful colour. Amongst us Indians, ideas of darkness, ignorance, sin, etc. are associated with it and that is why it is detested and not with a sentiment attached to mourning. Red is indicative of blood; hence, in Western countries ideas of cruelty, violence, murder, etc. are associated with it. Amongst us, particularly amongst the Hindus, red suggests both cruelty as well as auspiciousness, since it is the colour of both blood as well as *Kunkum*. Physiologically too, red, especially when strong, strains the eye and as it does not reflect light freely it darkens rooms. Green is abundant in nature, and we are very familiar with it; besides, it is a soothing and restful colour and therefore, it appeals to most of us.

Thus it is the sentiments attached to the colours by association with objects, which in fact make us feel happy or depressed.

In spite of this powerful influence, colour exercises on our minds, the majority of people are ignorant of the theory and effects of colours. The real artistic taste is found to be developed only in a few people. What commonly passes for artistic taste is in the majority of cases an imitation of what "persons of taste" have done.

This is particularly so in our country. Our senses of touch, smell, taste, and even that of sound are all sensitive. If we happen to touch something dirty, disagreeable, or impure (even from a religious point of view), our sentiments revolt; if there is something stinking even far away, our acute sense of smell is awakened and we hold a handkerchief to our nose; the organ of taste is developed perhaps even more. Few people would lightly value the preparations of a good chef or put off well dressed dishes till Sunday. The organ of sound, too, or what is called ear for music, seems to have developed in the majority of the people, so far at least, as to appreciate a harmonious melody. But the equally or perhaps more important sense of sight is surprisingly neglected. The beauty of form may appeal to most but by constant association, with things that are crude and vulgar in colour, from our very childhood, healthy development of this important sense has been totally neglected. It is, therefore, proposed to discuss here rather briefly the elementary principles underlying colour.

Before doing so it would be well to define a few technical terms so as to avoid a possible confusion.

The distinction between *Tint*, *Hue* and *Shade* :—

By mixing white with the original colour, a *Tint* of the same colour is produced. *Tone* means the same thing.

By mixing a colour with another colour, a compound colour or *Hue* is obtained.

By mixing tints of colours with black *shades** are produced.

* Though the scientific meaning of *Shades* is as above it is frequently loosely used to mean a tint or a tone as in the expression: panels of walls should be in the same as, but of a slightly lighter shade than, that of borders.

A colour is *broken* by mixing it with other colours either harmonious, or contrasting or both, to make it lose some of its original character i. e. it is subdued or made milder; a broken colour is still recognisable.

Harmony is that combination of colours, in which each colour matches with the next adjoining it and the combined effect of them is to present a neutralised bloom, causing a soothing and pleasant reaction on the eye. In a harmonious combination, no single colour attracts the eye, but every colour merges its individuality to produce a common pleasing effect.

Discord is the opposite of harmony, in which each colour, instead of making a pleasing combination with the one adjoining it, produces a jarring effect with it. The result is to strain and fatigue the eye, and if the discord is very sharp, even to cause a shock to the sense of sight, by the violence of the discording colours.

Contrasting colours are those which, when placed side by side make each of them look more effective. Contrast is not opposite of harmony; contrasting colours when in juxtaposition produce a pleasing effect, but unlike in harmony, each asserts its individuality and provides a good setting for the other close to it. Contrasting colours are complementary of each other and do not change when placed together. Thus black and white, red and green, blue and yellow are contrasting colours.

In order to explain the mutual relation between, harmonious, contrasting and discording colours, a simile from practical life would serve better :

Harmonious colours are like sincere friends and co-operators, one forgets himself to help the other and the result of their combined goodness is to bring about peace, harmony and prosperity to the community which they may be serving.

Discording colours are like sworn enemies, who, if brought together, look with anger at each other and create an atmosphere of discord and violence about them.

Contrasting colours are like an ideal pair of a Guru and his devoted disciple, both, persons of great distinction, each is complementary of the other and enhances the importance of the other.

What are called *Primary* colours are only three, viz. *yellow, red* and *blue*. All other colours—even those in the spectrum of the sun's rays, are produced by compounding these in different proportions; but these three colours are not themselves capable of being produced by composition of other colours, and that is why they are called *primary*.

Figure 17 shows a colour chart in a circular form, which would serve as a key to the understanding of the relation between various colours in respect of their harmony, discord and contrast. Only a few prominent colours have been included in the chart to simplify matter. Once initiated, the reader, who is interested in studying complex problems, can prepare an extended chart for himself.

The chart is based on the table prepared by Rood, after a very large number of experiments and investigations. It was Rood, who first discovered that there subsists, amongst colours, a natural order, which, if followed, produces harmony, and if reversed creates discord.

A close observation of the chart will reveal that there is yellow at the top, which is the lightest colour and therefore, nearest to white, and that at the bottom is violet, which is the darkest, and therefore, nearest to black. It will be noticed that if you go from the yellow to the violet, either in a clock-wise direction through orange and red, or in an anticlock-wise direction through green and blue, each succeeding colour is darker than the preceding one, between the two extremities viz. lightest yellow and darkest violet. White and black do not find a place in the chart as they can be produced by mixing other colours.

Harmony

Rood showed that if the natural order of the colours and their relative depth or darkness be maintained in any colour scheme, har-

COLOUR CHART

Explaining the principles underlying Harmony, Contrast & Discord of Colours.

Yellow •
(Lemon)



There are two series; both start from the yellow, which is the nearest to white, and end in violet, which is the nearest to black. The first goes in the clockwise direction through orange, red etc., while the other goes in anticlockwise direction through green and blue etc. The colours as they stand in the above chart are in harmony. If the order is reversed, discord results. The colours opposite to each other are contrasting colours. The yellow and ultramarine, orange and prussian blue, purple and green, red and blue-green etc. are contrasting colours. The chart can be extended and any colour can be given its proper place in it.

Note:—The nomenclature of the tints and hues in the above chart shown in brackets, is according to Ridgway's standard. [To face page 98.]

CAUTION—DO NOT EXPOSE THE CHART TO STRONG LIGHT FOR LONGER THAN NECESSARY.

mony is created. Thus if we take two colours, say orange and red first, and colour a surface with a certain tint of orange, the red colour coming close to it must be of a deeper shade than that of the orange for a harmonious effect. If a third colour, say purple, is introduced, it must be of a still deeper tint than that of the red and so on. The same thing holds good of the left hand series also.

It does not matter if one or more intermediate colours in the series be altogether missing in a colour scheme; so long as the natural order is observed, harmony is bound to prevail. For instance, if yellow and purple are used the purple must be of a deeper tint than yellow.

To make it easier for understanding, a table is given below showing how harmony would be effected.

SERIES No. 1

| Colour | Harmonises with a deeper tint of | Harmonises with a lighter tint of |
|---------------|----------------------------------|-----------------------------------|
| Yellow | Orange-yellow | |
| Orange-yellow | Orange | Yellow |
| Orange | Poppy red | Orange-yellow |
| Poppy red | Crimson red | Orange |
| Crimson red | Purple | Poppy red |
| Purple | Violet | Crimson red |
| Violet | | Purple. |

SERIES No. 2

| | | |
|---------------|---------------|---------------|
| Yellow | Yellow-green | |
| Yellow-green | Green | Yellow |
| Green | Blue-green | Yellow-green |
| Blue-green | Green-blue | Green |
| Green-blue | Prussian blue | Blue-green |
| Prussian blue | Cobalt blue | Green-blue |
| Cobalt blue | Ultra marine | Prussian blue |
| Ultra-marine | Violet | Cobalt blue |
| Violet | | Ultra-marine. |

The harmony described above is of a simple type. Such simple types abound very much in Nature, a few of which are quoted below :—

Young sprouts have light yellow-green leaves which gradually change into green and ultimately into deep green or bluish green. Observe the brilliant and fresh colours on the leaves of *coleus*, particularly of plants kept under a thick shade. Two or three simple harmonies of colours in both the series will be found on the leaves—a very striking example of harmony in colours on leaves. The leaves of *caladium* show a similar harmony. If a mass effect is desired look during spring time from a distance at a row of trees lining the street; all the series from light yellow-green to green-blue in large masses of foliage will be noticed.

Again, in most flowers, when the colours, red and yellow come together, the tint of the red would invariably be darker than that of the yellow. Almost all coloured flowers exhibit a partiality for harmony. Take canna, for instance, it is a perennially blooming plant with a number of varieties, the flowers are of all different colours from white, or cream to brilliant red, some have spots of bright red on deep yellow petals; however all varieties exhibit harmony to a wonderful extent, the colours of their flowers contrasting with green or blue green leaves.

Most of the fruits obey the same law of harmony in colour. Take the orange for instance, when it is quite raw it is green, as it grows to maturity the colour changes to lighter green, then to yellow green, then to yellow, to orange and finally to orange red in a ripe fruit. Apples do this in a still more striking manner. Lemons cucumbers, pumpkins, chillies, brinjals, berries all do the same thing. The half ripened tomato shows two harmonies one in each series viz. (1) green, yellow-green and yellow, and (2) yellow orange-red and red.

The brilliantly coloured birds such as the parrot, peacock and others also show a general obedience to the laws of harmony, though there is often times a harmonious contrast.

Colour schemes for interior decoration based on harmony are the easiest and safest of all, though at the same time they are less interesting and lack a thrill. The simplest scheme based on harmony is with spots, flowers or figures forming a pattern in a colour of original or of less strength on a surface coloured in a paler tone of the same colour. A further advance is to mix two or three different harmonious schemes together on a back ground of the lightest colour of them. In more complex harmonious schemes broken colours in different shades are used to harmonise with each other. The modern trend, however, is not satisfied with a harmonious scheme even of a complex nature as it lacks the element of adventure and surprise. A harmonious scheme, howsoever cleverly it may have been designed and worked, is dubbed as lifeless.

Discord

When the natural order of colours shown in the circular colour chart is reversed, discord is created. This is possible in two ways viz. (1) by using a lighter colour shade than the preceding, or (2) by using a deeper one than that of the succeeding colour in the chart.

Thus if a reference is made to the colour chart facing page 98 we get the following table:—

SERIES No. 1

| Original colour | Discord with lighter tint of | Discord with deeper tint of |
|-----------------|------------------------------|-----------------------------|
| Yellow | Orange-yellow | |
| Orange-yellow | Orange | Yellow |
| Orange | Poppy red | Orange-yellow |
| Poppy red | Crimson red | Orange |
| Crimson red | Purple | Poppy red |
| Purple | Violet | Crimson red |
| Violet | | Purple. |

SERIES No. 2

| Original colour | Discord with lighter tint of | Discord with deeper tint of |
|-----------------|------------------------------|-----------------------------|
| Yellow | Yellow green | |
| Yellow-green | Green | Yellow |
| Green | Blue-green | Yellow-green |
| Blue-green | Green-blue | Green |
| Green blue | Prussian blue | Blue-green |
| Prussian blue | Cobalt blue | Green blue |
| Cobalt blue | Ultra-marine | Prussian blue |
| Ultra-marine | Violet | Cobalt blue |
| Violet | | Ultra-marine. |

Though discord is jarring, and it strains the eye and gives a violent shock to the sense of sight, it is often necessary. Otherwise, long consistent harmony would be tiresome. If life were only a bed of roses, nobody would have appreciated the value of happiness. A pinch of salt or of hot spices is necessary when the palate is tired of sweet dishes, nay there is a craving for it. Too smooth, too easy a life becomes dull and boring. There must be something of a thrill, some surprise. But the latter should be just enough to recall the full value of the smooth, harmonious life. In a similar manner a little discord, if judiciously administered adds zest and stimulates the entire atmosphere of a room.

Too much discord is at the same time a dangerous thing to use. If it be even a little more than just necessary, it mars the whole effect. It should never be given a prominence such as on a wall surface or a screen, which must always serve as a background ; it should be allowed in accessories such as a vase, glazed pottery, cushion covers, flowers, bouquets etc.

It is sometimes very difficult to avoid a discord. For instance, in a colour scheme with a violet or purple background, which are the last colours in the colour chart in both the series, even though their tone be very pale, they would require even paler green or yellow for the sake of avoiding a discord. But, if very pale colours are used they would look quite flat and will have no "body" at all. Under such circumstance just a line border of a little deeper tint of violet or purple, as the case may be, or an outline of white, round the figures

of yellow or yellow-green in the pattern would considerably save the situation.

contrast

In the colour chart given elsewhere any colour in one series is complementary of the colour exactly opposite to it in the other series. The complementary colours are called contrasting colours. Thus purple and green, yellow and ultramarine etc. are contrasting colours. It is often loosely said that red and green, or blue and yellow are contrasting colours but it is not strictly true. This can be verified very easily. Look steadily for a minute at a strong red colour and then turn your eye to a fresh green surface, you will invariably see a blue patch before your eyes. Instead of looking at green if you had looked at blue, a green patch would have appeared, indicating that the complementary colour of red is a combination of green and blue and neither of them singly. The reason why the green or blue patch appears before the eye is that after looking steadily at a strong colour the eye gets tired and tends to see the opposite of that colour.

Contrasting colours when placed side by side, not only do not change or re-act upon one another, but each heightens the effect of the other. Thus, when black and white come together, the black causes the white to look whiter by contrast and vice versa. That is why contrasting colours are said to be complementary of each other. Here is a list of a few important contrasting colours, which can be easily verified with the help of the colour chart.

| Colour | Contrasting Colour |
|---------------|--------------------|
| Yellow | Ultra marine |
| Orange-yellow | Cobalt blue |
| Orange | Prussian blue |
| Poppy red | Green-blue |
| Crimson red | Blue-green |
| Purple | Fresh green |
| Violet | Yellow green. |

Contrasting colours look most beautiful when they are of equal strength and when one of them is in small areas and the other in a large surface surrounding the small areas.

Contrasts in colours abound in nature, but not in very large quantities, or surfaces. Red flowers amidst green foliage is a very favourite contrasting scheme with Nature. The brilliantly coloured birds have contrasting strong colours on their wings. As contrasting colours attract the attention, they have been advantageously used on the most of the national flags, and also on starboards of ships and railway and road signals. The sky is full of contrasting colours at sunset.

In decorative schemes contrasts are not so dangerous to use as discords because they are not jarring. What they do at the most is to attract the interest of the looker-on towards themselves and thus throw the entire colour scheme even though rich and elaborate, into insignificance. Therefore, contrast must be used just like discords in small quantities and in unobtrusive positions just to serve as an emphasis or as an accentuating note. The piping of the edge of a cushion, edges of a lamp shade, a chair cover, door or cupboard handles of bakelite etc. in a strong contrasting colours, are some of the suggestions.

Colour schemes

With the foregoing discussion of the theory and principles underlying colour schemes, the reader will, it is hoped, be in a position to understand at least what would cause harmony and what would bring about discord. It is not possible to lay down definite, hard and fast rules as to what colour and its combinations would look best, because, it is wholly a matter of individual taste. One person may be fond of a particular colour, which another person might abhor. All colours are beautiful; there is not a single one, the colour scheme built on which cannot be pleasing.

Equipped with the knowledge already acquired with the help of the colour chart, the reader should no longer, accept a scheme thrust upon him by his contractors or copy what his friend has adopted for his own house, because the latter is a person of artistic taste. To help him a little further, a few facts universally accepted, are given below.

It must never be kept out of sight, that light is the basis of every colour scheme. Without light colour has no existence. Therefore, the colour scheme of a room primarily depends upon the manner in which it receives light. This assumes a special importance in a tropical country like India. In England and many other western countries the sky is always full of clouds, often for twenty-four hours, and there is very little sunshine, if there be any at all. Therefore, inspite of the provision of large windows in every exposed wall, the light inside the house is grey and never white, and therefore, colours of only less than half their original brilliance look at their best. This gives us a warning against copying even those colour schemes which have been announced to be the best in those countries. Here, in our own country, even the strongest colour is drowned and considerably toned down, in the dazzling light. Moreover, the direct sunlight adds a tint of yellow or white to all the colours, and therefore make them look paler. Even the black colour loses much of its sombreness and depressing effect in the bright sunlight. We are often classed, by the westerners, in the same category as the African Negroes and shown up as being fond of brilliant colours, so much so that the expressions "orient blue", "Indian red" are applied to blues and reds of original strength. Similarly the term "riot of oriental colours" is often applied to a scheme in their country in which strong contrasting colours are used. But there is nothing wrong or unnatural in it. Even Nature helps it. Not only coloured birds like the parrot and the peacock in the orient have brighter colours, but even the flowers in the tropics show a partiality for more brilliant colours than those in the cold countries. If we were to use the colour strengths which are used in the western countries, whether in the textiles or interior decoration, they would be all drowned in the dazzling sunlight.

The light coming through windows in the Eastern side of the house is bright and very cheerful as the morning sun is very pleasant. Further, as the sun rises, the morning light gets warmer and brighter. Whereas, the light through the windows in the Western walls is hot, causes restlessness, and gets fainter and fainter as the sun sinks down below the horizon. It is, therefore, necessary to treat the two rooms, in respect of colour, in two different ways.

In a similar manner the North light is always cold*, but uniform in strength, while the South light is moderately warm and varying in brightness according to the season. It is, therefore, necessary to avoid very cold colours such as the blue, gray-blue, green-blue etc. in the rooms facing the North and adopt such colours as yellow green, light rose, cream, buff etc. instead. The colours in a hot room should be cold and soothing, and those in a warm room moderately so, though this further depends upon the purpose for which the room is used.

After this, the proportion of the window space to the size (both floor area and height of walls) must be considered. Suppose, the window is very large in proportion to the size of the room. The result would be that the glare of the dazzling light would drown the colours and make them look flat, if they be light, both by the direct action of the dazzling light and also by the reflection of light from one wall to the other. Therefore, a colour comparatively bright, but restful and dull in reaction, would be appropriate in large forms. Thin lines or small forms in delicate colour would not be seen at all.

In dark situations, on the other hand, for instance, in a large room with windows small and situated long apart, the colour to be used must be such as would be reflected from the lighted portion of the wall surface to the dark spaces and corners, and remove the gloom therefrom. In such rooms the treatment also of the ceiling should be of colours which reflect light, so that the capacity of lighting on the part of the windows should be increased.

This is exactly what is done very effectively in the Mugal palaces at Delhi, Agra and Bijapur. To avoid the strong glare which tires the eye, they constructed inner apartments with thick walls for coolness and provided them with small windows. This had, naturally, a tendency to make the apartments look gloomy and dull, which they successfully remedied by using very bright colours on the walls and

* Here again, our circular colour chart facing page 98 is helpful. As a general rule the yellow-green-blue series of colours on the chart and the combinations of other colours with the light colours in that series, such as lime green, blue grey, French grey etc are cold colours, while, the colours in the red-purple series and their combinations are warm colours.

even brighter colours and gilding on the ceiling, which reflected their colours into the dark corners and imparted an air of cheerfulness to the entire apartment.

If the walls are disproportionately too high, they can be made to look low by reducing the height of the wall surface with a dado at the bottom and a freize at the top. The dado is usually from one foot to 3 feet in height and should never be higher than the height of the back of the chairs. Its colour should match that of the doors and wood work. The freize should be of the same colour as, of either the wall or the ceiling, but of a lighter tone, and should harmonise with the adjoining colour. Another way to reduce the apparent height of the walls is to darken the ceiling and give it a coat of copal varnish so as to make the surface glossy. The partial reflection of the floor into the ceiling gives an effect of its having come down.

For increasing the apparent height of the ceiling, on the other hand, a perpendicular effect should be given by drawing vertical stripes on the wall so as to divide it into tall and narrow panels. The stripes may be of the same colour as the panels, but of a little deeper shade. They might offer an opportunity for showing an effect of contrast in a stimulating colour in the form of thin edging lines on the borders of the stripes.

An effect of increase in the length and breadth of a room can be obtained by painting or distempering the walls and the ceiling in the same colour tone. The same effect can be further increased if the colour of the floor, or at least that of the carpet matches closely that of the walls. The continuity between the walls and the ceiling, or the wall and the floor, conceals their extremities and gives an effect of something like endlessness.

The foregoing discussion explains the theory underlying colour schemes in the interior decoration. But when an amateur has to face a practical problem, he is sure to be confused as to how and where to start. The advice is that if he is writing on a clean slate, i. e. if his house is newly built and is to be newly coloured and decorated, if also all the furniture, curtains, carpets and other accessories are to be

newly purchased, then it is comparatively an easy task. He will, in all probability, have a fancy for some particular colour, no matter even if it be red. Let him build his colour scheme on the basis of that colour. He will first think of the windows and the light coming through them. [This is very important, because, the windows are once for all fixed into the walls and therefore, though the light can be lessened, it can never be increased] Then he will think of the curtains which will match his favourite colour. It is better because, easier to buy the curtains first and then to colour the walls to match the curtains, rather than to colour the walls first with a certain colour, and then to hunt for curtains of a pattern and colour to match. As a matter of fact such curtains may not be available at all in the market. When the curtains are purchased, they should be temporarily hung in the windows and the light reflected by them on to the walls, watched. A patch of the desired colour may be applied on the wall or a paper coloured with the tint held against the wall, where the light from the curtain is reflected to watch the effect. In this way, the shade which gives the best effect may be determined by trial. After this the colour of the dado, ceiling and carpets should be decided upon. The dado should always be slightly darker and the carpet still a shade darker as they are more liable to be soiled and then look dirty, if coloured in very light shades. The ceiling should be of a lighter shade especially if the room is not adequately lighted, so that it would reflect light. After this is done the colour and shade of the upholstery, chair covers, cushion covers, lamp shades, rugs, ash trays, book-cases etc. is to be determined. Upholstery and chairs are not of great importance, because, if they are not of the desired colour and shade, the defect can be remedied by providing covers of the required colour and shade. In this way the entire scheme should be completed.

If, however, a colour scheme is to be prepared to suit a house which is already in existence, or to which some additions, alterations or renovations are made, it is rather a difficult job. In this case some nucleus might be chosen, round which a scheme may be built. For instance, there might be some valuable woollen rugs, or some costly piece of furniture already in possession which cannot be disposed of. These or similar articles might provide a basis for suggesting a suitable colour scheme. Unless a room is detached from the main

house, or forms an altogether separate unit isolated from the other rooms by something like a staircase, or a lobby, the scheme for the entire house should form one unit, individual rooms—one opening into the other, forming parts of that unit. Of course, slight modifications will be required to suit the aspect of each room, and are essential from the point of view of avoiding a monotonous effect.

The science of interior decoration is very interesting and provides a full scope for any amount of thrill and excitement for one who wants it. As the modern interior architecture has dispensed with all mouldings and ornamentation, the importance of decoration by colours has increased several times. The amateur, however, is advised not to dabble in contrasting schemes until he has tried several schemes based on harmony and acquired sufficient confidence in them.

As a general rule bed rooms and living rooms should have restful and soothing colour such as green, blue green, blue grey etc. unless they are in the North. In the latter case, a cream, pale primrose-yellow, lime green would be more suitable. The dining room should have a lively colour such as pale pink or rose, yellow, orange etc. with a certain stimulating note. The kitchen should have also lively colours, but, for practical reasons, such colours as would not be soon spoiled by smoke, such as buff, blue grey and smoke etc., should be used. Bath room should have fresh, clean and stimulating colours such as ivory, cream etc. with notes of stimulating contrasting colours. If white glazed tiles are used for the dado in the bath room, a coloured border should be provided, or the upper surface of walls and the ceiling may be coloured in a shade of a warm colour like rose so that it would be reflected by the tiles and the room would be made look cheerful.

Insulation or Heat-proofing.

The function of insulation is to retard the passage of heat through walls, floor and roof of a house. When the outside air is colder as in the winter, heat tends to flow outside and when it is hotter as in the summer, it flows into the house.

In Europe the summer is very mild and therefore, they do not necessarily require insulation for summer conditions, but in winter, if the house is not properly insulated, large amount of heat within the house escapes outside and increases the bill for coal, gas or electricity used for heating air. In most parts of America the summer is as severe as here in India and the winter too, is as severe as in Europe and therefore, they have to be very particular in providing proper means of insulation, which, even though initially very costly pays them in the long run as it helps them in both the summer and winter. The item of insulating the house is as necessary and important in their the construction estimate as the foundations, walls and the roof.

Our problem in India is a very simple one. Except on some hill stations we do not require fires in the winter. We want insulation for summer conditions only. The method employed hitherto such as providing a wooden ceiling in the roof, and khus curtains in windows have been quite unsatisfactory. But with the advent of air conditioning which is sure to be commonly adopted in not a distant future, systematic efforts at insulating the house would be necessary; otherwise, the recurring cost of air conditioning would be very heavy. Hence, it is proposed to deal here with the latest methods of insulation a little in detail.

It should be noted that even though insulation may be due for summer conditions only it is bound to help during winter also in keeping the house warm and enjoyable.

We have seen in an earlier chapter while discussing orientation of houses (pages 24 to 27) that the main cause of discomfort in summer is the fact that the roof and outer walls of the house

absorb heat from the sun's rays and radiate it inside. Therefore, if a layer of some perfectly non-conducting or insulating material is interposed between the outer and inner faces of walls, and just below the roof so that the heat absorbed by the outside surface is either stopped or reflected away before it reaches the inner surface, our purpose would be eminently served. Air itself is a very good conductor, and therefore, if a cavity is formed inside the thickness of the wall and the roof it should, in theory, prove a very good insulator.

But there are practical difficulties more particularly under the roof, of properly sealing the cavity so as to make it perfectly air-tight. If this is not accomplished, i.e. if the cavity is in communication with the outside and inside air, the air in it absorbs heat or cold and no longer serves as an ideal insulating medium.

The modern methods of insulation may be classified into four main types :—

- (1) Blanket type
- (2) Loose fill type
- (3) Board type
- (4) Mirror type.

It may be mentioned here that all these types are suitable for the method of construction of walls which is rarely practised in India. However, we can very easily adopt them for insulating our roofs. In fact a roof, particularly a tiled one, radiates more heat than walls of the ordinary thickness built in our country.

The method of constructing walls practised in the western countries is this : The entire weight of the floor or floors and the roof is supported by a framework of vertical "studs" or posts, erected two to four feet apart, either of timber or steel, and on both sides of these studs is fixed lath-work either of metal or wood which is plastered with cement. In other words, even the outside walls are only three to six inches thick with an inside cavity equal to the thickness of the studs. Sometimes these hollow walls are constructed with the outside covering of either wooden boards (shingles) nailed to the

studs or a four inch brick-in-cement wall (brick-veneer) and the inside of a covering of lath plastered with cement as usual. In any case the outside walls are thin requiring very light and inexpensive foundations. The entire reliance for heat-proofing is, therefore, placed on the insulating material used inside the cavity. Our practice in this country is to build solid walls and depend upon their thickness for heat-proofing.

Out of the modern methods of insulating a house (1) in the Blanket type there is a regular blanket or rather a quilt, made of any loose fibrous material like sea weeds, loose coir, mineral wool, wood fibre etc. spread between two layers of tough (building) paper and stitched just like cotton quilts, and formed into rolls usually in two widths sixteen inches and four feet. These rolls are unfolded and tacked to the frame work of the studs by means of thin wire nails. In roofing, the wider rolls are nailed direct to the rafters after stretching them properly and the ceiling boards are fixed above, on which tiles may be laid as usual on battens. The quilt is usually one to two inches thick.

(2) In the Loose fill or bulk type, loose insulating material, fibrous, granular or powdery is either poured, blown, packed or filled under compressed air as necessary, into the cavities in the side walls or under the roof. As the thickness of the cavity is considerable (two to four inches) this type proves a very effective insulator.

The material can be filled into the cavities of the outer walls through holes at the top, or may be packed with hand as the wall progresses, but in roofing, it must be packed on the top of ceiling boards before the tiles are laid.

In moist and damp localities it is likely that the moisture or water vapour might condense and not only reduce the insulation value of the material, but also set a rot in the loose material itself and also in the wooden frame-work of the wall, besides causing foul gases to emanate. It is, therefore, necessary, in such localities, to provide proper means of ventilation, inside the wall, so that if air circulates, the water vapour also moves out with it or dries up.

In the above two types the mineral fibres such as rock wool, glass wool etc. have got one special advantage over the vegetable fibre such as sea-weeds, wood fibres etc., viz. that the mineral material is fire-proof, vermine-proof and also rot-proof.

(3) In the third type comes the material consisting of insulating boards, either rigid or flexible, from $\frac{1}{2}$ to two inches thick. They are made of wood fibres suitably treated, and compressed between rollers so as to form large sheets which can be used in several different ways. The rigid board on account of its stiffness can be used as a structural material, for instance, in the place of lath work or as ceiling boards under the roof. The insulating board, whether rigid, or flexible like thin cork sheets, can also be used as a plaster base, applied to masonry walls by cementing, or nailed to wooden frame. The variety of insulating boards which has a smooth finish can be used also as an interior finish of walls. Thus the board type of insulating material, serves, besides insulating, another purpose also.

(4) The principle involved in the mirror type is quite different from that of the above three types. It is based on a law in physics viz. that if a ray of heat impinges against a polished surface it is reflected back towards the source of heat, just as a ray of light does. Thus if a paper covered by aluminium or copper foil is interposed in the cavity of a wall parallel to the wall surface or in the roof, parallel to the roof surface so that the foiled surface is towards the source of heat, it not only effectually cuts off the heat, but causes it to be reflected away. It is not necessary that the surface should be bright. A single curtain of reflecting paper is sufficient, though usually two or more curtains are used to increase the insulating effect. The action of the paper curtains is two-fold. The first is mechanical in so far as the metal-clad paper is very tough and if tacked well to the frame-work effectually seals the cavity and traps air inside which itself forms a very good insulator. Second is optical and the paper curtains reflect away the rays of heat.

If it is desired to insulate a house with the present methods of constructing solid walls it is necessary to do the following :—

(1) Insulate the roof by adopting one of the methods mentioned above.

(2) Keep the doors and windows in the outside wall closed during hot hours and provide them with either (a) properly weather-stripped wooden shutters or (b) panes of special kind of glass such as "Calorex" which are often used for windows of the first and second class railway carriages. They admit light but cut off most of the heat or (c) double panes of ordinary glass, which with the film of air between the two panes materially cut off heat rays, and

(3) Build walls of such material as absorbs heat least and radiates it most readily.

Amongst building materials, metals are best conductors of heat and therefore absorb heat and also radiate it most readily. Brick absorbs more heat than stone but also radiates it more easily. Stone is a bad conductor of heat but once it absorbs it by long exposure is very slow and reluctant to part with it. Earth or clay is a still worse conductor. Therefore, walls of unburnt clay or of *pise de terre* make the house cool and comfortable. That is also why mud roofs are cooler than concrete terraced roofs, which, again, are cooler than tiled ones.

The colour of the surface exposed to sun's radiant heat has a great effect on comfort. White absorbs least heat, and whatever little is absorbed, it radiates again most readily. Its opposite extreme is black which absorbs heat most and is very slow in radiating it. Intermediate between these, are yellow, grey, green, blue and red in the order of absorption i. e. yellow absorbs heat less and radiates it sooner than green and so on. White-washing the exposed surface of walls and roof is an effectual remedy but it causes a glare. Grey or khaki (hay colour) is, therefore, the next best so far as insulation is concerned.

Even a galvanised iron sheet roof can be considerably improved in respect of heat by spreading grass either loose or in the form of a mat on its top. Even a thin bamboo matting on its top affords considerable protection. They do it in two ways; firstly they themselves possess considerable insulating property and secondly they reflect away the heat rays from their yellowish, shining surface as the metal clad-paper does.

Air-Conditioning

In its present highly specialised form, air-conditioning has developed very recently, and during the past two or three years in particular, it has made such great strides, and such new discoveries and improvements are being made every day that it promises to be very cheap and come within a fairly easy reach of the middle class people in the immediate future.

“Air-conditioning” a room, in plain simple words, means, artificially creating such conditions of the air inside the room as would give maximum comfort. Now, what are the factors which make us feel comfortable? We know that circulation or movement of air is one. It is our every day experience that on a hot or sultry day when we sit near a fan we feel comfortable. But, if we analyse the causes of this comfort, we shall find that it is not the movement of the air alone, created by the fan, but something more which is responsible for the comfort. The hot and sultry air caused us to perspire to a more or less extent and it is the evaporation of this perspiration by the movement of the air, that cools down the temperature of the air in the immediate vicinity of our body-surface and gives us the feeling of comfort. Thus, we know that (1) the movement of air and (2) the lowering of temperature are necessary for comfort. There is also a third factor, viz: the moisture, or water vapour present in the air which affects our comfort. Everybody knows that on a coastal place like Bombay or Madras, though the temperature be not high, it is the amount of water vapour with which the atmosphere, due to its proximity of the sea, is charged, that makes us feel oppressive, particularly when the air is still. Thus, water vapour in the atmosphere, or what is called ‘humidity’ is a third factor—and perhaps more important than the other two,—affecting our comfort.

Now, according to a law in Physics the maximum amount of water vapour, which the atmosphere can hold depends upon the temperature. It increases with the rise, and decreases with the fall in temperature. Thus, supposing that the atmosphere is saturated

with water vapour at a certain temperature and that by some cause the temperature is suddenly lowered, then the water vapour in excess of the capacity at the lower temperature is condensed and separated and falls to the ground. This is exactly how we get 'dew' and even 'rain'.

Scientists have found by experiments that the requirements for the optimum comfort of the human body for Indian conditions, are : a range of temperature between 76° and 82°F and the relative humidity between 60% and 45% respectively. This means that the greatest comfort is caused when the temperature is, say 82°F and at the same time the amount of water vapour present in the atmosphere is 45% or about 5% less than $\frac{1}{2}$ of the maximum which it could hold at 82°F.

Thus for getting maximum comfort we must secure the following :—

- (1) To maintain the temperature between 76° and 82°F.
- (2) To maintain the relative humidity at 60% to 45% and
- (3) To cause the air to circulate.

But, if the same air in the room were circulated round and round again, the oxygen in it would be soon used up by human respiration. Therefore, in the course of the circulation, some vitiated air must be expelled and fresh air brought in to replace it continually.

Further, the movement of the air inside the room must be at such a speed that no perceptible draught would be felt.

Perfect air-conditioning not only seeks to do all this with automatic controls, but even a little more, viz. it filters or deprives the air before it is admitted into the rooms, of all particles of dirt and dust, which, while floating in the air, carry a large number of harmful bacteria.

By the way, the filtering of air so as to eliminate dust and other matter is very beneficial to asthmatic patients.

In the process of making this accomplishment we automatically secure one more advantage viz : the insulation of sounds. It is this wise : For proper air-conditioning all the doors and windows have to be kept closed—the windows exposed to the outside air—with double-glass panes, if necessary, and this effectively shuts out all the outside noises.

If all-the-year-round air-conditioning is sought to be accomplished,

(a) *In winter* the air is much cooler than the comfort zone of temperature viz : 76° to 82° and therefore, it contains much less moisture also, than the relative humidity at the comfort zone ; hence we have to

- (1) heat the air.
- (2) humidify it or add moisture to it.
- (3) filter and force it into the room for proper circulation. whereas,

(b) *In summer*, we have to

- (1) cool the air.
- (2) dehumidify it or extract moisture from it, and
- (3) filter and force it into the room for proper circulation.

The third factor is common to both the cases.

The cycle of operations involved is shown diagrammatically in figure 17 :—

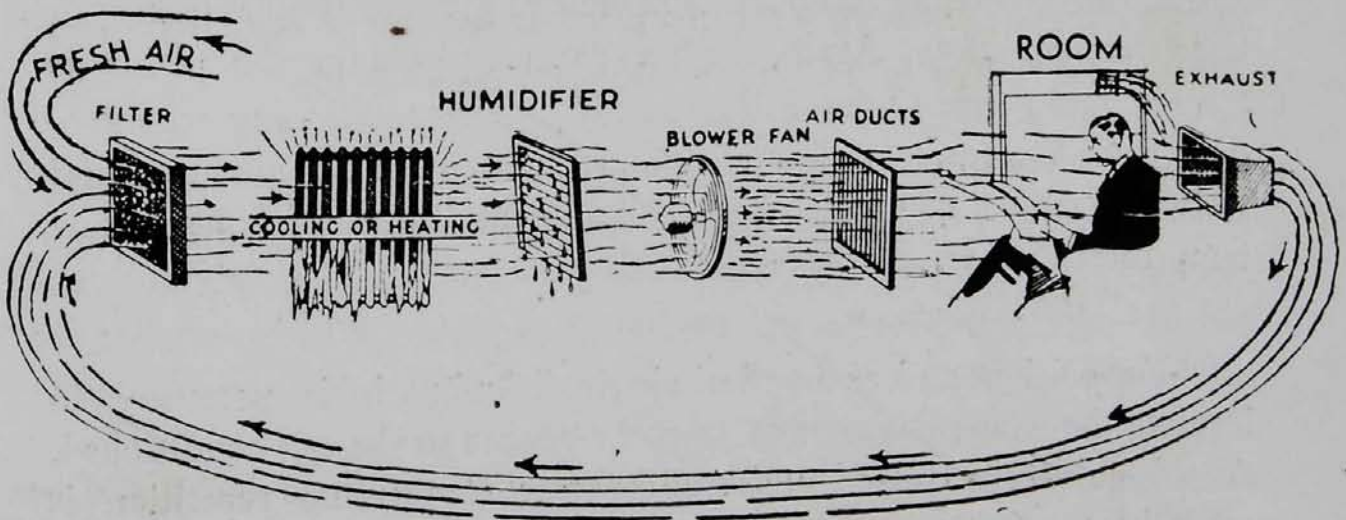


Fig. 17

With these general facts as the back-ground, we shall now discuss the different methods of accomplishing this.

India being a tropical country, our problem is mostly one of summer air-conditioning only. So this would be discussed in greater detail here.

Before proceeding to describe the methods of summer air-conditioning, it would be well to sound a note of warning: When the outside temperature is high, the atmosphere of an air-conditioned room should never be so cool as to cause even a slight chilling effect to one entering the air-conditioned room from outside. Normally the difference between the outside and inside temperature should not exceed 15°F in the case of rooms likely to be occupied for a short period of two or three hours, (such as restaurants, theatres etc.), and 20°F if the room is to be occupied for a long period, as in a residence or in an office. This is necessary in the interest of health.

One is apt to think that this is a serious hindrance in the way of air-conditioning at places where the temperature in summer is high. For instance, there are a number of places in India where the temperature in the summer is as high as 115°F in the shade and if it be positively harmful to lower it below 100° inside, there is no use of air-conditioning at all, as this is 18° higher than the highest limit of the comfort zone, (viz. 76° to 82°F), but it is not so. It is the common experience that to those accustomed to a temperature of 115°F , 100°F gives as much comfort as 82°F temperature gives to people living in temperate climates. Again, the heat at such places on the plains is too dry and parching, and therefore if by air-conditioning we introduce the correct relative humidity and further keep the air in motion we will feel as comfortable and still healthier without a low temperature inside.

For efficient and economical air-conditioning, it is necessary to insulate the whole house or at least the rooms to be air-conditioned. As this subject is treated under a separate chapter no repetition is made here.

The methods of air-conditioning depend upon several factors, such as the budget (both initial and annual), the temperature, humidity, the insulation made, materials available and so on. Again, it can be either complete or partial. If, for instance, the temperature of a place is not high and at the same time there is sufficient moisture in the air, though not quite upto the standard of comfort zone, then a mere artificial air circulation may be sufficient. Again, if the temperature is not high, but the humidity is too much then dehumidification alone may be effective.

The cheapest and a fairly efficient way of partial air-conditioning is by the method of what is called "cooling by night air." This method lends itself particularly suitable to the plains, or in fact to all the places in India except those in the coastal region where the atmosphere contains too much of moisture.

The method consists in mounting a fan of suitable size, just in the loft below the roof and working it by night. A square or circular stair-case built centrally in a house extending into a tower or a dome at top with windows on opposite sides for cross ventilation, would provide an ideal place for such a fan, and the results, too, would be very satisfactory. The way in which it works is this :

Soon after the nightfall, the outside air becomes cool, but the roof, walls and every solid thing, both inside and in the immediate outside of the house, which have absorbed heat during the course of the whole day begin to radiate it and make the rooms a veritable hot-house by night. This they continue to do almost till the small hours of the morning, making it impossible for the inmates to enjoy a restful sleep. Now, if the windows of the ground floor be opened just as soon as the outside air begins to cool down and if the fan is set working, it would draw up the outside air through the entire house and cool the latter down appreciably in a short time and contribute to the comfort of the inmates. As the night advances and gets cooler and cooler, the air from outside being sucked in by the fan would materially reduce the temperature of the surface of the inner wall and floor and everything inside the house. If, upon rising in the morning, all the windows and outside doors are again closed and kept closed, as far as possible,

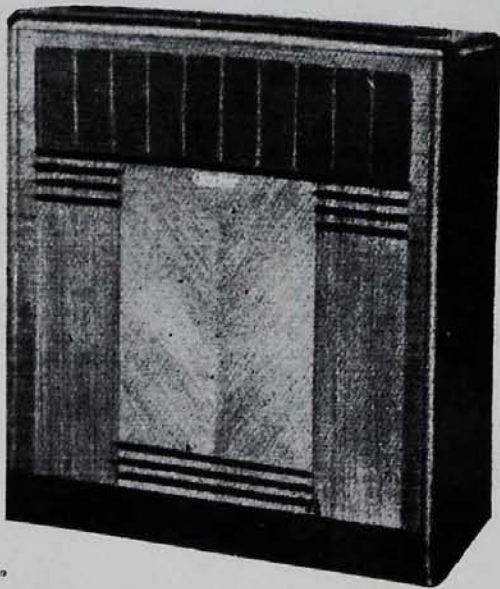
during the whole day, it would be a long time before they absorb heat again. In this way throughout the day also, the inside air of the house would remain cool and comfortable, and thus our object would be attained.

It would be sufficient if the fan is operated only for a few hours, say till the mid-night and then closed. If electricity is available it would be the easiest thing, if not, it is possible to work it even by manual labour if some suitable gearing is introduced. We normally employ a punkha-puller just to cause a movement of air in a single room. Here, the entire house could be cooled in a much more efficient manner, and possibly within the same expense.

Another slightly more expensive but equally simple method is to cool the air in a closed room by evaporating water—say, by exposing a continually wetted cloth-surface to a revolving fan and then to dehumidify the air by utilising some chemical such as lithium chloride etc. which possesses the property of absorbing moisture.

As to the methods of systematic air-conditioning under proper controls, they are many. They can however, be classified into two divisions : (1) The *central system* and (2) The *unit system*. The principles involved in either are the same viz : (a) sucking the air through filtering media, (b) cooling (or heating) it, (c) dehumidifying if it is to be cooled (or humidifying if it is to be heated), (d) forcing it into the rooms for proper circulation through grilles and finally (e) collecting the used air through exhaust to be mixed with some outside fresh air also and sucked again through the filtering medium, thus completing the cycle.

The only difference between the two systems is that where as, in the central system, (1) the different operations are performed at different places and only the conditioned air is supplied to rooms through regularly constructed concealed ducts mostly at the ceiling level, in the unit system ; (2) special, portable, attractive cabinets of a design to fit in with the decoration of a modern room, called “room-coolers” are placed inside the room. They are self-contained in every respect except, perhaps, in some cases the condensing unit (an electric motor or an engine and a compressor) is placed some-where away in a



REAL AIR-CONDITIONING IS

- **COOLING**
To comfortable indoor conditions regardless of outdoor temperatures.
- **HUMIDIFICATION**
Removal of excess moisture from humid outside air.
- **PURIFICATION**
Filtering of dust, dirt, insects, and other foreign matter from the air.
- **VENTILATION**
Supplying pure fresh air to room interiors.
- **DISTRIBUTION**
Uniform supply of conditioned air without drafts.

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Room
Air Conditioner

For
Health and Comfort
In
Homes and Offices

All these benefits are yours in the self-contained **Carrier Air Conditioner** developed especially for climatic conditions in India. It is intended for single rooms without structural alterations.

Low in Cost and Economical to Operate.

For large rooms or groups of rooms, self-contained **Air Conditioners** of various sizes are available.

We would be pleased to supply full particulars upon request.

VOLKART BROTHERS

Bombay - Calcutta - Madras - Lahore - Karachi - Cochin



"COLORCRETE"
for
GARDEN PATHS

Paths of
crete made
sections of
ous colour

Individual
tural effects
be produced
hand after
concrete is

SUGGESTIONS FOR
PERMANENT IMPROVEMENTS WITH
COLOURED CEMENTS
IN AND AROUND THE HOME

HOUSE

The exterior may be rendered with "Snowcrete" or "Colorcrete" and suitable aggregate; or alternatively, it may be faced with "Stipplecrete." The interior walls may be treated similarly whilst the floors can be of coloured concrete laid either in-situ or in the form of tiles.

GARDEN

"Colorcrete" can be used for the paths, for lining swimming pools or lily ponds, for step, verandah floor, dwarf walls, pergolas, fence posts, etc.

GARAGE

A concrete garage is fire-proof, and, when faced with "Stipplecrete," an artistic adjunct to the house. A concrete drive made with rapid-hardening "Colorcrete" in buff or red is distinctive as well as being one hundred per cent efficient.

TENNIS COURT

A concrete tennis court made with rapid-hardening "Colorcrete" needs no attention, is free from glare and playable in all weathers.

The above are but a few of the many uses for coloured concrete. Every permanent structure can be enhanced in appearance by using

"SNOWCRETE"

"COLORCRETE"

"STIPPLECRETE"

Agents for Western India:—

KILLICK, NIXON & CO.

Home Street, Fort Bombay.

COLOURED CONCRETE

By the use of white or coloured cements every building can be made permanently decorative; not only the structures themselves but also the approaches, surrounds, paths—in fact every constructional item

COLOURED CONCRETE IS PRODUCED BY THE USE OF

"SNOWCRETE"
WHITE PORTLAND CEMENT

"Snowcrete" complies in every respect with the requirement of the British and all the leading Standard Specifications.

**"COLORCRETE" COLOURED
PORTLAND CEMENT,**

Supplied in a range of delicate shades. Since only a thin facing is required the cost of the coloured finish is low.

**"COLORCRETE" COLOURED
PORTLAND CEMENT, RAPID-
HARDENING**

In two shades—buff and red. This coloured cement is sold at a price which enables it to be used economically throughout the total thickness of concrete units such as slabs, blocks, etc.

"SIPPLECRETE"

This is a special mixture of coloured cement and aggregate so graded and proportioned that it can be applied as a thin facing by brush or trowel. Suitable for interiors or exteriors. Available in white and a range of colours.



"SNOWCRETE" AND "COLOCRETE" FOR DOMESTIC ARCHITECTURE.
House faced with "Snowcrete". Roof of concrete tiles. Approach and garden paths of coloured Portland cement concrete resembling natural stones.

**24 YEARS OF
MANUFACTURING
EXPERIENCE**

CEMENT

carries with it
C.A.I. FREE
TECHNICAL SERVICE

cellar or a closet and a pipe carrying either a refrigerant or refrigerated water is connected from it to the "room-cooler". In both the systems, the temperature is controlled automatically by means of a thermostat and humidity by means of a humidistat.

Figures 18 to 20 show diagrammatically the two systems of air-conditioning.

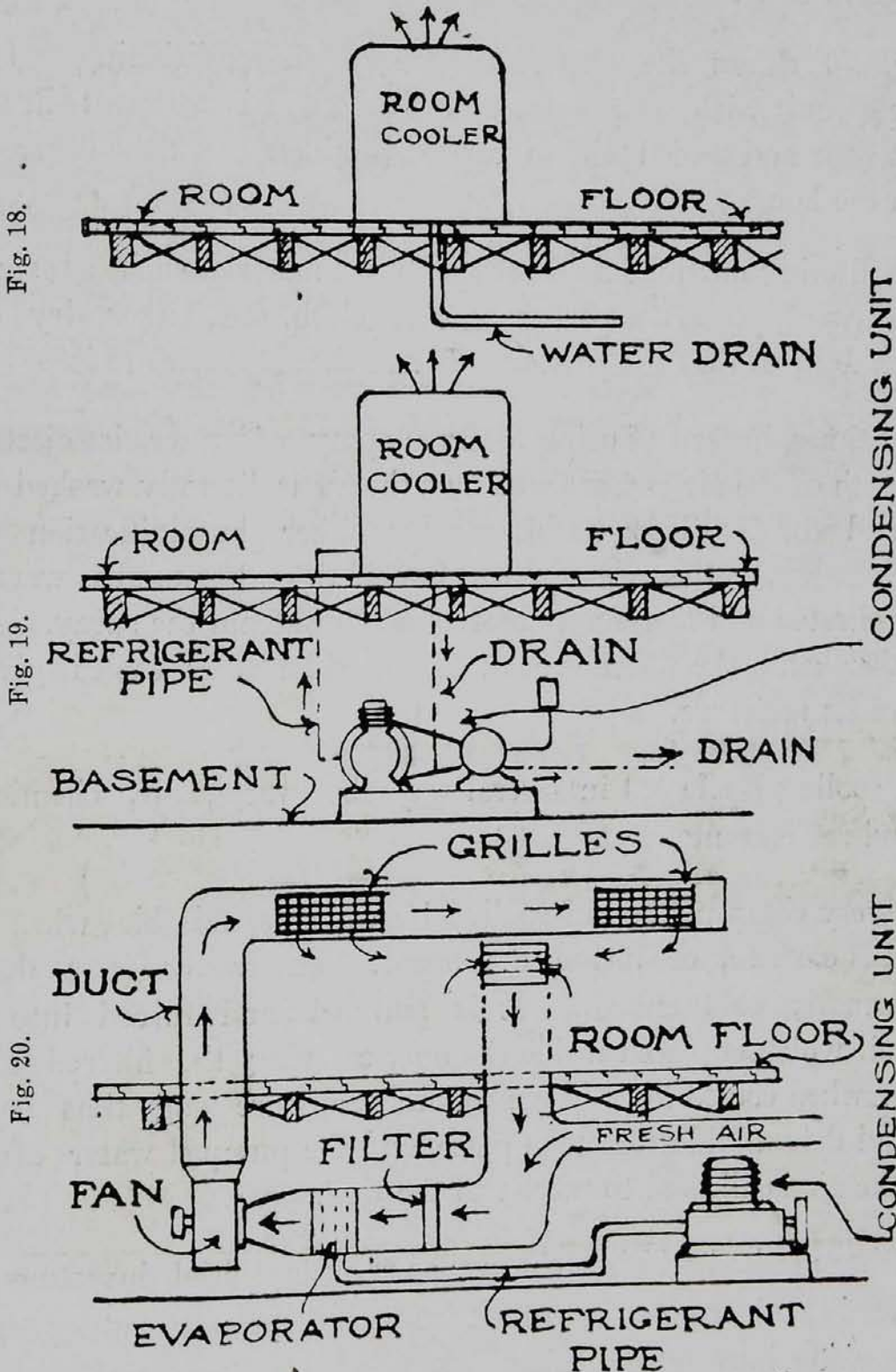


Fig. 18 shows a "room cooler" self-contained in every respect placed on the room floor. There is a pipe under the floor to drain off water from the room cooler.

In fig. 19 the "room cooler" is not self-contained. Its condensing unit viz. an electric motor or engine, and a compressor are some where away on the basement floor, and a refrigerent and drain pipes are connected to it.

Fig. 20 shows the central system of air-conditioning. The condensing unit with evaporator and fan are all stationed in the basement floor and cooled air is carried by ducts to all the different rooms in the house.

The filtering medium used is any fibrous material such as spun glass, steel wool, porous paper, wood-fibre, cloth, etc., either dry or wetted with oil, so that the particles of dust should adhere to it.

Sometimes, instead of using filters a spray of water is ejected into the path of the air current and thus the air is literally washed of all dirt and dust. This washing helps either humidification or dehumidification, as the case may be. For, if the water used is warm, the air is heated and therefore, absorbs moisture from the spray. If, on the other hand, the water is cold, the air while being cooled gives up part of its moisture.

The cooling is effected in several ways—by water, air, chemical sprays and refrigerants, etc.

One very cheap method of cooling by water is suitable when a deep well is close to, or inside the house. The water of a deep well is usually cold enough. It is pumped and forced into a cooling coil which is placed inside the duct carrying the filtered air. The latter when cooled loses some of its moisture and thus both cooling and dehumidification take place, and the pumped water after it cools the air is allowed to return to the well.

Another method which is cheaper as regards initial investment, but costlier in maintenance is to melt ice with a spray of water and pump the water into cooling coils.

By far the commonest method is to cool the air by means of one of the refrigerants, such as methyl chloride, freon, etc. In large-scale air-conditioning plants, the power unit (an electric motor or oil engine or steam engine and a compressor) are installed in the basement as in fig. 20 and either the compressed refrigerant itself is pumped into coils for cooling the air directly or water is cooled by allowing the refrigerant to evaporate, and then pumped into coils. In the self-contained "room coolers" a small electric motor does all this inside the cabinet.

For winter air-conditioning, instead of a refrigerant or cooled water, steam or hot air is introduced into the ducts by means of separate heating coils.

As regards the choice of the type of the system, the central system is economical in the long run in operating costs, provided the whole house is to be air-conditioned and also provided that the structure allows the installation of ducts without expensive alterations. The height of the ceiling must be pretty high ; the walls must admit of the ducts being carried through. In the case of new buildings all this could be provided for at the time of construction. The unit system with "room coolers" is very useful for air-conditioning individual rooms.

There has been recently introduced in the market by Messrs. Volkart Brothers a unit which is a true air-conditioner and is so ingeniously designed that the moisture condensed from the cooling coils is vaporised and ejected from the machine to the outside automatically. Hence, no drain pipes etc. are necessary ; only an air duct to the outside is sufficient.

Sound-proofing for Privacy.

The modern practice is to built only the outer walls thick enough to resist heat and also afford a protection from burglars, and to build all the inner walls as partitions of a thin section. This effects economy both of space and money. But possesses two disadvantages, viz : (i) that no wall cupboards can be provided and (ii) that sound is likely to be transmitted from one room to the other across the thin partitions unless they are made sound-proof by some special means. In fact the first is not a disadvantage as is commonly supposed. Because, closets with thin walls as described on page 62, which are more efficient than wall cupboards, or even removable wardrobes could be easily provided. • Both these occupy less space and can be made at a considerably less expense than a solid wall built right from the foundations simply for the sake of wall cupboards as many people thoughtlessly do. However, the second disadvantage viz. that sound is likely to be transmitted through the thin partition, is real and must be remedied. Privacy in respect of sound is necessarily required in bed rooms, bath rooms, sanitary closets, study room and the prayer room, otherwise much of the pleasure, a home is expected to give, is lost.

The science of sound-proofing has made such great strides of late that it is possible to eliminate all the noise by means of even a thin partition. In the Radio City, in the Rockefeller Centre Building, New York, a brass band playing in one studio is absolutely unheard in another studio only ten feet away. This is, however, very expensive to accomplish. What is aimed at normally in a home is, not the complete elimination of sound, but reducing its intensity and making it unintelligible, and this can be done very easily at a small expense.

It is commonly known that sound causes vibrations at its source. These vibrations set up waves in the air and it is these waves which travel from one room to the other. Now these waves may pass directly from one room to the other through key holes, chinks and cracks in the door-openings even though the shutters might be closed

or they may strike the surface of the partition and set up vibrations in the particles of the material of the latter and might be reproduced at the opposite face. In the first case they pass unimpeded, so that the sound in the adjoining room is distinctly heard. In the second case much depends upon the material forming the partition. If it be soft and resilient, like cork, rubber etc., or of a spongy, loose, fibrous nature, the waves striking the material are damped and distorted and the result is that the sound reproduced on the opposite side is low and unintelligible.

The surface treatment of walls has a great effect on sound transmission, and it is, therefore, that a lining of felt or cork is used on the inside surface of walls in a wireless studio. But it is out of the question for homes as such a surface is bound to collect dust and be difficult to clean. The question, therefore, reduces itself to constructing a hollow partition and to filling the cavity with a loose material of a powdery, granular, or fibrous nature which is less resonant so that the sound waves may be materially damped before they reach the other surface of the partition. Here again, as in insulating against heat, material of a mineral origin is to be preferred to that of vegetable origin. The loose fill type of insulation, and to a certain extent the blanket type also described on page 112 would provide reasonable sound-proofing also. A hollow partition i. e. a partition with its cavity filled with air does not help sound-proofing.

To recapitulate, all key holes, chinks and crevices must be properly closed and cavities must be provided inside the partition walls and filled with some loose material and this would afford sufficient privacy in respect of sound ordinarily required in homes.

An Ideal Home

Specifications

- (1) *That it shall provide excellent facilities for cooking, dining, sleeping, rest, entertainment, toileting, children's activities, study, concentration and storage.*
- (2) *That it shall be built to endure—built in such a manner that Strength and Stability shall be reflected in every part of it.*
- (3) *That it shall shelter and protect the inmates from the elements, and afford them perfect health, ease, comfort and happiness as a combined result of excellent workmanship, faultless sanitation, proper orientation, necessary privacy, perfect flexibility and unobstructed circulation.*
- (4) *That it shall reflect the personality of the family in it, with the individuality of appearance impressed upon it.—A home plain, simple, unobtrusive; yet neat, tidy and sublime both in appearance and in quality.*
- (5) *That it shall suit the family's purse, and shall be capable of expanding as the family's demands and income both increase.*
- (6) *That it shall be a home, where the glory of Love, the joy of Happiness and the peace of Contentment shall reign forever. A home where little voices shall babble in the joy and innocence of babyhood, and grow to healthy childhood boisterous and noisy, then gradually to full blushing youth and in the process of evolution come to maturity and grey old age, finally in fulness of time to rest in eternal peace.*
- (7) *That it shall be the delight of children's children, the rallying-point or centre of the family, that shall attract its many members and hold them together, knitting generations, each to each—A home which shall forever remain the dearest spot on earth, not because of its cost, nor because of the richness of the materials and furnishings, but because of the happiness it has given, the storm and stress it has faced, the tears it has dried and the smiles it has raised.*

Introduction to Plans.

In presenting the plans in the following pages it is far from my intention that they should supplant the valuable and special services of architects. They are given rather to create an interest in the minds of laymen in the study and analysis of the plans and elevations of houses designed by architects and to enable them to appreciate what really constitutes the difference between good and bad planning. They are given with a further object of illustrating the many comprehensive new ideas suggested in the text in the foregoing pages, reference to which is frequently made in the notes on the plans.

They are, however, never meant to serve as "type" plans to be blindly adopted. No type plan, howsoever good, can ever satisfactorily fit the varying conditions, such as the aspect, prospect, location, orientation etc. A type plan is lifeless ; it lacks the personality, which every home, with its individual aspirations and sentiments, must necessarily possess. A house must fit the family as clothes do the wearer. It must also reflect the personality of the family as the dress reflects that of the wearer. Type plans are like ready made clothes and can not be accepted without a certain amount of compromise and sacrifice.

Although copious notes on constructional details are given on each plan nothing can be more strongly recommended than the advice of an architect or engineer before construction is started. For instance, there are a number of plans here, in which the walls on the upper floor are not supported by similar walls below them on the lower floor. This condition was deemed quite essential a few years ago but has now been more honoured in its breach than in observance, with the present-day new materials and methods of construction. If such a wall is to be built without a supporting wall below, it can be built hollow, of very light wall sheets (of which there is a large variety in the market), which would, not only occupy less space and be very light, but would also be reasonably heat-proof, sound-proof, fire-proof and secure against burglars. Another way to accomplish this is to give

a support to the wall in the form of an R. C. C. beam either exposed to view or concealed within the floor and to build the partition above it also of R. C. C. designed to make it support its own weight, either partially or wholly.

Reinforced concrete is a very simple, but at the same time a most dangerous material to handle on the part of the layman. A wooden or even a steel beam if wrongly designed or wrongly laid in position might bend and form an ugly sag, or might crack, and even, if it collapses, it would give an ample warning beforehand. But if the steel reinforcement of an R. C. C. beam is bent in a manner reverse of what is properly required, it would suddenly collapse as soon as the centering is removed. In the hands of a qualified person, however, and with the spread of the technical knowledge, this thing is of very rare occurrence at present. This is mentioned by the way as a warning to the lay enthusiast.

Though a few plans of flats or tenement houses have been given, attention is mainly concentrated on the planning of cottages suitable for the middle class. A few photographs of cottages actually built are purposely given as they are likely to convey a better idea to the layman than either flat or perspective elevations.

Mention has already been made while introducing the book, about the costs quoted. They must necessarily vary, not only from province to province or district to district, or town to town in the same district according to the kind, quality and rates of materials and labour, but also at the same place according to the fluctuation of rates of materials and labour from time to time. They will, however, be useful to give a rough idea of the cost, at least for the comparison of one plan with another.

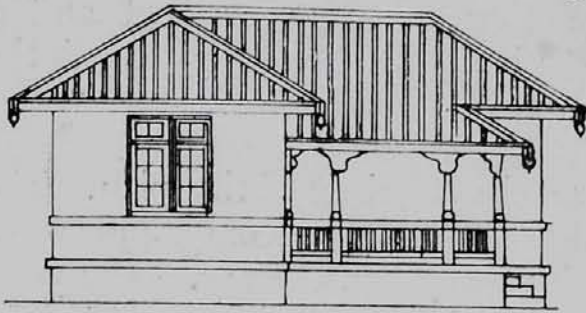
It is assumed that the site is level, that firm foundations are available within a depth of 3 ft. below the ground level and that every other condition is normal. The costs do not include the cost of site, fencing, electrical fittings and out-buildings.

Plinth Area
1024 sq. feet.

Plan No. 1.

Cost Rs. 3500.

This is a plan of a cozy cottage, simple in design, self-contained



FRONT ELEVATION

Scale. 16"=1'

Fig. 18

in every respect, and neat and attractive in appearance. The left hand portion projects about a foot beyond the verandah just for the sake of an artistic effect. Similarly the verandah is also made 3 ft. short in length, which has made the roof look more alluring.

Although the design is of a conventional type and the cottage is small it provides all the amenities of a large house. It possesses the best of light and ventilation. The sizes of all the rooms are not bad for a typical small cottage like this. Every room has got a separate entrance and the bath room and W. C. are independently accessible from every room. The latter is of a cess pool type suitable for the suburban area. The refuse, both solid and liquid, is allowed to deposit in a small pit with an air tight cover, from which it is daily removed and

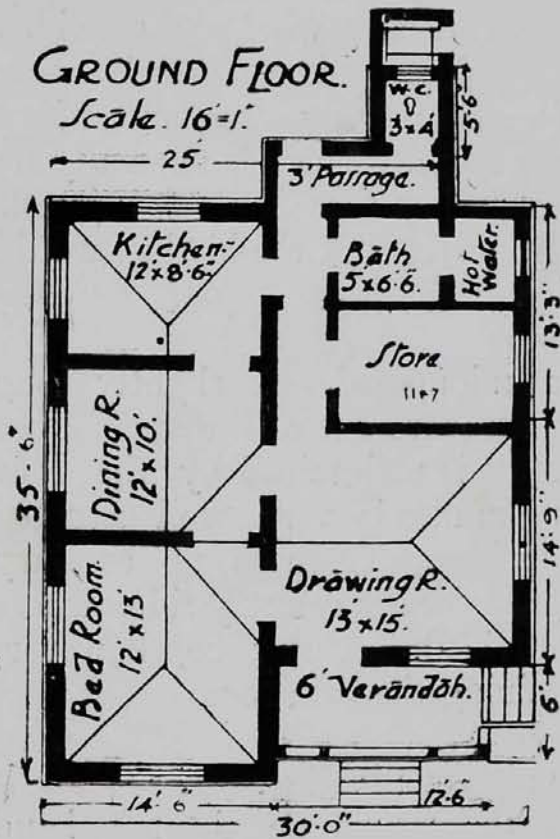


Fig. 19

carted away. It is for this reason that it is separated by a three feet lobby, from the main building as required by the Municipal Bye-laws, Bombay. The roof is very simple and yet attractive. There is a terrace on the top of the store room and bath room. The outer walls are of brick in lime 14 inches thick plastered also on the outside, and coloured cream and the inner ones are either $4\frac{1}{2}$ inches or nine inches thick.

Plinth area] **Plan No. 2.** [Cost Rs. 3680
1068 sq. feet.

This is another plan taken from the writer's Residential Buildings suited to India. It has been very much appreciated and a number of cottages have already been built in various parts of the country according to it.

There are several special features characteristic of this plan. The first thing is the small yard in front enclosed by a compound wall, which affords it a privacy from the high-way and by-way. The yard would serve an excellent place for an outdoor sitting room or a dining room caressed by the shade of an ever-green tree if planted on a side. The eight feet spacious verandah in front, open to the breeze from the South West is another attraction. If it be enclosed by a dwarf wall about three feet high and glazed windows provided above it, it would even prove a better place for rest and relaxation than the drawing room. The kitchen is unusually large for such a small cottage with a separate large store room. There is normally no necessity of a separate dining room, except when there are a few guests at home. In the latter case the bed room in front of the kitchen would provide a space for dining temporarily.

The bed rooms though small are elongated. A slightly long and narrow room is more useful than a square one of the same floor area. The privacy of both the bed rooms is maintained by the four feet passage in front. The drawing room also is very well situated with light and ventilation from three sides. There is no sanitary closet shown in the plan, as it is designed for the country-side, where there is no water carriage system provided. It may be, however, conveniently located, just outside, adjoining the bath room.

The roof is very simple with only one valley. The plan is designed to face the South, so that all the rooms on the left hand side including the verandah get the benefit of the breeze. The kitchen being in the N. E. corner, would be made cheerful by the morning sun and remain cool throughout the day and night and the kitchen smokes and smell, if any, would be carried away. With the kitchen in this position the lady working there would very easily keep an eye on strangers entering the compound.

The outer walls are of stone in lime mortar 18 inches thick and the inner ones of brick $4\frac{1}{2}$ inches thick reinforced with hoop iron in cement mortar in every 5th layer.

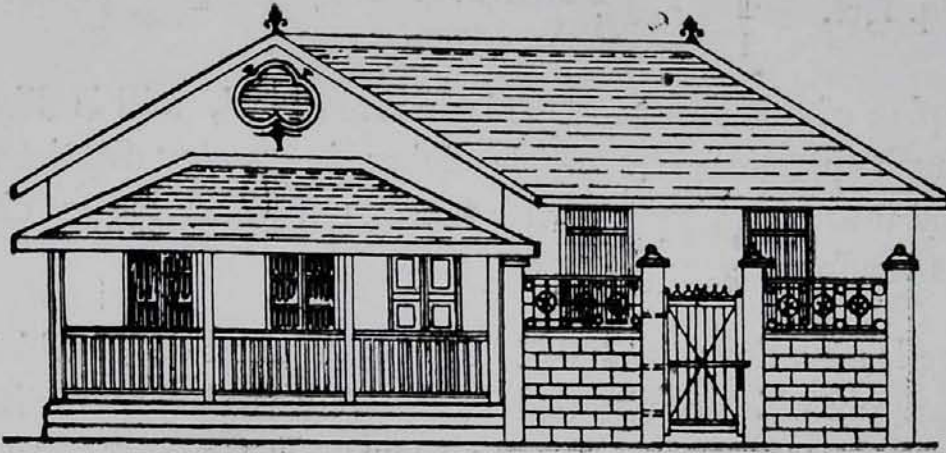
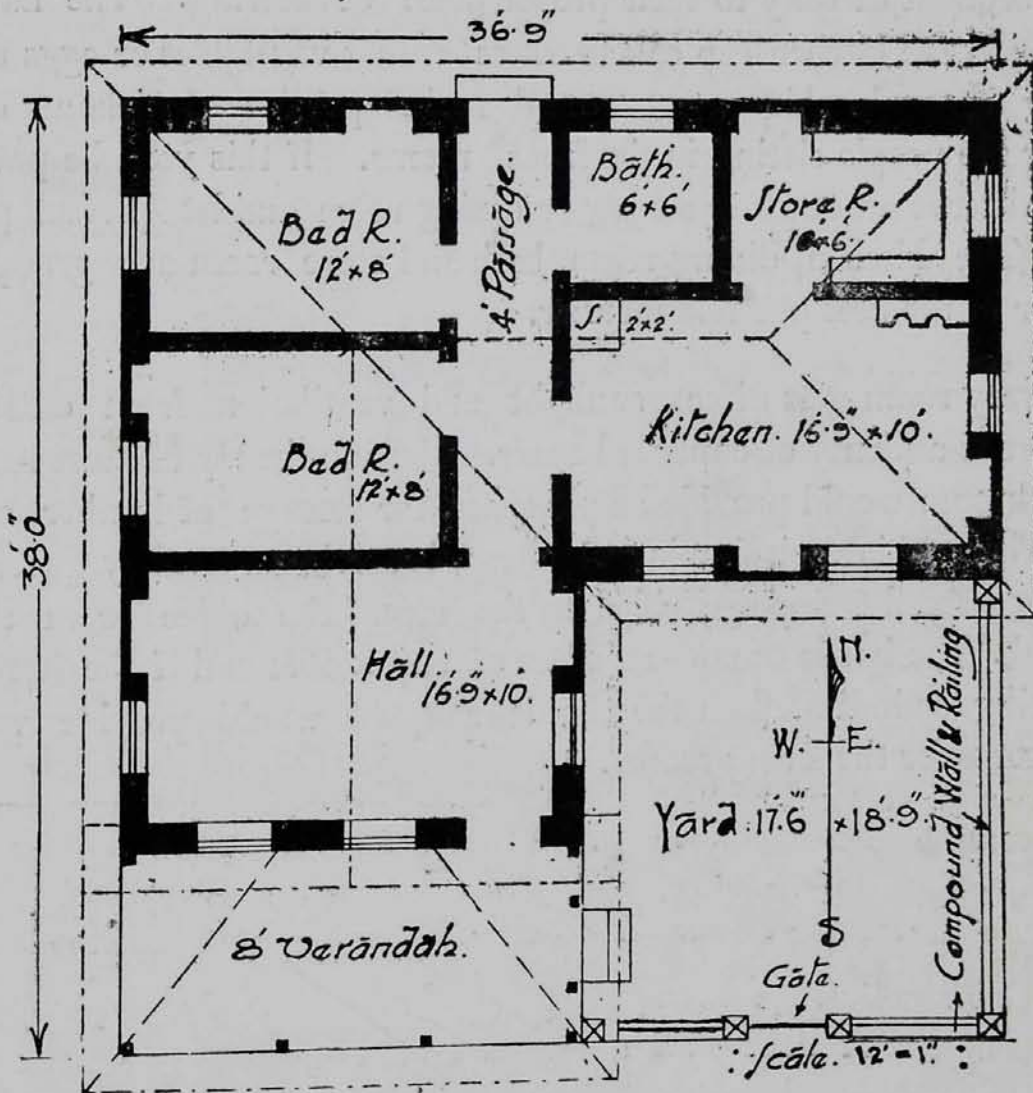


Fig. 20



: GROUND FLOOR PLAN. :

Fig. 21

Plinth Area
1145 Sq. feet.

]

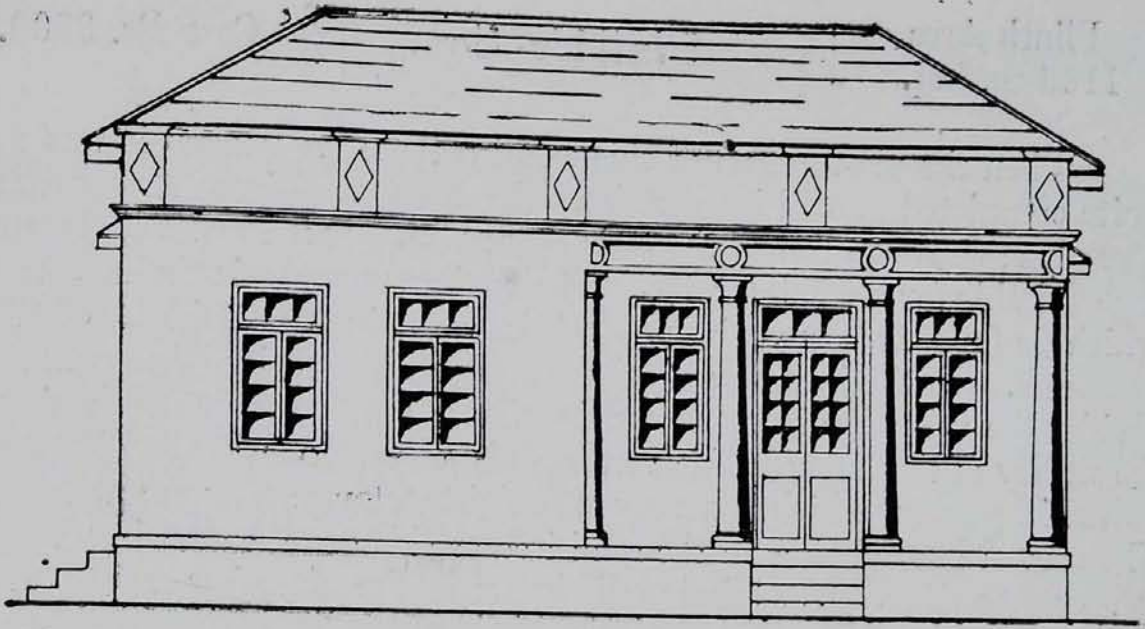
Plan No. 3.

[Cost Rs. 3750.

The plan of this small cottage is conventional, still is likely to be very much appreciated by people living in country districts. It is sure to find favour particularly with families in which ladies observe *purdah*, as it affords more privacy.

There is a spacious verandah in front, on one side of which is a small office room which can be used alternatively as a bed room. Behind these are a bed room and a drawing room. The special feature of the plan is the small open yard with a separate entrance to it from outside. In fact it is this open yard and the back entrance which afford the house so much privacy. Fuel and provisions purchased in the market can be brought directly to their proper place of storing. The ladies working in the kitchen can call hawkers selling vegetables or eggs etc. directly through this entrance and make purchases without disturbing the people sitting in the front rooms. If this yard be paved it would serve an outdoor sitting or dining room amidst perfect privacy. The kitchen, dining room, bath and store room are grouped together in the best possible manner.

Every room gets direct sunlight and ventilation from outside and there is a plenty of cupboard space. A loft on the top of store room and bathroom would provide ample space for storage of lumber and fuel. The roof is very simple and cheap, involving no valley gutters. There is a small terrace provided on the top of the office room and verandah. The house occupies a space of 29ft × 40ft and if the North-east facing as indicated on the plan is adopted would provide very good breeze for the living rooms.



— FRONT ELEVATION —

SCALE IN FEET—

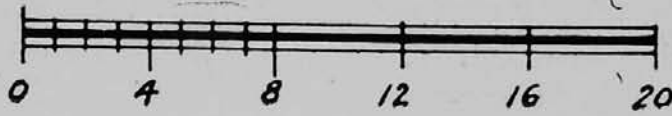


Fig. 22

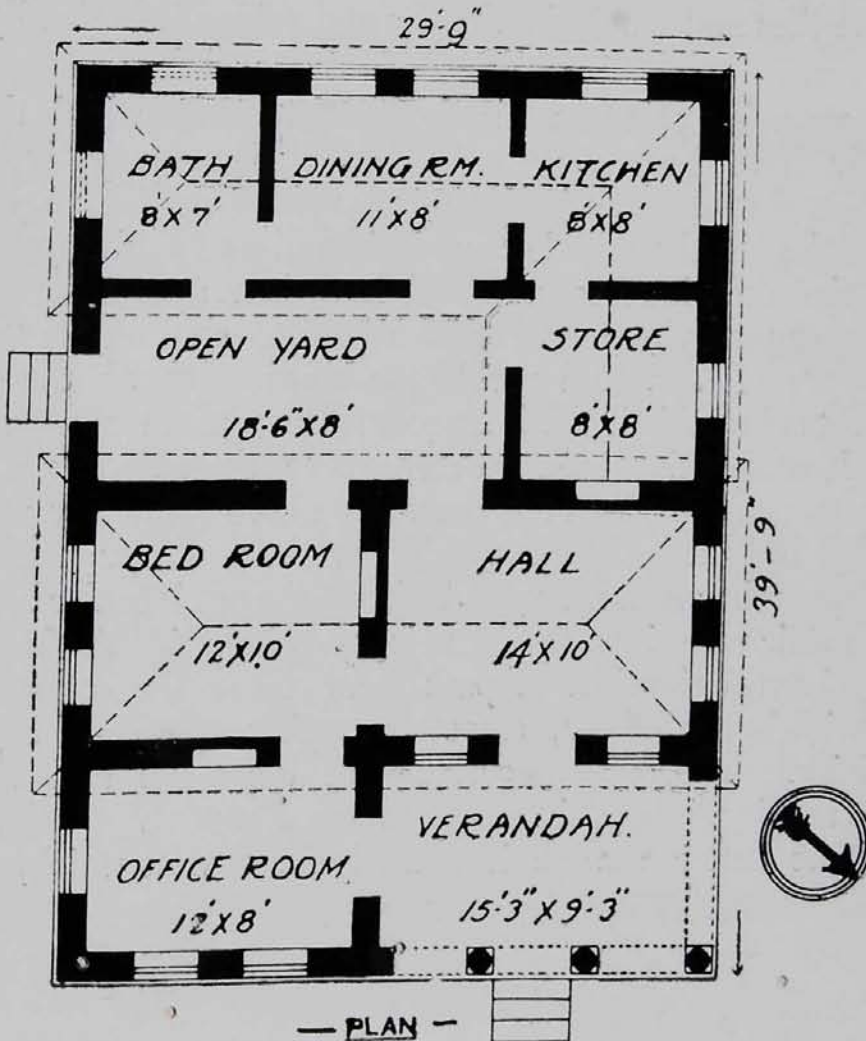


Fig. 23

Plinth Area
1166 sq. feet.

Plan No. 4.

Cost Rs. 3900.

When the photograph of this small cottage was taken it was not quite completed as will be seen from the corrugated iron sheets temporarily spread on top of the stair case room. It is a nice little cottage suitable for a small family. The main entrance is in a corner which is far more convenient than if it were in the middle of the verandah. In the latter case, the passage defined by the entrance divides the verandah into two portions, and detracts very much from the utility of the latter. The verandah is eleven ft. wide and leads to a drawing room, which is a very well lighted, long and narrow room. The curved bay window in the semicircular side of the drawing room is very attractive. The blind wall between the drawing room and kitchen would effectually exclude kitchen smells. The kitchen is sufficiently spacious. The size of the bed room is quite adequate in the general scale of the small cottage. The small twin windows combined with the door in the bed room opening into the verandah are worth noting. They provide better light, ventilation, and effect a considerable saving in wood. The wide verandah on the rear side would provide ample space for certain necessary activities of the ladies outside the kitchen but inside the home. The stair case on the left hand side is for giving access to the terrace. The latter is paved with mosaic tiles and would be the joy and pride of the family.

There are a few common mistakes made, but for which the cottage would really have been very enjoyable. They are firstly, the door opening from the verandah into the bed room should have been in a corner instead of in the middle, for considerations of privacy; the corner adjoining the drawing room would have been appropriate for this. Secondly, after purifying oneself with a bath to step on the "defiled" entrance to the w. c. would revolt the sentiments of the orthodox people. Instead of this if the bath room were made square and the w. c. were located inside it in the corner near the edge of the verandah with an entrance facing the stair case, the above difficulty would have been avoided and the bathroom would have been larger without even encroaching on the verandah space. Thirdly, the semicircular bay window to light the stair case is wasted. If it had been in the bed room it would have been enjoyable. Apart from these the cottage is very attractive with bay windows, smooth sweeping curves of the chhajjah and simplicity. The outside surface of the walls and also of the compound wall is plastered in cream coloured cement. A South facing would suit it better though it actually faces west which, again, is wrong.

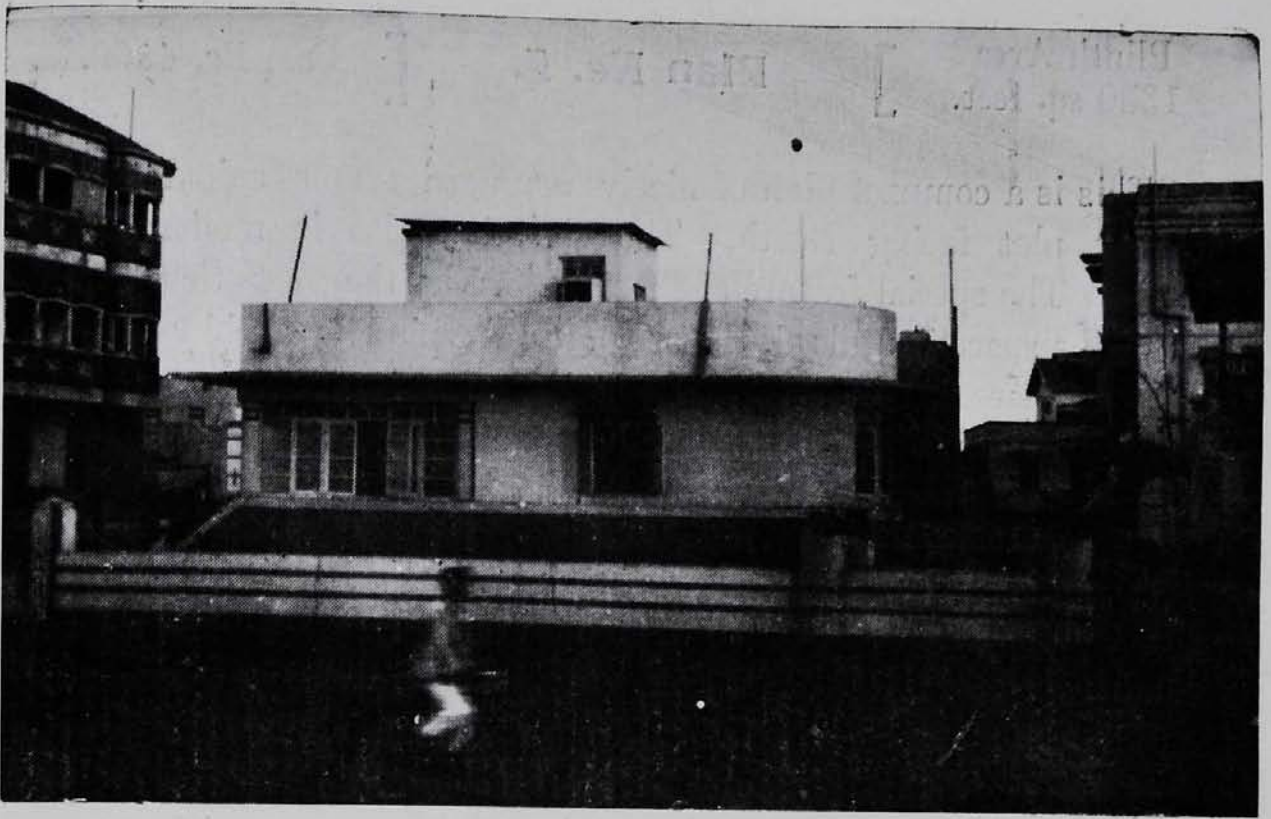


Fig. 24

- GROUND PLAN -

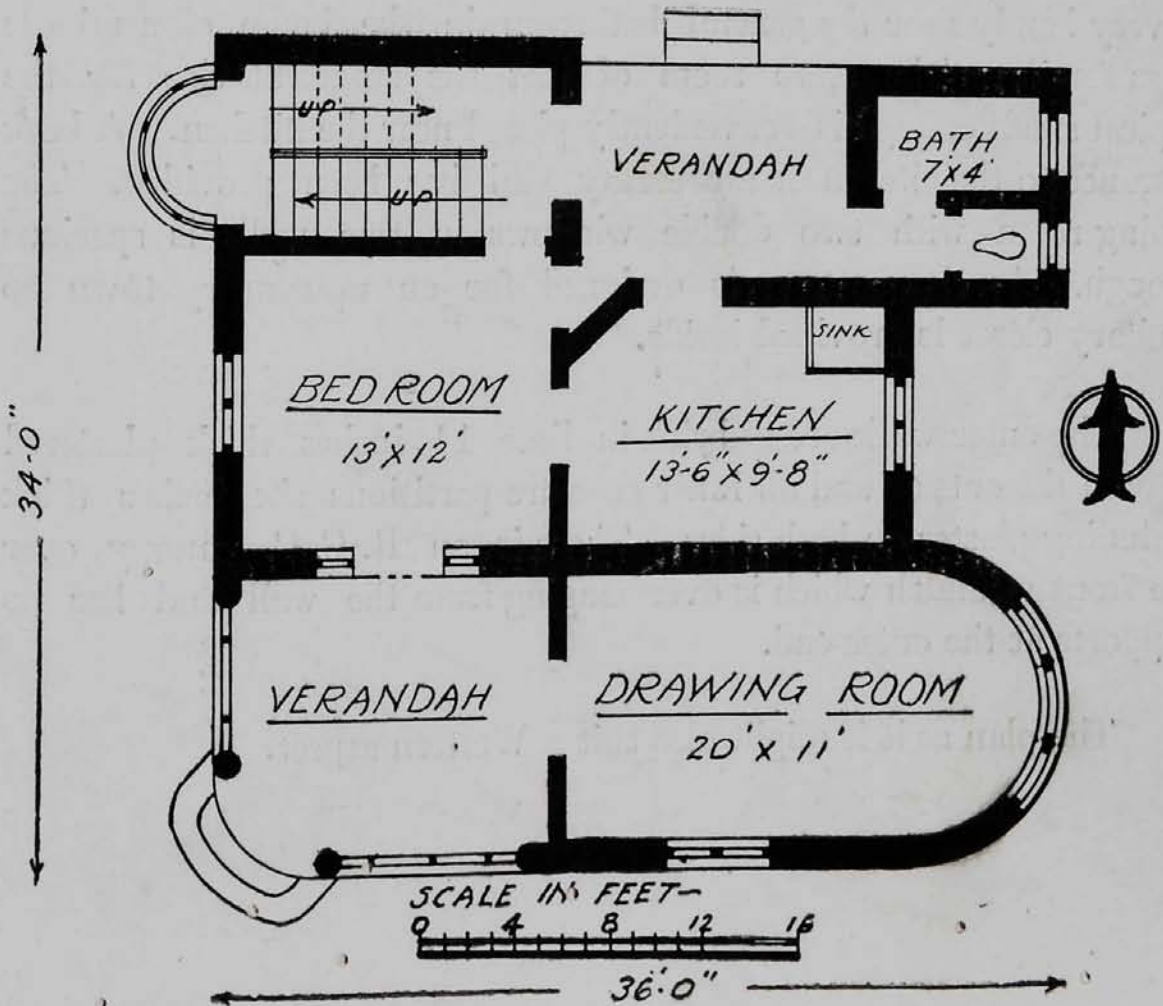


Fig. 25

Plinth Area
1380 sq. feet.

Plan No. 5.

Cost Rs. 4500.

This is a compact plan of nicely arranged rooms suited for a building plot facing North. The elevation also is modern and artistic. The special feature of the plan lies in the fact that every inch of the space is utilised, the only area occupied by a lobby is that of a few square feet in front of the bathroom and yet every room is independently approachable. The bathroom is so situated that it can be reached independently from any room.

There is a small verandah in front ; if funds permit it may be made 7' 6'' wide at least so that it would function better as a verandah for all its legitimate uses. It would be well if an access to the dining room could be provided from the verandah by the provision of a door just in front of the entrance steps. The drawing hall of 12' x 17' is indeed a luxury for such a small cottage. There are three bed rooms including the ladies' room, all of adequate sizes. There are clothes closets of ample size provided in two bed rooms, and one extra near the bathroom in the lobby. A closet for keeping clothes of daily homewear, after they are washed and dried every day is very handy near the general bathroom in the home of a middle class family. The store room of just the sufficient size for the typical small cottage is conveniently placed near the kitchen. A back entrance to the kitchen is a necessity and has been provided. The dining room with two double windows in two walls is spacious enough. As the cottage is designed for an up-country town no sanitary closet is provided inside.

The outer walls are of brick in lime 14 inches thick plastered also on the outside and all inner ones are partitions six inches thick including plaster on both sides. There is an R. C. C. canopy over the front verandah which is over-hanging from the wall and has no supports at the outer end.

The plan as it is might also suit a Western aspect.

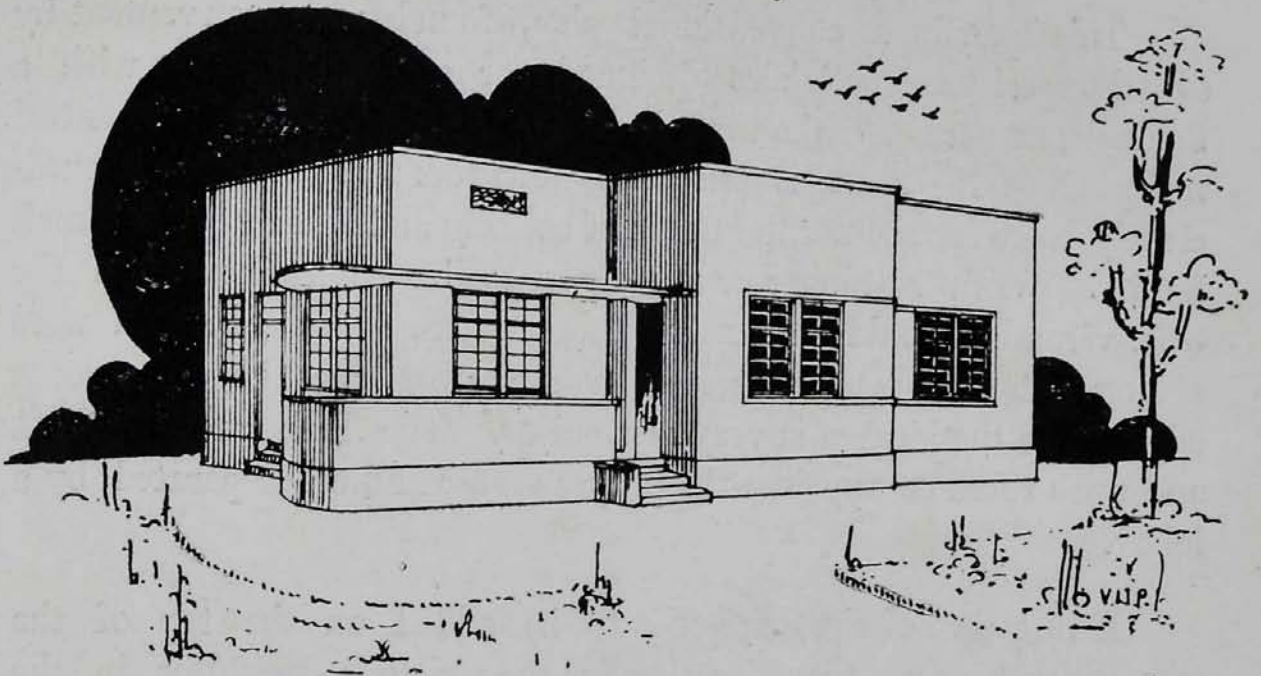


Fig. 26

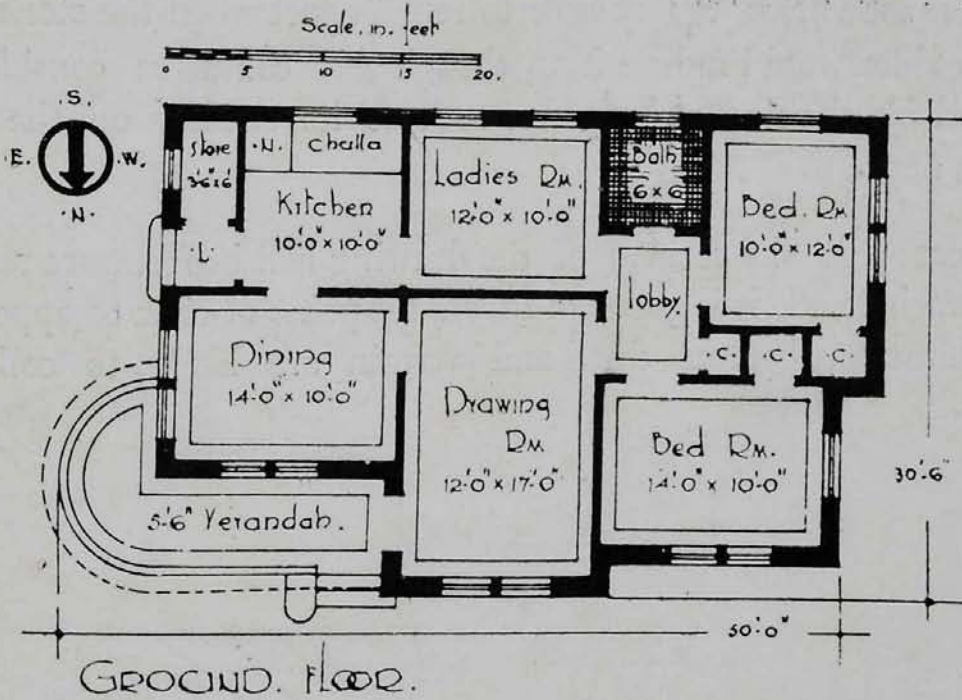


Fig. 27

Plinth Area
1550 sq. feet.



Plan No. 6



Cost Rs. 5650.

This is again a conventional plan, found very convenient by actual experience. It is also designed for a building plot with a Southern aspect. All the three bed rooms are 12' × 10'. The central main hall of 19' × 12' is quite a spacious room. The kitchen is sufficiently large for the normal needs of cooking and dining of a small family. When a stranger or a guest is to be entertained then the 8 ft. verandah would serve as a dining room. If the kitchen were oblong instead of square it would have been better. The store room adjacent to the kitchen is very convenient. The bath room, W. C. and wash room occupy just the proper corner and are separated by a lobby.

If in course of time a floor is to be added on the top of the ground floor a convenient location for the stair case would be in the verandah between the two bed rooms on the West side. Thus the cottage is very convenient for a middle class family. The only defects in the plan are that there is no verandah on the front side and that the space of the back yard between the kitchen and bed room where *Tulsi* plant is shown, is too narrow to remain cool when the stone walls on both sides would radiate heat, though this could be considerably remedied by planting a shady tree to cast its shadow on the walls and the floor.

Note that the corners of the drawing hall in front are rounded by a semicircle. This is good both from the point of view of appearance and sanitation, because dust and vermin are likely to collect in corners.



FRONT ELEVATION.
Scale. 16'-1"

Fig. 28

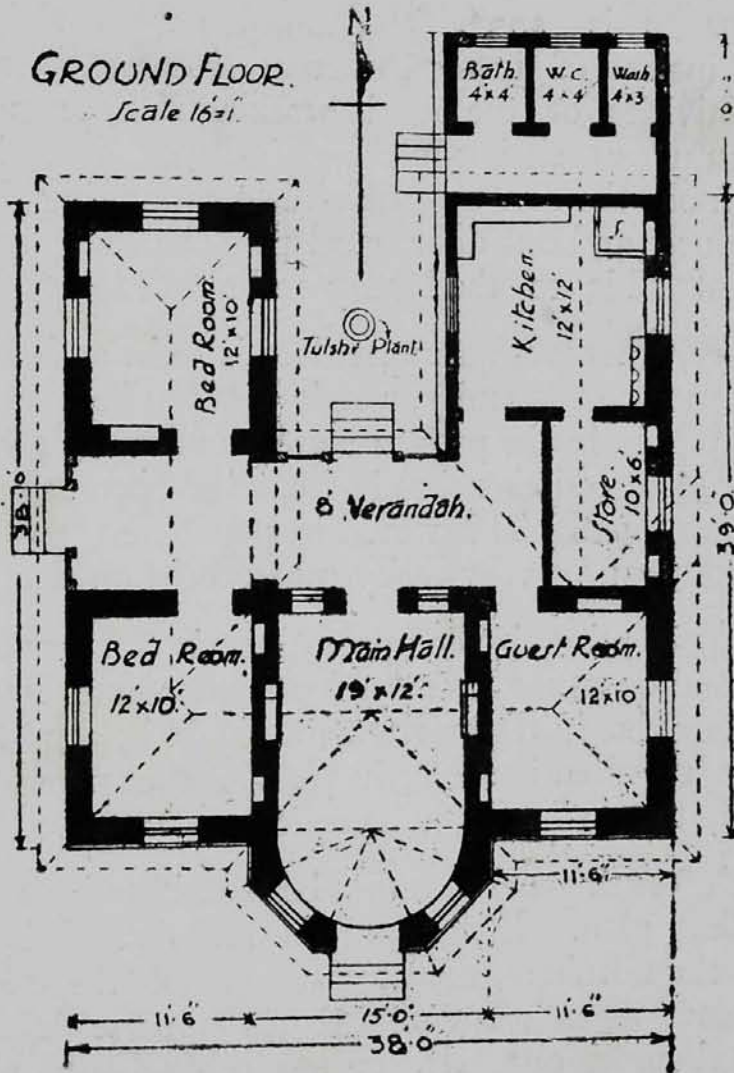


Fig. 29

Plinth Area] **Plan No. 7.** [Cost Rs. 5700.
1550 Sq. feet.

The plan of this snug, little home is found very comfortable by actual experience. The verandah in front is seven feet wide and on the right hand side of it is a drawing room, though strictly speaking it would be more convenient as a bed room as there is a large room behind the verandah to serve as a drawing room. The verandah is cut short on the left hand side by about three feet just to obtain an artistic effect in the elevation of the roof. There is another bed room on the right hand side of the drawing room, of sufficient size. The small room behind it, would properly serve as a bath room and the bath room shown in the corner as a kitchen. If this is done the kitchen room shown on the plan would be available as a third bed room. There is a store room of sufficiently large size, placed at a convenient place. The door opening in to the dining room is specially arranged on the right hand side of the lobby instead of in the corner in front of the store room to screen the activities of the people working in the rear rooms from the gaze of strangers sitting in the main hall. There is a spacious work verandah on the rear side which is a connecting link between the indoor house and out door garden. The half hexagonal bay window in front adds to the beauty and attraction of the home.

In future, whenever an upper floor is to be added to meet the demands of the extended family, a stair case can be very conveniently placed in two flights in the present store room and the room beyond it in the corner named kitchen, but in fact a bed room, can be converted into a large store room. This would be possible as any number to rooms up to four can be very easily constructed on the upper floor.

In the alternative if the upper floor is constructed just like the lower one and be treated as an independent flat to let, a stair case in the same place viz. in the store room would be convenient. What more would be required is a door in place of the present window in the store room, to serve as an independent entrance to the upper flat.

All such contingencies must be considered at the time of fixing up the first plan. If the family's income also increases with the increase in the members, the way to extend the house without necessitating heavy dismantling of part of the house already constructed, should be thought out. If, on the other hand, unfortunately the family need to add to their income by letting part of the house in future, this contingency also must not escape consideration.



Fig. 30

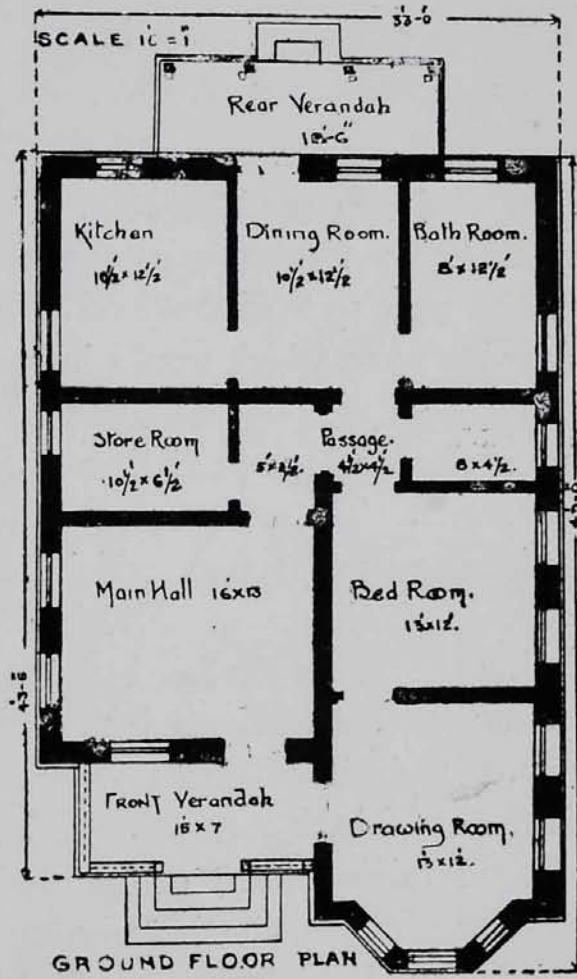


Fig. 31

Plinth Area
1585 sq. feet.

]

Plan No. 8.

[

Cost Rs. 6000.

This is a modern design planned for economy, beauty and comfort, most suitable for a corner plot facing North or North-west. It comprises three bed rooms including the office room, a drawing room, kitchen, dining and store room, a verandah and two bath rooms, and thus provides all the necessary accommodation demanded by a middle class family of five or six members. The building would look well if erected on an elevation such as a small hill top commanding the view of the surrounding country.

Just at the main entrance there are curved flower boxes on either side. These are made of concrete with two or three small pipes near the bottom for drainage and aeration of the roots of the plants. Ascending the flight of entrance steps one reaches a curved spacious verandah which adds to the beauty of the elevation. Behind it is a large sized drawing room which would indeed prove a luxury. There is a general bath room 9' x 6' centrally situated. The kitchen and the dining room are both of adequate sizes and grouped together in the best possible manner. The store room is a little away and separated by the back entrance passage, which is done at a little sacrifice of convenience to obtain a symmetrical effect. However, the inconvenience is trifling. There is another bath room attached to the bed rooms for a common use. A private bath room attached to a bed room is a luxury, though it is gradually becoming a modern necessity. There is the usual back entrance. There are two clothes closets provided. The special feature of the design is the corner windows provided in the office and the front bed room. If the sills of such windows are made low and seats are provided on them they are very enjoyable to sit in comfort and look at the fresh flowers and foliage in the garden. The elevation is very attractive though quite simple both in concept and construction. The cottage would be also very suitable as a sea-side resort facing the sea.

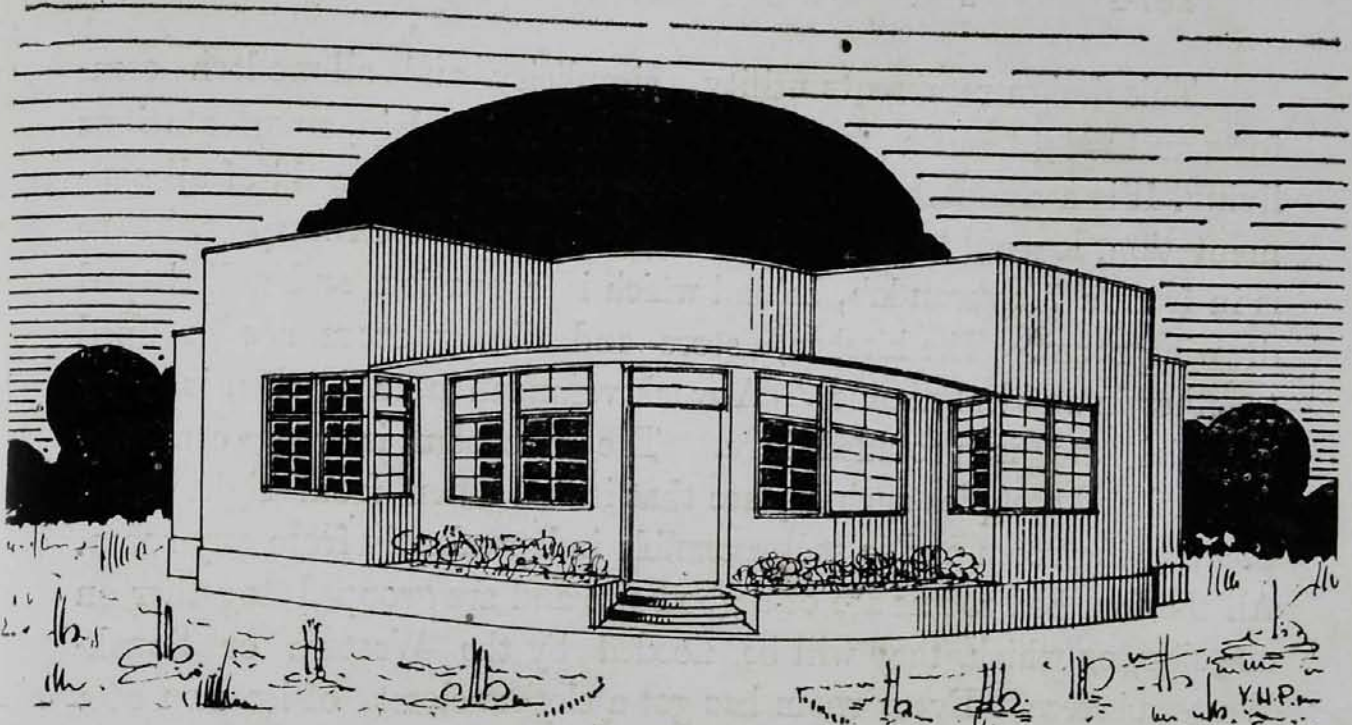


Fig. 32

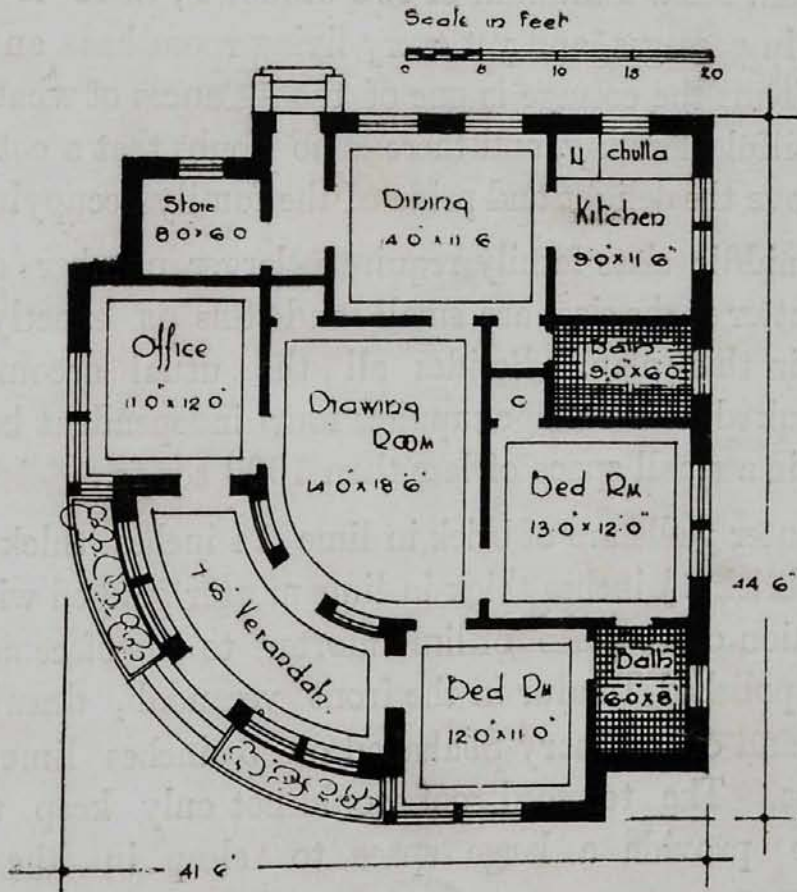


Fig. 33

Plinth Area
1874]

Plan No. 9.

[Cost Rs. 6750.

This design represents utility, simplicity and all modern comforts and would suit a family whose motto is plain, unostentatious living. It is a compact plan with square corners and devoid of all ornamentation. It would suit a North, North-west, or Western aspect. There is in front a 7ft verandah, behind which is a spacious and well-shaped drawing room. The kitchen, store and dining room are grouped together in an ideal manner. A work verandah near kitchen is very essential and is provided here. The bathroom is very centrally situated and occupies such a place that it is hidden from sight from the drawing room and is still accessible independently from any room. All the four bed rooms are of a good size and are grouped together on one side, on which, they will be flooded by the Western or South-Western breeze. Every room has got a clothes closet of its own of a spacious size. The closets are so arranged that they form hollow walls separating one bed room from another and thus preserve the privacy in respect of sound of every bed room.

Every room has a minimum of two windows ; there is very little space wasted in passages and yet every living room has an independent access. Thus the cottage is one of the instances of what could be achieved by skilful planning, and there is no doubt that a cottage like this should prove the delight and pride of the family occupying it.

A large middle class family require a larger number of rooms, it does not matter if the sizes are small and this is exactly what is accomplished in this plan. Besides all the usual accommodation normally required, this cottage supplies four independent bed rooms, and that too in a small space of less than 1900 sq. ft.

All the outer walls are of brick in lime 14 inches thick and the inner ones of brick $4\frac{1}{2}$ inches thick in lime mortar gauged with cement in the proportion of 10 parts of lime mortar to one of cement. The flooring is of polished Tandur in the front verandah, drawing room and the bath and of ordinary Shahabad on 3 inches lime concrete in other rooms. The terraced roof would not only keep the house cool but also provide a large space to sleep in the open air during summer.

One half



Fig. 34

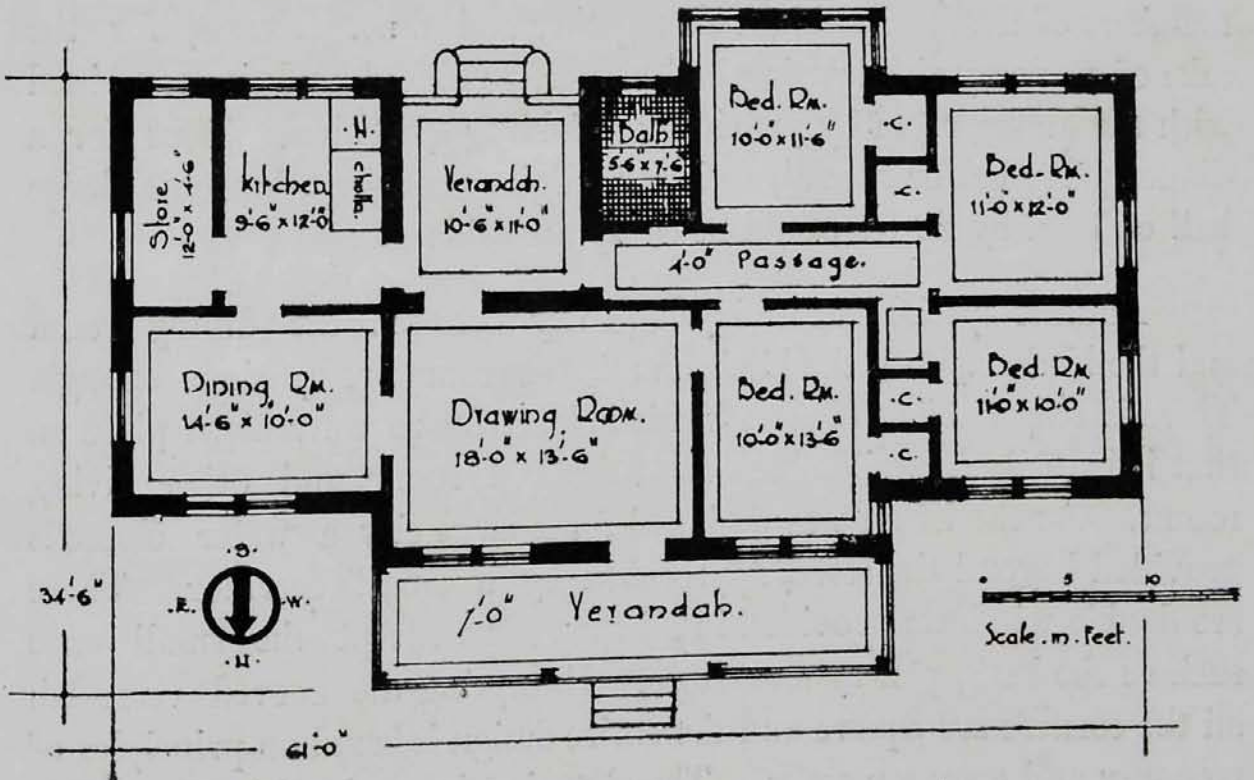


Fig. 35

Plinth Area
1900 sq. feet.

**Plan No. 10.**

Cost Rs. 6800

This is a design of an artistic home specially planned for convenience and comfort. It is suitable for a South or East facing. The main entrance in the front is at one end of the verandah instead of one usually in the centre. The entrance at one end is more convenient as very little space is engaged in the passage and the remaining area of the verandah is available for occupation. The front verandah extends in a semicircle on the right hand side, which allows more space, looks more artistic and costs very little extra amount since the circular part is roofed by an over-hanging canopy without an additional post to support it. All the bed rooms are arranged on the side commanding breeze. The sizes of all the bed rooms are very good. The small longitudinal lobby gives an independent access to every bed room, and also leads to the bath room. One special feature of this design is the folding partition between the drawing and dining rooms. The house was designed for the family of a busy man dwelling on the outskirts of a large commercial city. In the family of such a man a large dining room is required only on special occasions or perhaps on Sundays and other holidays, when all the members of the family might sit together and dine. Hence, for the sake of economy the drawing hall proper is reduced and is combined with the dining room by providing a folding partition. Thus for a dinner party or for special, social or religious congregations one large hall of 16ft. by 23 ft. would be easily available.

Another special feature is the pantry between the dining room and the kitchen. Both the kitchen and store room are spacious enough. There is only one bath room, but it is located at a convenient place so that it is easily accessible both from the bed rooms and other living rooms. As the house was designed for a large city a water closet is provided beyond the store, approached by a small corridor. There are double windows provided in all the rooms except the small ones such as the bath, pantry and store. Excepting the curved verandah all the corners are square and the entire design is based on principles of economy and common sense. The elevation is as simple as possible and yet attractive.

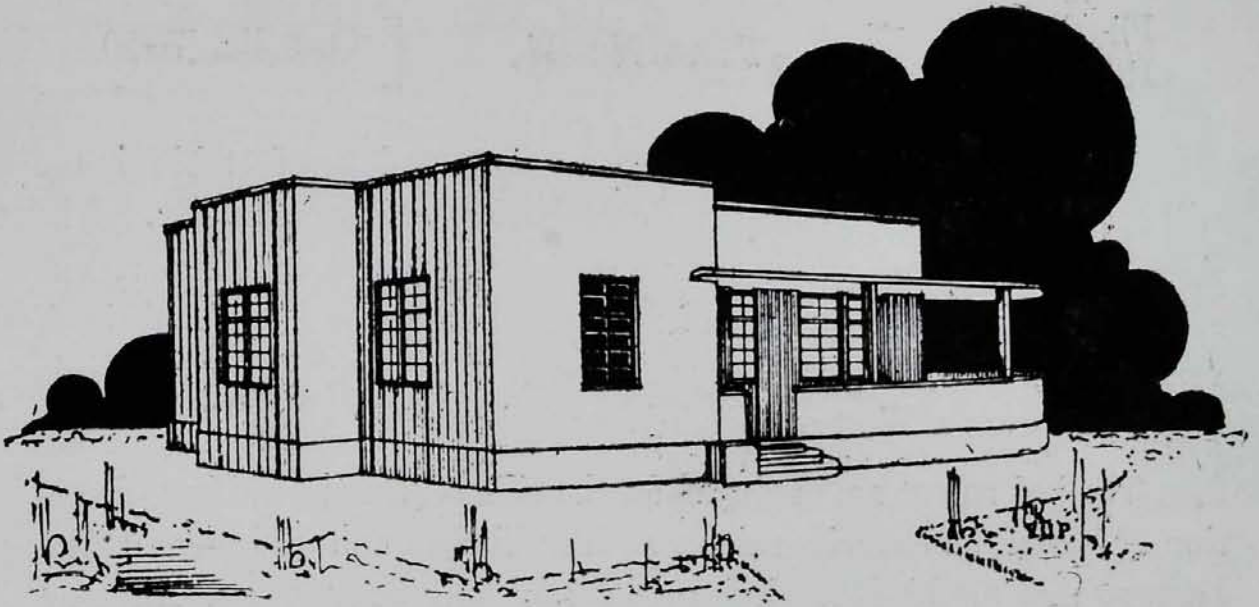


Fig. 36

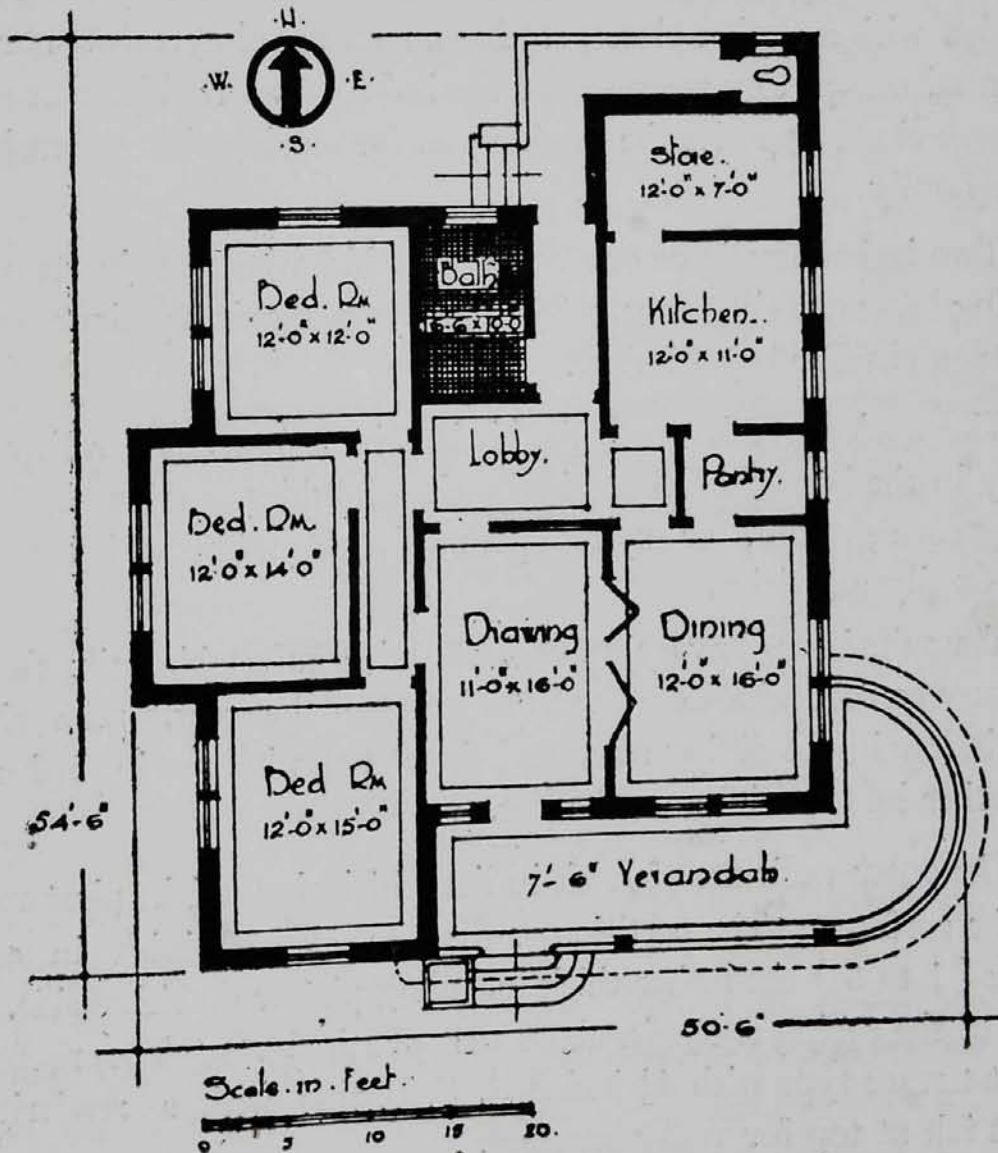


Fig. 37

Plinth Area
1900 sq. ft.

]

Plan No. II.

[Cost Rs. 7000

This another design of a very convenient and comfortable home will appeal to a person of middle class having a large family. The sizes of rooms except perhaps those of the dining and drawing rooms are not large, but the number of rooms including the front and back verandahs is nine. It is designed for a Northern aspect, still it might suit even a West or North-West facing plot.

The bed rooms are arranged on the side of the prevailing direction of breeze, and service rooms, such as kitchen and dining, on the East, so that the kitchen odours and smoke may be kept out. Another advantage of this is that the kitchen and dining room would get plenty of pleasant and cheerful sun in the morning and in the afternoon and evening these rooms would remain cool. Every bed room is provided with a clothes closet, so that no extra almyrrahs, nor even pegs need occupy any space out of the bed room. Besides these there is a large closet opposite the bath room for storing the general linen of the family.

Two bed rooms have got corner double windows in two sides ensuring breeze at all times. The dining room is spacious enough and has a circular bay window.

The work verandah near the kitchen is a necessity rather than luxury in the houses of the middle class families. It is useful for getting corn ground, or spices pounded, off and on and for many other family activities.

Thus the house is very convenient and comfortable, still, there are too many corners which are bound to increase the cost. The circular bay window in the dining room and the corner windows in bed rooms are further items to increase the cost.

The outer walls are of brick in lime 14 inches thick plastered on both the surfaces. The partition walls are also of brick in cement mortar (1 to 6) six inches thick including plaster on either side. The height of the ceiling is ten ft. above the plinth level. The roof is of the flat terrace type with $4\frac{1}{2}$ inches R. C. C. slab with a rendering of asphalt felt at top for water proofing.

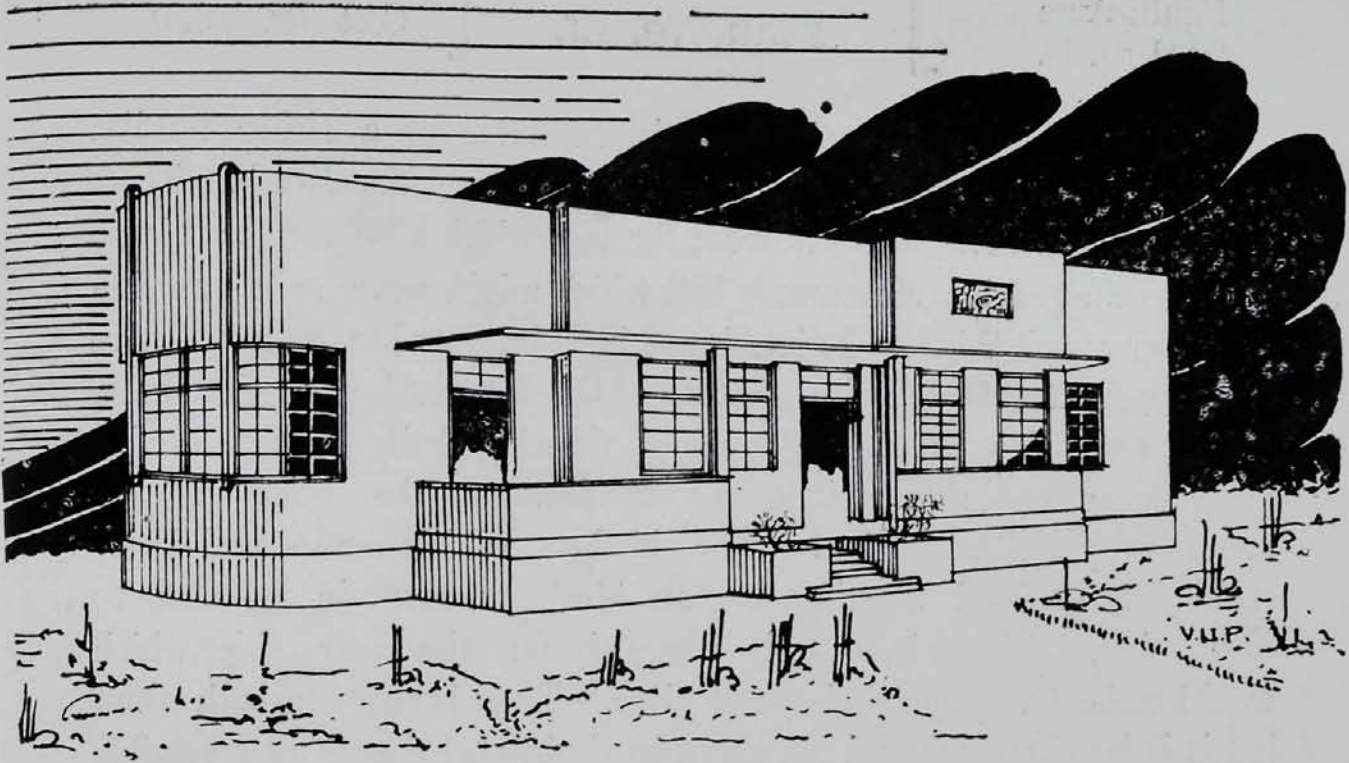


Fig. 38

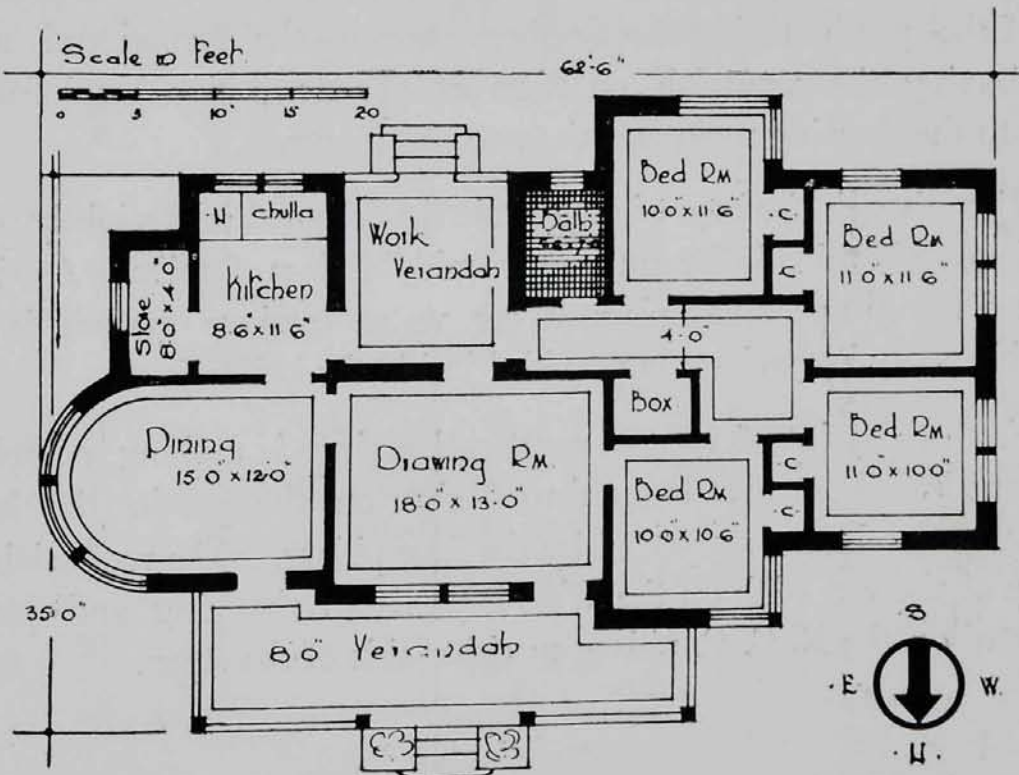


Fig. 39

Plinth Area
2091 sq. ft.

Plan No. 12.

Cost Rs. 7650

This is a home of ample dimensions suitable for a richer family. It has two faces, one on the West and the other on the North. There is a small porch on the North front through which a car can be driven. Next to the porch is an entrance hall which might serve as a waiting room for a visitor before he is ushered into the drawing room. There are two closets denoted by letters 'C' for putting cloaks, hats, canes, umbrellas etc. The spacious drawing hall with a double window on one side and a bay window on the other should prove a great attraction. The kitchen, dining room and store room are grouped together in an ideal manner in relation to each other. There is a wide verandah on the rear side which would make a very good sleep-out place. There is only one bath room but it is large enough and so conveniently located that it is accessible independently from any room of the house. All the three bed rooms are very good sized and command the best orientation possible. There are large clothes closets provided in bed rooms. Another special feature is that every bed room abuts against a verandah. The provision of the porch makes the Northern entrance the formal and main one, leaving the verandah on West as private to give an informal access to the drawing room and the two bed rooms.

Thus though the home is economically designed it is slightly on a luxurious scale suitable for an upper middle class family. As it is designed for an upcountry place where water carriage system is not available no sanitary closet is provided inside the building.

From the point of view of construction there is nothing complicated about it. There is a terraced roof also on the porch, the latter resting on two beams supported by the four pillars. The roof slab on the top of the verandah on the West is partly overhanging and partly supported on the R. C. C. pillars on either side of the steps.

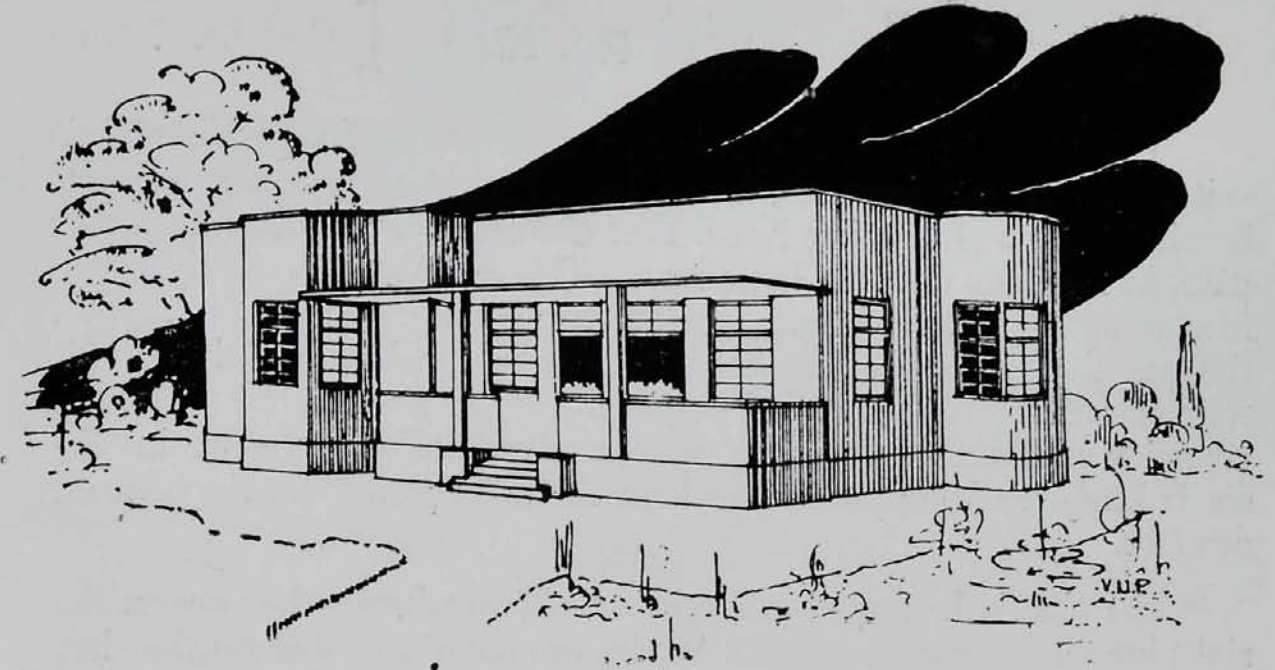


Fig. 40

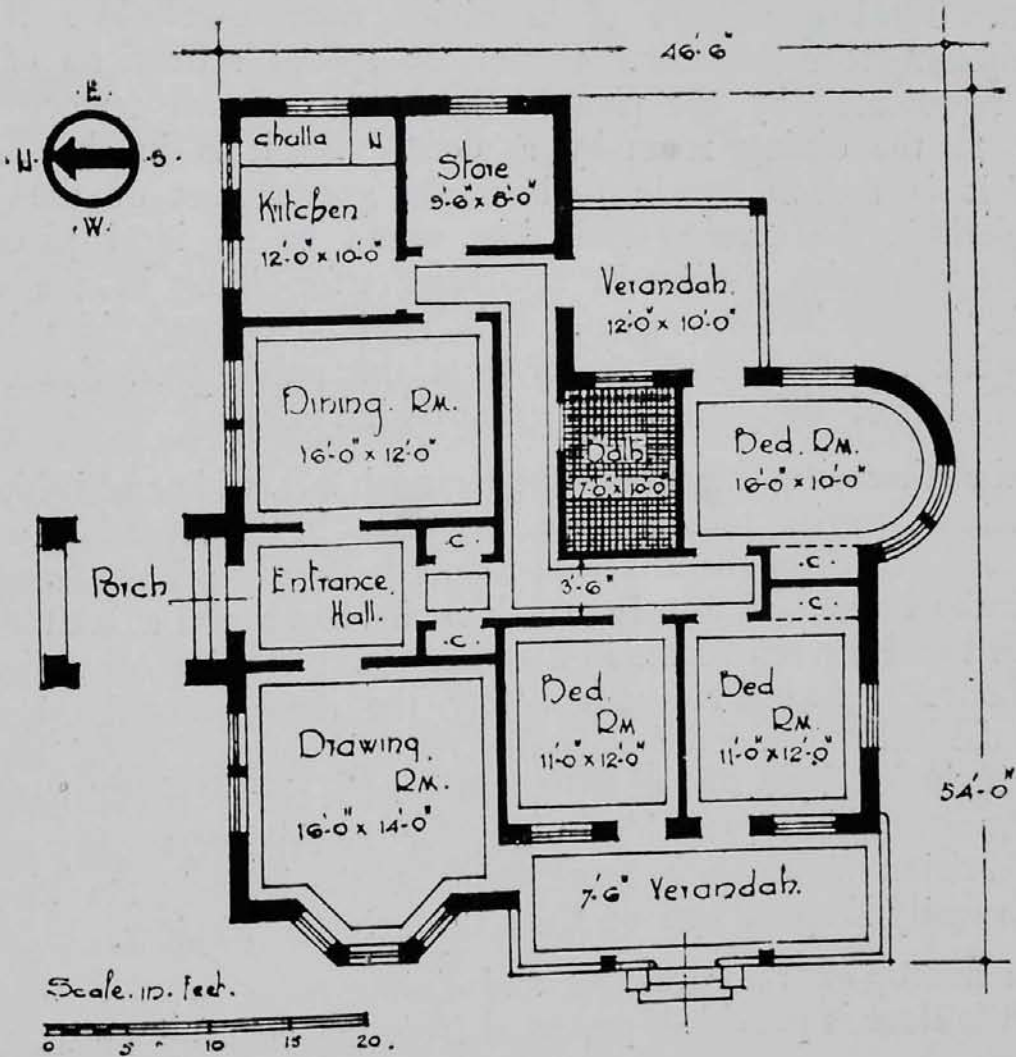


Fig. 41

Plinth area
2080 sq. ft.



Plan No. 13.



Cost Rs. 7860

This plan of an ideal home is on a more commodious scale and is suitable for a more fortunate family blessed with a large income. It is suitable for a plot facing North East or East. It is not a compact plan, but spreads out on a large area. This would not be costly where firm foundations are within a foot or two below the surface. Still the quantity of material in the walls must be much more than if it were compact. However, it has got its own advantages. On the riverside or the seacoast where the excessive humidity present in the air is likely to be oppressive such an extended plan gives the greatest comfort.

The plan is L-shaped and consists of two wings - the one on the right hand side may be called a service wing and the other on the left hand side a living wing. The service wing includes a spacious dining room, a large kitchen, a store, a bath room and a rest room for the cook. The dining room is joined to the drawing by a simple cloth curtain. The large window of the dining room overlooks a flower bed adjoining it in the front. One of the special attractions of the home represented by the plan is the outdoor open terrace connected to the dining room by a door. As it is in the North corner it is sure to remain cool in the greater part of the day, particularly in the evening and thus would be an ideal place for rest and relaxation sitting in armchairs or for dining in the open air which has got its own charm. It is screened on two sides by a trellis work for the sake of privacy from the public gaze. Space for drying clothes of dailywear is provided behind it.

In the other wing there is a front verandah 9 ft. wide and behind it is a spacious drawing room. There is a door in the verandah which separates the block of the three bed rooms as strictly private from the rest of the house. A four ft. corridor in front and a bath room common to all the bed rooms in a corner complete the conveniences of the house. The bed rooms face fully the direction of the breeze. Behind the bed rooms and the drawing room is an open paved terrace which if shaded by a row of trees would make the rooms still cooler. The terrace would serve an ideal place for the children to play under the supervision of people in those rooms or the lady in the kitchen who can easily keep an eye on them through the window.

On the top of the drawing and dining room, a terrace with mosaic tile floor is provided, protected from the rain by an R. C. C. canopy.



Fig. 42

Scale 1/4" = 1 foot

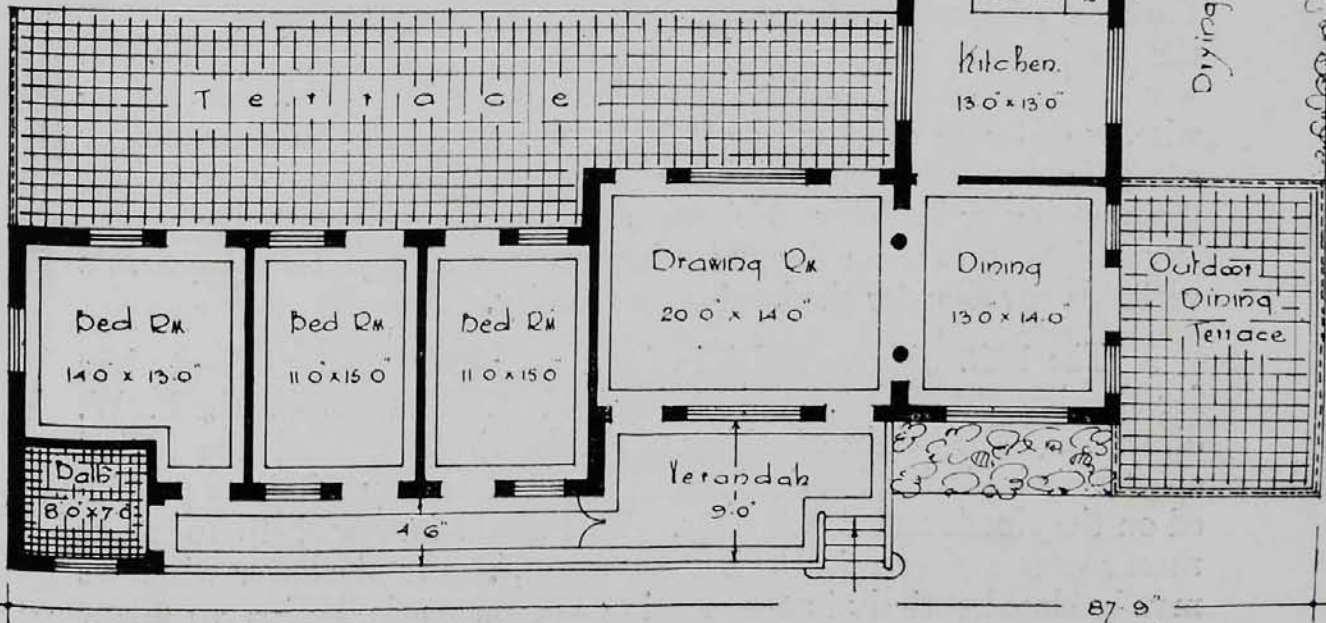
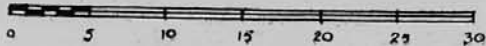


Fig. 43

Plinth Area] **Plan No. 14.** [Cost Rs. 8050.
2054 sq. feet.

This plan of an ideal home is specially designed for comfort consistent with economy. It is in fact the perfection of a home personified. It is designed for a plot facing North, though N. E. or N. W. facings also would equally suit it. It would also suit a corner plot. It is L-shaped and still, more compact than the preceding one.

The front circular verandah is in the N. W. corner and gives access to the spacious drawing room. The latter, lighted and ventilated by a very wide double window in the North side and protected by the verandah on the West is sure to remain cool throughout the day and night. The large room behind the drawing room is in fact ladies' sitting room. The kitchen and store have got the right place in the N. E. corner. The dining room is a luxury, because, it is virtually a glass room. All the bed rooms are spacious enough and are placed on the West side. Their independence and privacy are maintained by the provision of the corridor. A very spacious bath room is centrally located so as to serve all the rooms.

The family occupying a home of such dimensions and niceties usually employ a cook, either male or female and the cook needs a bathing place to clean himself or herself before cooking is started and this requirement is met by providing a sink marked N (Nhani) in the store room. There is a large paved recreation terrace provided in the back yard, where all the members of the family can congregate in the evening and listen to the boy's story-telling or girls' music. It would also serve an excellent place for children's play, which, otherwise, would have over-run the entire house, or for daily outdoor dinner of the family or for entertaining a large party on festive occasions like wedding or birthday celebration. The Southernmost bed room is ventilated on three sides and being spacious enough would prove a veritable paradise for the head of the family.

The 12ft. wide verandah in front would serve an excellent place for sleeping out of doors amidst the flood of breeze from the S. W. direction. The height of ceiling of the drawing room and the ladies' apartment behind it, is raised to 14ft. and clerestory windows provided on the North and South sides. This would further help to make these rooms cool even in the hottest season, because the lower windows may be closed entirely in the morning as soon as it begins to grow hot, and light and ventilation obtained through the low and wide clerestory windows.

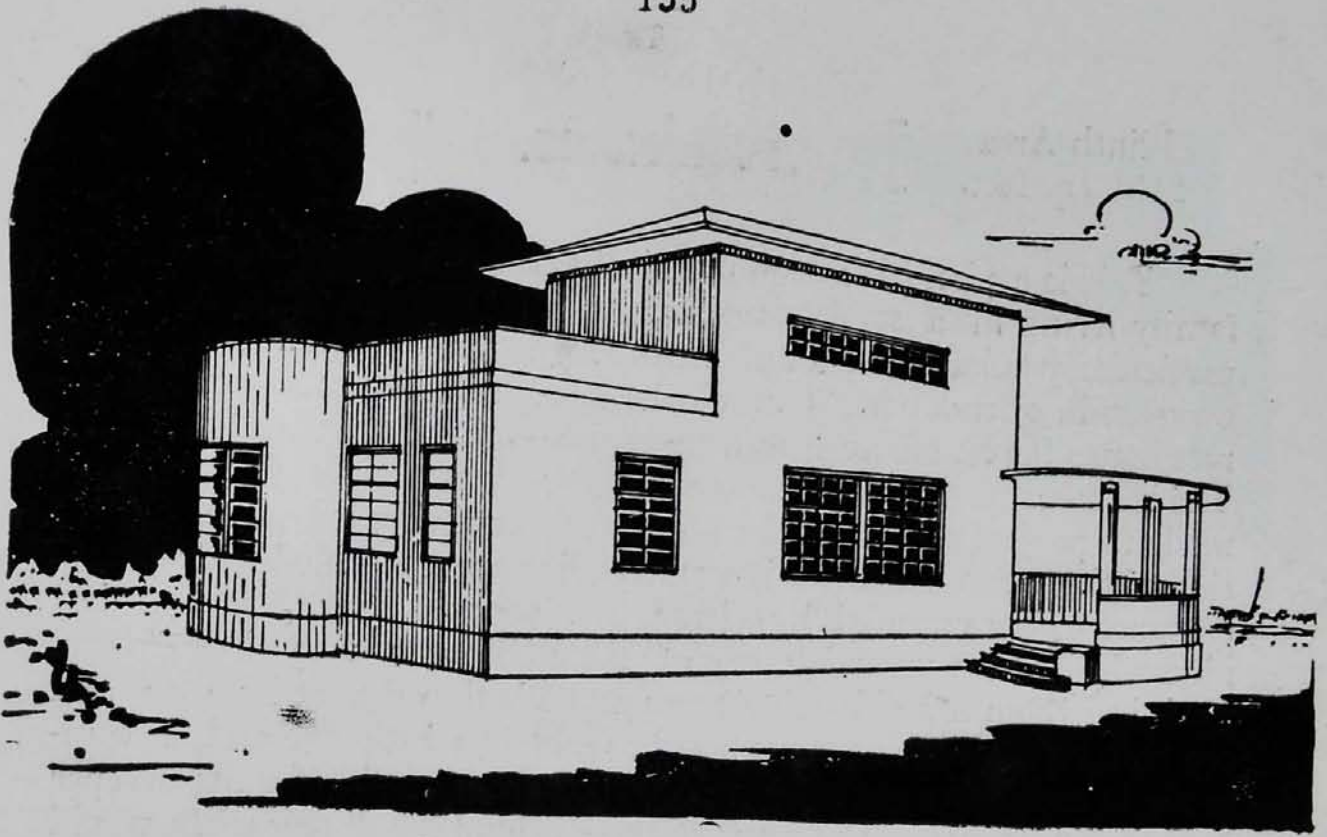


Fig. 44

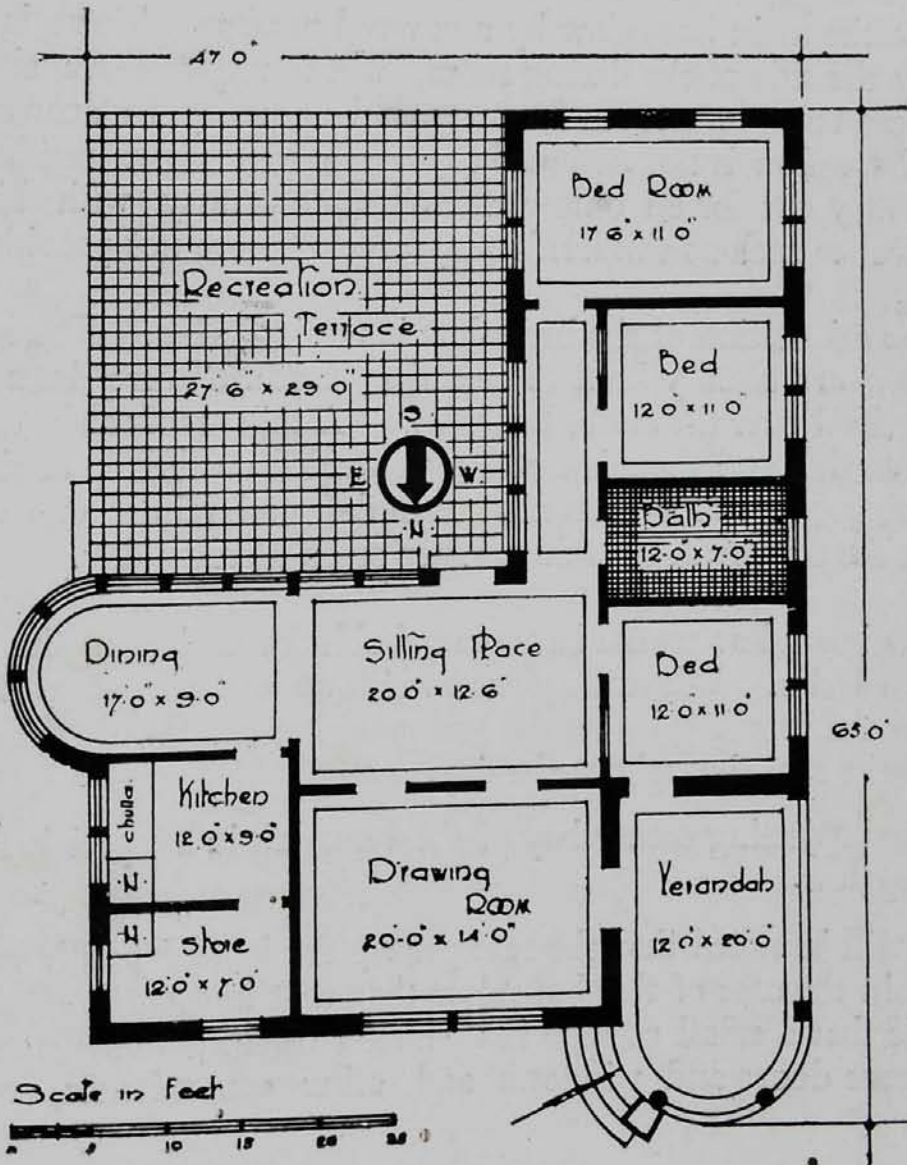


Fig. 45

Plinth Area
2280 sq. feet.]

Plan No. 15.

[Cost Rs. 8300.

This is a plan of a comparatively large building for a small family living in a stylish manner in the European fashion. It is particularly suitable for an officer of high rank with a number of servants in attendance. It would be more suitable as a comfortable rest house for an officer travelling on inspection duty with his family. The main entrance is in a corner where the verandah is widened and made to project so as to make it an excellent sitting out place. On one side of the verandah there is a small office approachable by a separate entrance to the verandah by clerks and peons. There are two bed rooms behind the verandah, one of them being a very large room. Each bed room has a dressing room and a bath room of its own and the bath rooms which are supposed to contain a bath tub and a commode in each, have got separate entrances from outside for the sweeper to come and serve. The rear verandah behind the dining room would serve as a dispensing room. The kitchen is in an out-building connected to the main bungalow by a covered passage. There is a store room by the side of the dining room, which might serve either as a store room or an ante-room for an attendant ready to answer a call. As the bungalow is not designed to serve a permanent residence, but a temporary one for an officer travelling on duty with his family other niceties such as children's play-court etc. are not provided for.

The orientation of the bungalow is not indicated. However, such bungalows are usually built to face the North. There is a terraced roof provided over the entire bungalow. A thin roof slab covers the front verandah and there is a canopy provided on the top of the terrace on the dining room for protection from dew and rain if one chooses to sleep on the terrace in the fair weather or on a sultry day.

The bungalow would be more suitable for a site on the plains of Northern India. When the glazed windows in the front verandah are closed in the morning before the sun gets hot the two central rooms will remain cool throughout the day.

The projecting corner bay of the verandah is a special feature of this bungalow.

It will be noted that the rate per square foot of plinth area works out less in the case of this bungalow than that in a small cottage. The reason is that a small cottage has smaller rooms, which means more walls, more doors and windows and other conveniences, which cost more.

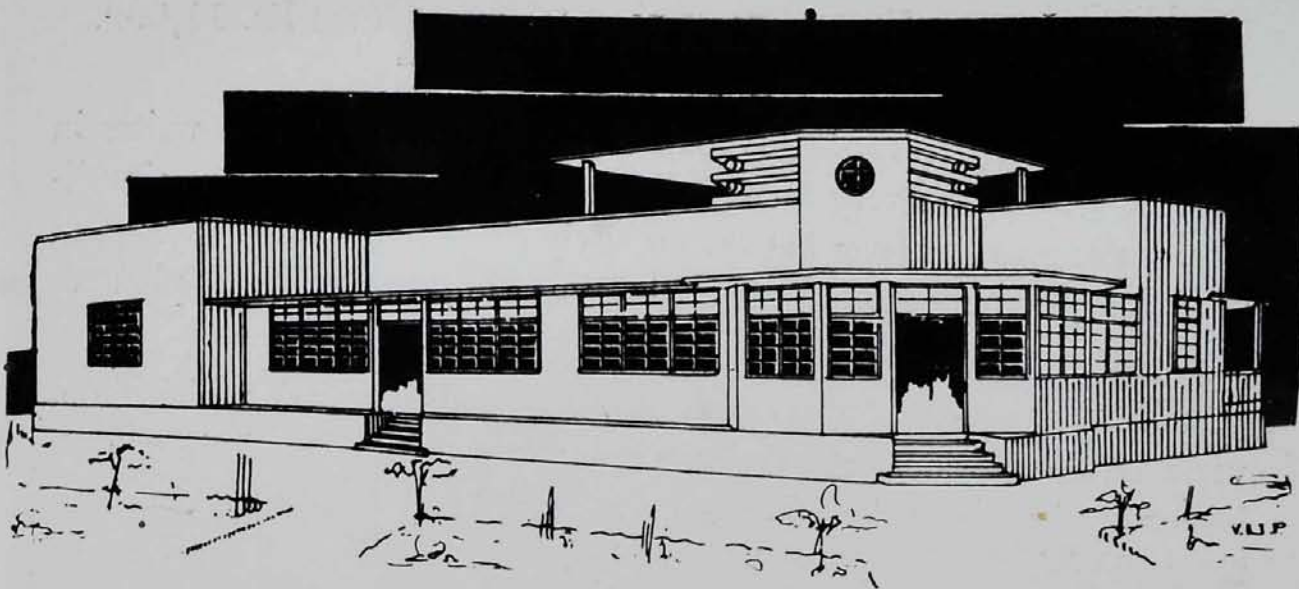
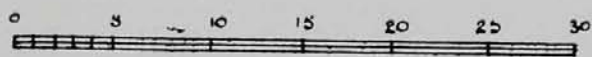


Fig. 46



Scale in Feet

Covered Passage
to kitchen

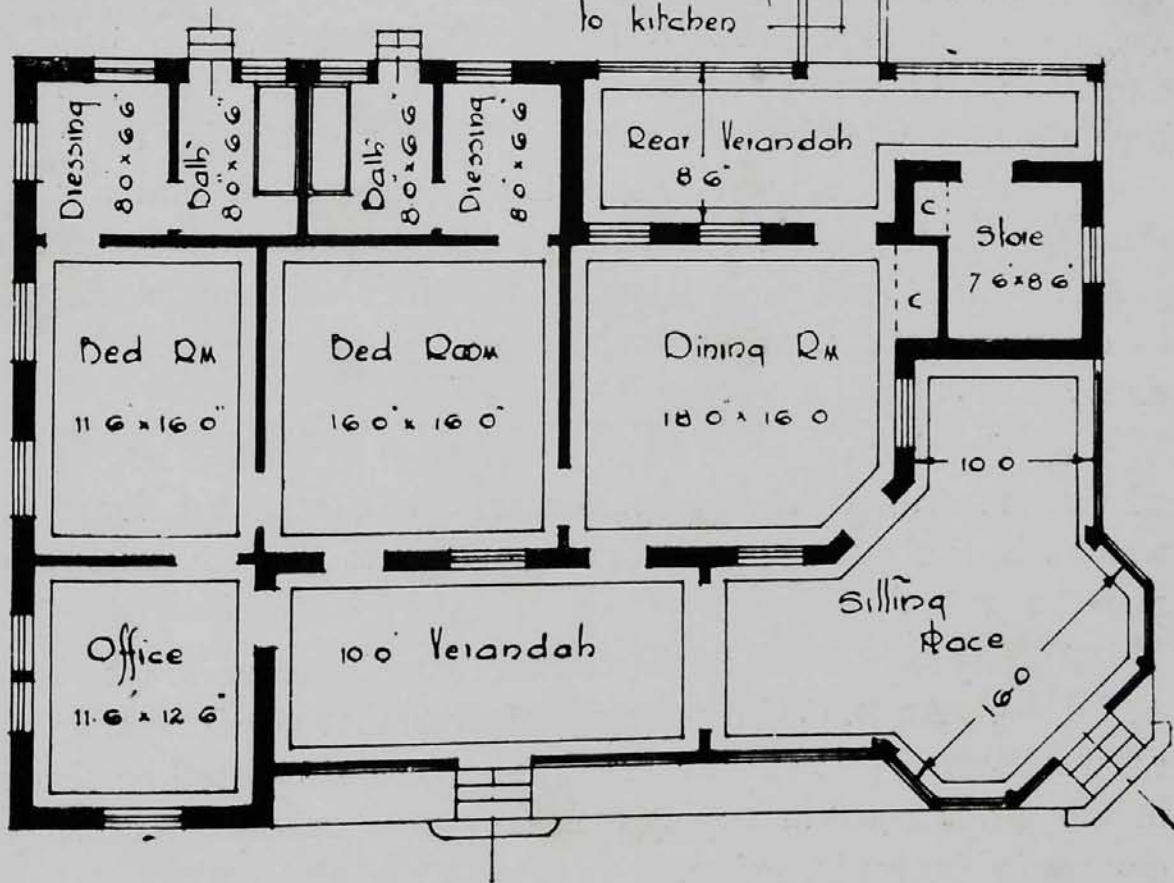


Fig. 47

Plinth Area
2760 sq. feet.]

Plan No. 16.

[Cost Rs. 11,000.

The photograph of this building was taken by the writer in Germany, as he was very much impressed with its grandeur in simplicity. The plan, however has been entirely changed to suit the Indian conditions, keeping the front only the same as in the original plan to suit the photograph.

There is an open terrace with railing in front, behind which, is a verandah 8'-6" wide. All the four bed rooms are arranged in a row behind on the West side. There is a sanitary block consisting of a bath room and W. C. in a corner detached by a small lobby. This can be approached independently through the verandah from every bed room. The dotted lines in the bed rooms show the positions of beds. The large bed room has a double bed and a separate toilet room of its own.

The special features of the plan are its large dining hall and the terrace above. The dining hall itself is 33 ft. long and 16 ft. wide and in addition to it the 25' × 18' drawing room is joined to it by a folding partition, so that it becomes a very large hall suitable for a large assembly, when both are combined together by opening the partition. There is a small servery close to the dining room and a small washing place in a corner useful for washing plates etc. at the time of dinner. The kitchen block is outside the main building attached to it by a covered passage. There is also a back entrance opposite to the dining room.

The drawing room has a curved front wall in which a large treble window is installed. In fact this curved wall with the large bay window in it gives an appearance of grandeur to the otherwise quite plane bungalow.

An easy stair case from the verandah gives an access to the terrace on the top. An R. C. C. canopy projects from the roof of the stair case room and covers part of the terrace. The plane, simple railing of pipes on the terrace is just in keeping with the general atmosphere of simplicity carried by the bungalow.

The house faces East though it would be equally suitable for North-east.

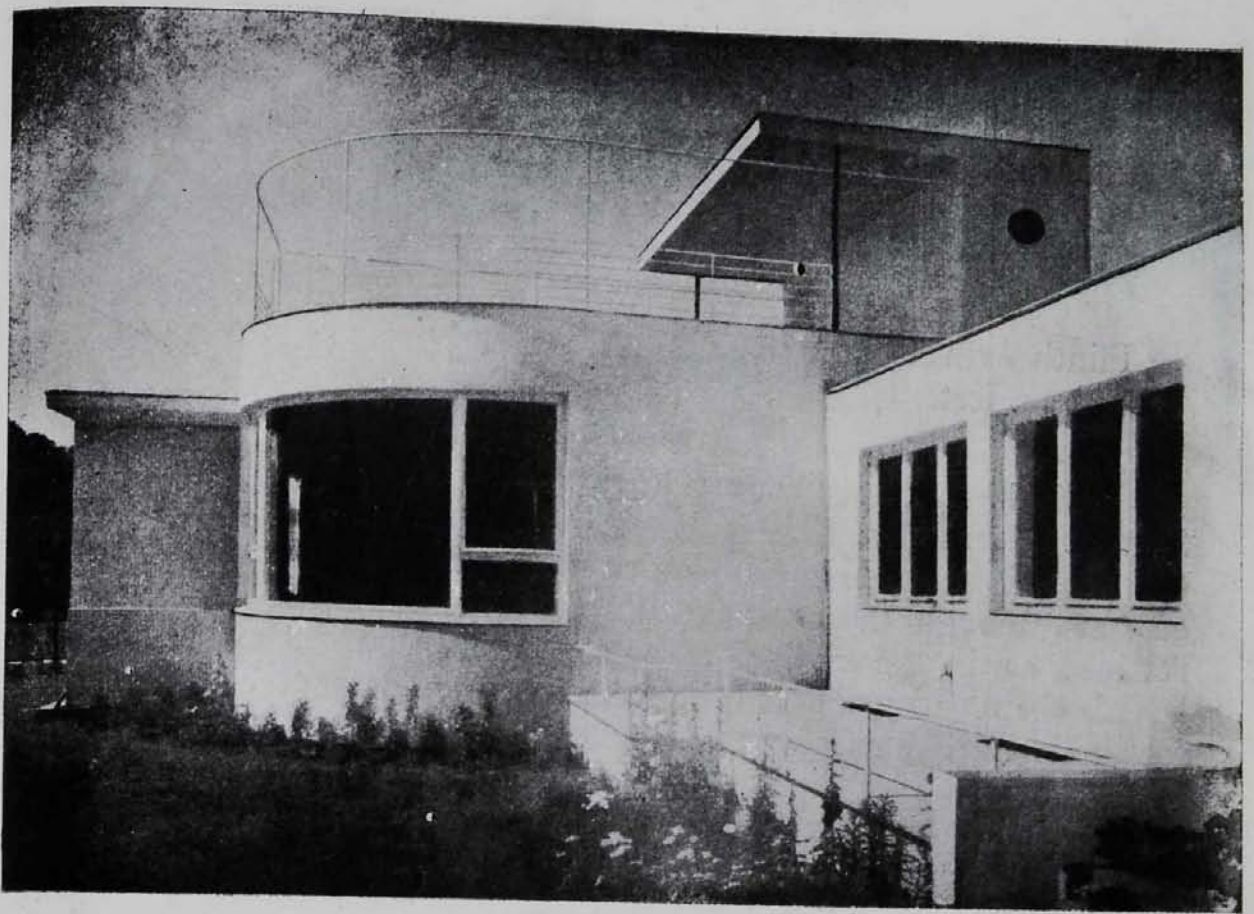


Fig. 48
A BUNGALOW IN BRESLAU, GERMANY.

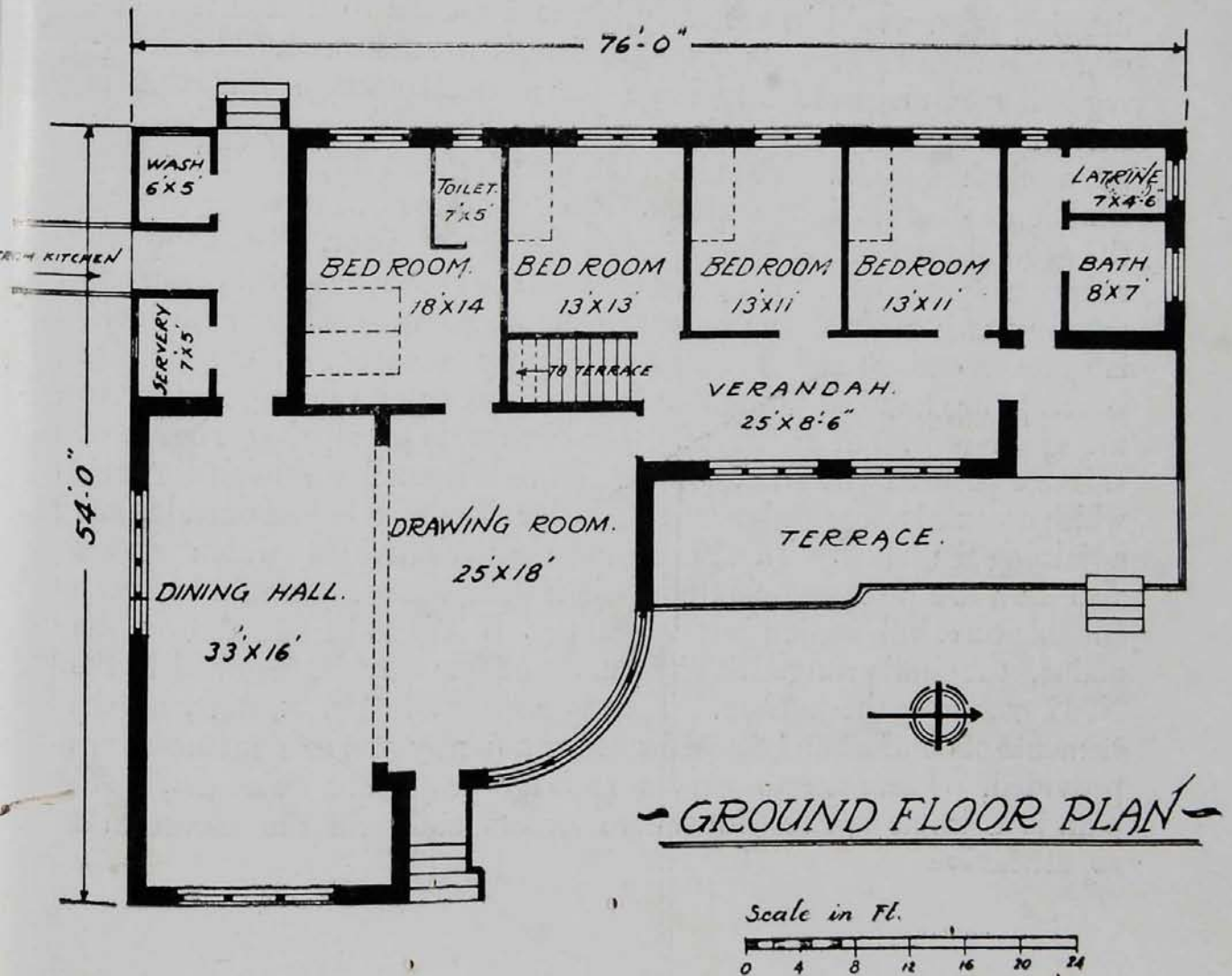


Fig. 49

Storied Cottages

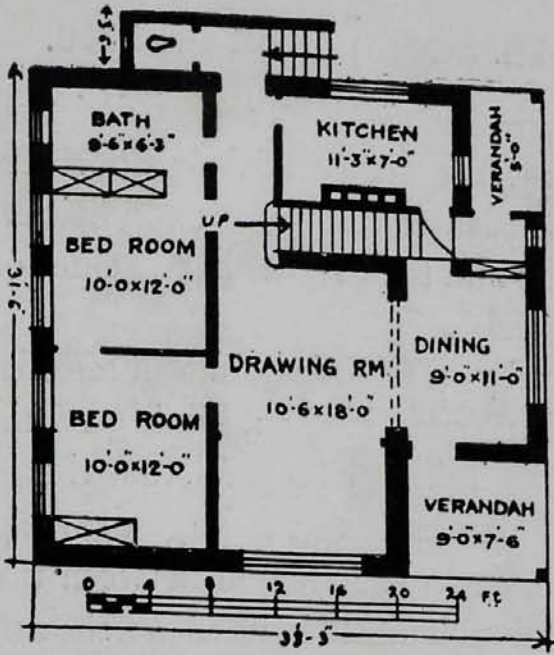
Plinth Area]
1383 sq. feet.]

Plan No. 17.

[Cost Rs. 4600.

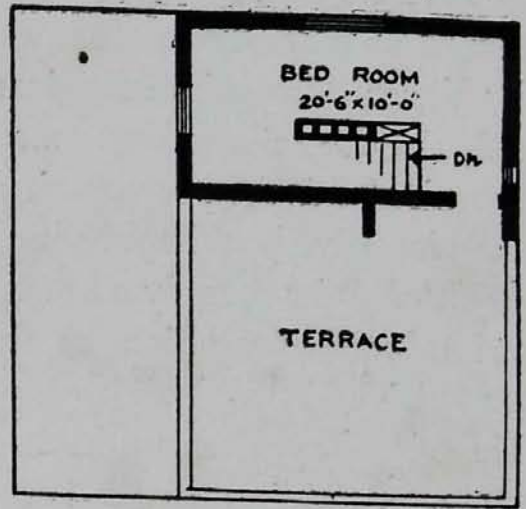
This is a famous cottage designed by Bruno Taut built at Stuttgart, Germany. The isometric elevation is original, but alterations have been made in the plan to suit Indian conditions and social customs, though the front and the right hand side of the plan are retained as in the original to suit the elevation. The orientation has also been changed. It is built to face the East at Stuttgart but for Indian conditions it would be suitable for the South or South-east.

The design is replete with several useful features and possesses a charm in simplicity that is at once inspiring. There is a small verandah in front, just to serve as a waiting place before a visitor who announces his arrival is admitted into the drawing room. For Indian social customs a door from the verandah opening into the drawing room would be necessary but as I wanted to retain the original elevation to show its grace no changes were allowed. The drawing hall which is sufficiently large for a small cottage like this is further increased in size by combining the dining room with it by a cloth curtain. Thus both the drawing and dining hall would function to the maximum extent. There are three bed rooms — two on the ground floor and a large one on the upper floor. Both the bed rooms are provided with clothes closets. The rectangles with diagonals crossing each other shown in bed rooms are the closets. The bath room is spacious enough and is very conveniently situated. The stair case is occupying an ideal position accessible from any room to go either to the upper bed room or terrace. The kitchen is occupying the most suitable position viz. N. E. corner. There is a small verandah through which an exit is provided on the back side. The w. c. is just outside, but adjoining the house. There is a smoke outlet provided which serves also as a fire place and chimney. The design as it is would be very suitable on a hill station in this country. If it is to be adopted on the plains, the chulla range with its smoke outlet may be installed in the N. E. corner of the kitchen. Thus in a space of 31ft. × 33ft. all the elements of comfort and convenience for a family of 6 or 7 members are provided. There are no curves and no projecting balconies. The plan is a simple square with square corners and still the elevation is so attractive.



GROUND FLOOR

Fig. 50



FIRST FLOOR

Fig. 51

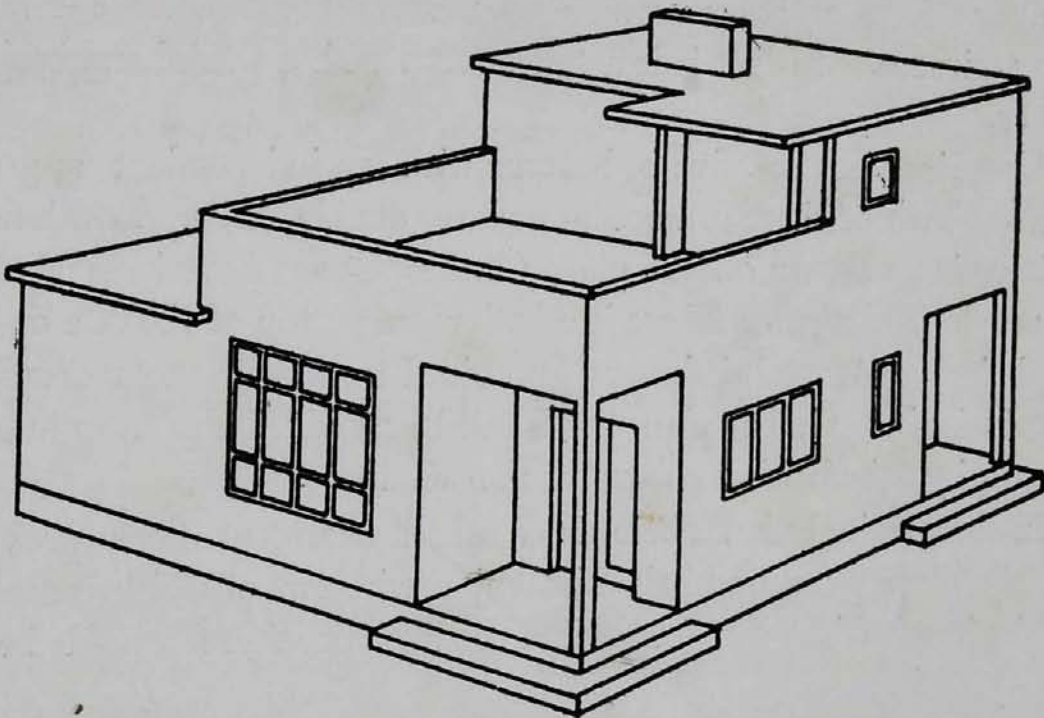


Fig. 52

Architect: BRUNO TAUT, GERMANY.

Floor Area]
1674 sq. feet.]

Plan No. 18.

[Cost Rs. 5750.

This is another cottage well known in Europe. It was designed by Victor Bourgeois of Belgium and is built in Brussels. Considerable alterations have been made in the plan to suit Indian conditions, though to suit the photograph the front and the right hand side of the plan have been kept as in the original.

It occupies roughly an area of 32ft. by 32ft. only and still affords as much accommodation as five bed rooms, kitchen, dining room, verandah and two bath rooms, which is indeed a marvellous thing. There is an open terrace in the front which leads to the large drawing room. A folding partition or a cloth curtain is arranged between the drawing room and dining room where double dotted lines are shown, so that on special occasions either one large drawing room or one dining room 30ft. long and 12ft. wide can be easily made. The kitchen is spacious enough. The verandah near the kitchen would prove a very good utility room. The staircase is 3' - 6" wide and has an easy climb. The bath room is at a convenient place to obtain an easy access from any room, and a w. c. is located below the landing of the staircase. In fact it is a toilet room with a wash-hand basin in a corner.

Upstairs there are five bed-rooms with an independent approach to each. Two of them can accommodate double beds. Positions of beds have been shown on the plan. Clothes closets have been provided one in each bed-room. There is a bath room on top of the one on the ground floor. A small balcony is provided to which access from one bed-room is shown in the plan, but it can be provided also from another bed-room by substituting a door for the window.

In the original plan there is a small basement floor provided below the dining room and the kitchen, a window of which is seen in the right hand side. But for Indian conditions there would be no necessity of it.

The elevation looks beautiful by its very plainness and simplicity. All the outer walls and one central wall are 14 inches thick of brick in lime, the remaining ones, $4\frac{1}{2}$ inches thick. It is possible to provide two or three wall cupboards in the central thick wall though they are not shown in the plan. There is not the slightest doubt that the cottage would prove an ideal home for a large middle class family

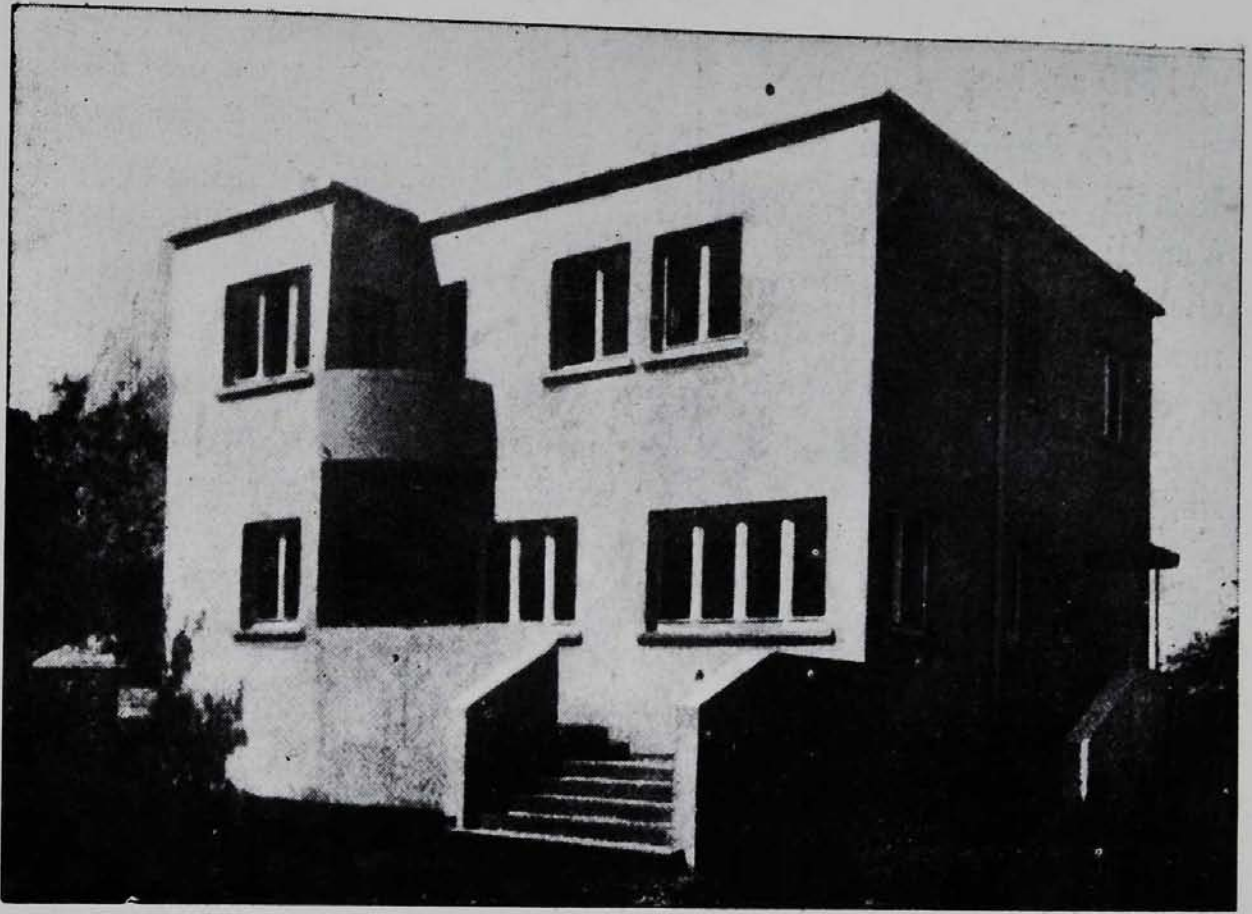
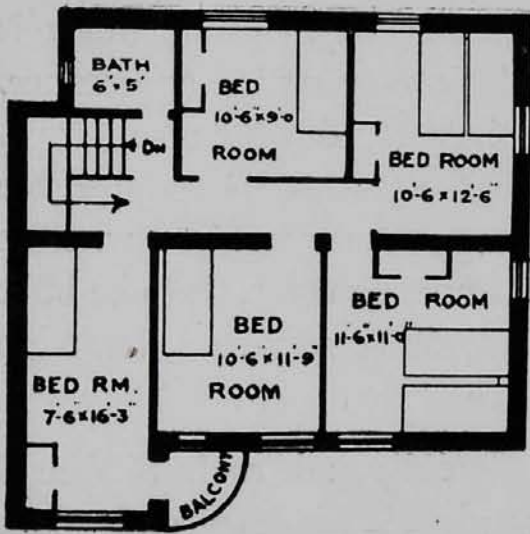


Fig. 53

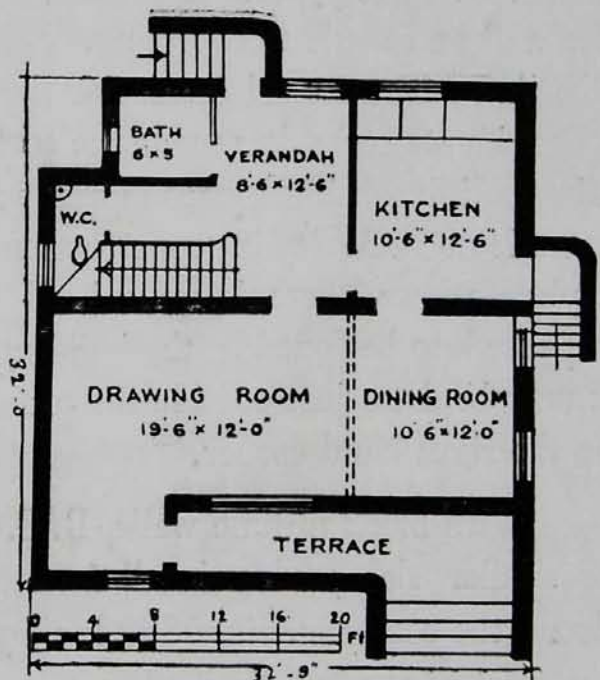
A COTTAGE IN BRUSSELS.

Arch: VICTOR BOURGEOIS, BELGIUM,



FIRST FLOOR

Fig. 54



GROUND FLOOR

Fig. 55

Floor Area]
1760 sq. feet.

Plan No. 19.

[Cost Rs. 5800.

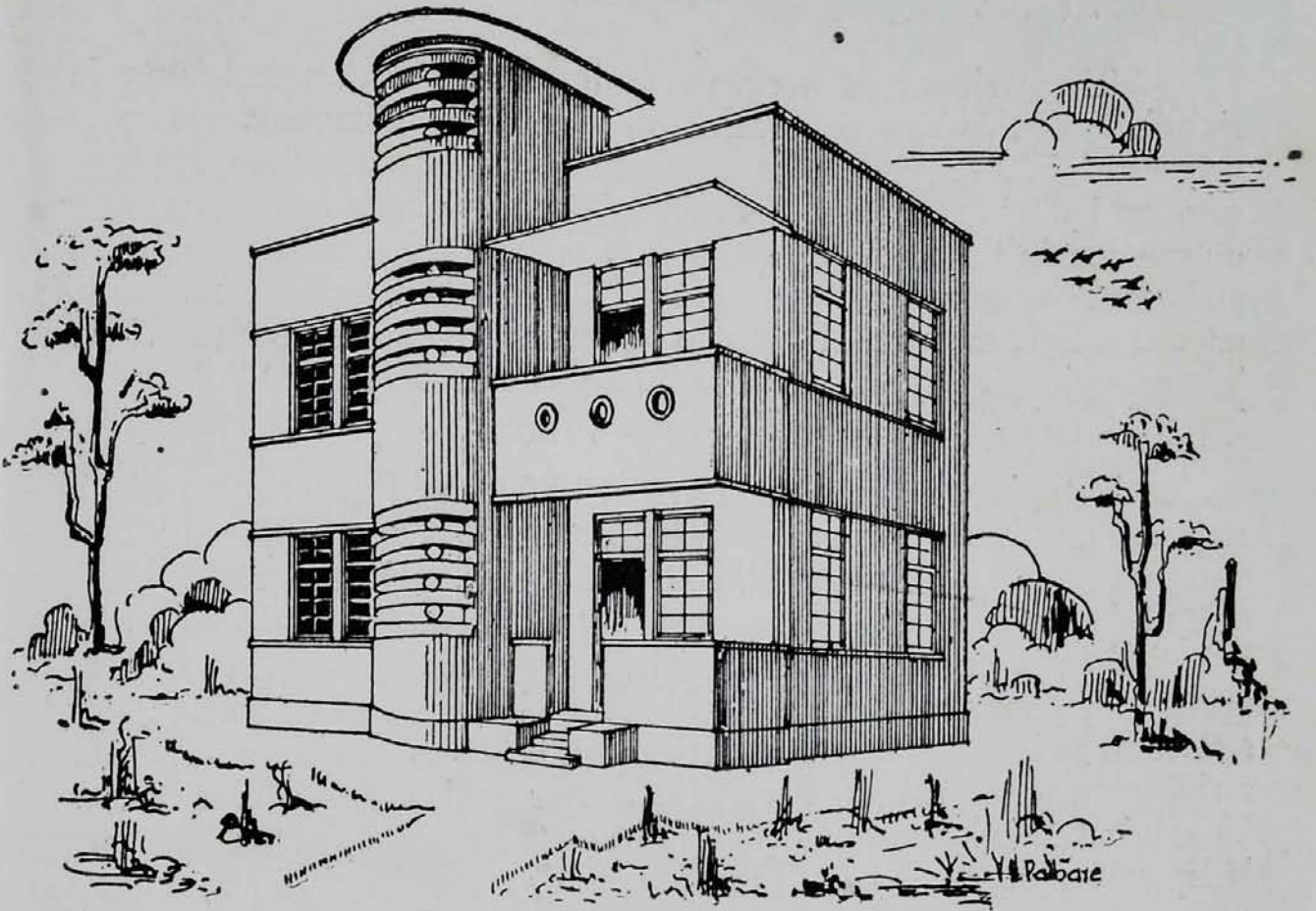
The design of this cozy cottage is sure to appeal to every body. It is an example of what could be achieved by skilful planning even in a small space and with a small amount of money at one's disposal. It encloses a space less than 900 sq. ft. and yet provides all the amenities of modern home for a family of 6 or 7 members. It meets all the normal requirements of a middle class family. A verandah in front and rear, a large drawing hall, a nice kitchen, a spacious dining room, and a small store and bath room on the ground floor, and four nice bed-rooms with a common bath room on the upper floor, all grouped together in a most compact and convenient manner, certainly must prove a delight to the occupants. The bed-rooms are no doubt small, but what a large middle class family needs is the number of the rooms and not their sizes which must necessarily be restricted according to the budget.

Since the bath room and the kitchen abut against a common wall, it is possible to carry the flue gases by constructing one common chimney on the countryside where usually firewood is burnt and the latter causes smoke.

Note that the balcony on the top of the front verandah is not supported by any posts or pillars, but it is entirely anchored inside the wall and made to overhang. The canopy over the balcony does likewise. The central feature of the projecting bay, inside which is located a staircase has made the cottage look so smart in appearance. The building being square in shape and the roof, of flat terraced type, there is no difficulty in construction. As the cottage is designed for a place where there is no subsoil drainage constructed, a w. c. is supposed to be outside the building. If one, however, is to be built it may be done just outside the cottage adjoining the rear verandah on the right hand corner.

With brick in lime walls, R. C. C. flooring and roof, Shahabad or similar slab paving in all the rooms, glazed windows and plane doors, the cost, viz. Rs. 5800 is very reasonable. It does not include the price of the building plot, compound wall or fencing, electric fittings and drains.

Fig. 56



GROUNO . FLOOR.

FIRST. FLOOR.

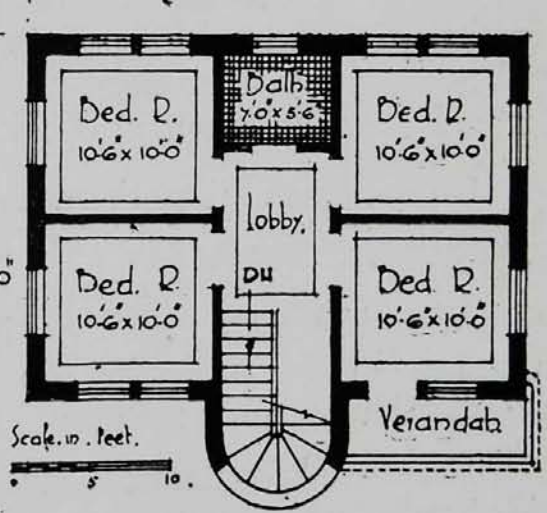
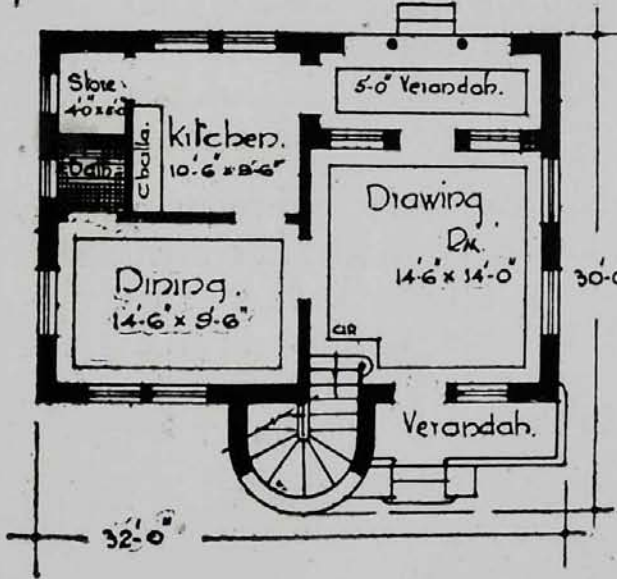


Fig. 57

Fig. 58

Floor Area
1687 sq. ft.

]**Plan No. 20.**

[Cost Rs. 6500.

The writer was very much impressed with the beauty in simplicity of this building erected in Wurzburg, Germany. It was designed by Peter Feile and represents one of the three types of cottages built in staggered lines. Considerable changes had to be made on the rear in the original plan so as to make it suit Indian conditions and social customs. This cottage would be most fitting on a riverside, or a sea-face, or on a hill station commanding an extensive view. The area occupied by the actual building is only 28 ft. by 29 ft. Yet it provides all the accommodation needed by a fairly large family.

There is an open terrace in front of the main entrance, to which steps are provided on one side. The entrance leads to a drawing hall on a luxurious scale for a small cottage like this. On the right hand side of the drawing hall is a small sitting room which might serve as a ladies' room or a spare room. The kitchen, dining room and bath room are all very conveniently arranged with respect to each other and a store room is made by enclosing the space below the staircase. There is a side entrance on the right hand side, near which is placed a w. c. The stair case is located in a convenient corner so that it is easily and independently accessible from every room or from the outside.

On the first floor there are three single bed rooms with one common large bath room. All the bed-rooms face the West and they are further provided with spacious clothes closets. (The diamond crossed rectangles indicate these closets). The terrace in front is paved and would prove an excellent out door sitting room for common use.

On the second floor there is only one double bed-room with a private bath attached. Provision of a clothes closet also has been made. The bed-room on the second floor recedes a little leaving an ample paved terrace in the front. There is a large window in the front wall. The sill of it projecting on the side of the terrace is made hollow and flower plants are grown in the earth filled in it.

The special feature of the building is the terraces with railing provided on both the upper floors. There is absolutely no ornamentation—not even a cornice in the whole building.

Incidentally it may be noted that the walls on the upper floors are not supported on similar walls on the lower floor. This can be done both by providing beams below these walls and further by making the walls hollow of light sheets stiffened by timber frames hidden inside the hollows. The method of constructing such walls is explained in the chapter on Insulation or heat-proofing on page 111.

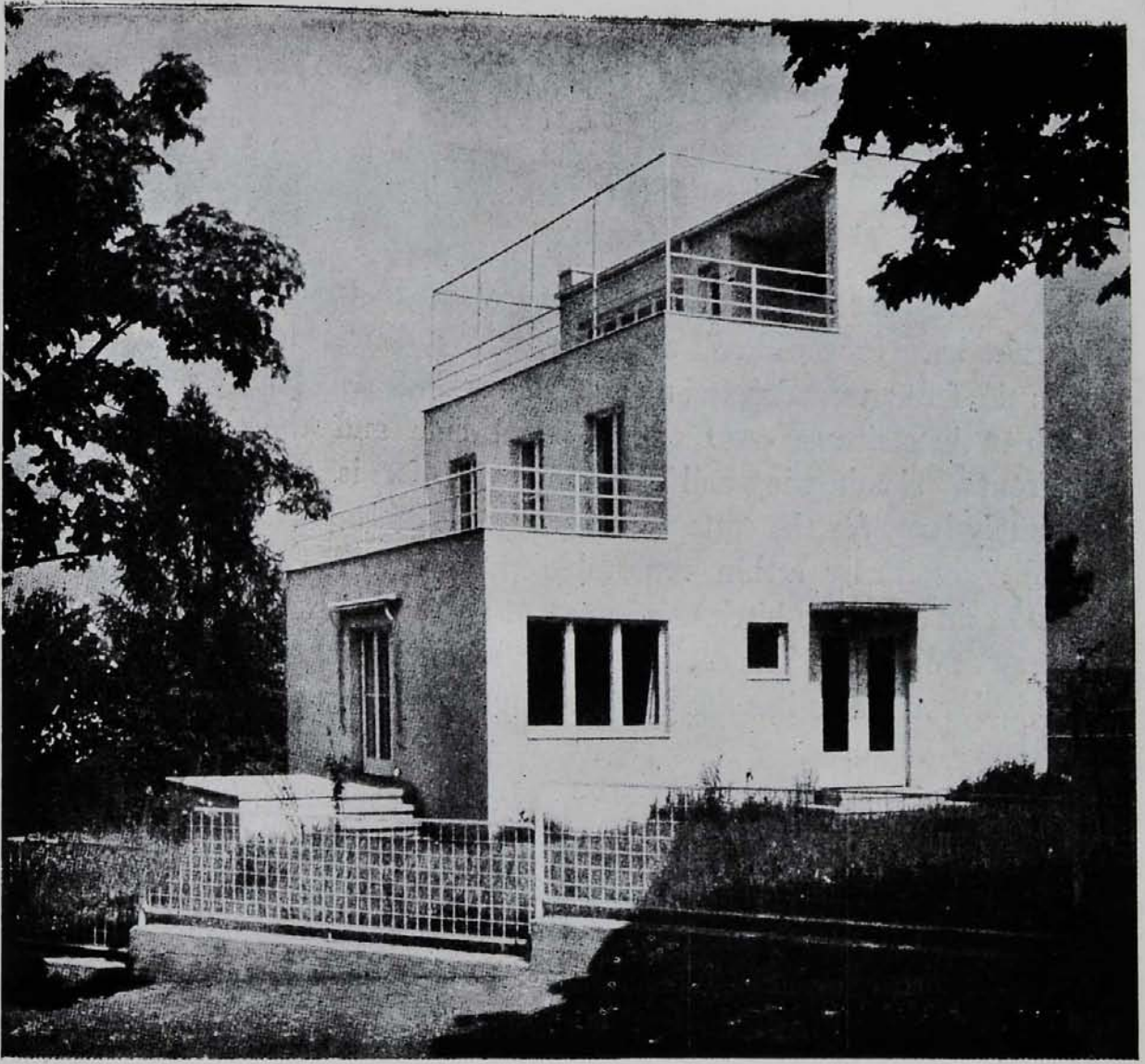


Fig. 59

A COTTAGE IN WURZBERG, GERMANY.

Arch.: PETER FEILE.

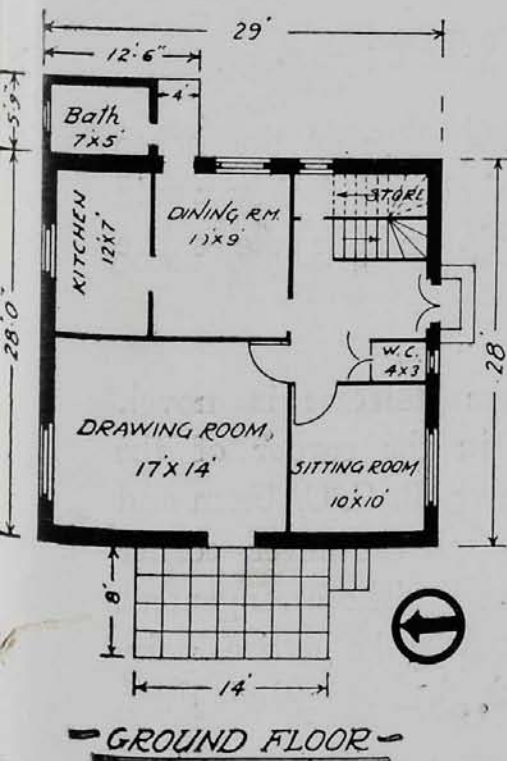


Fig. 60

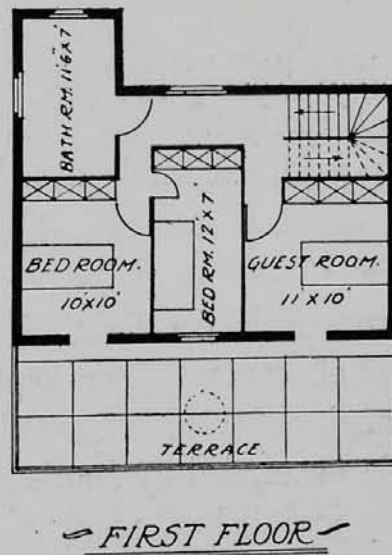
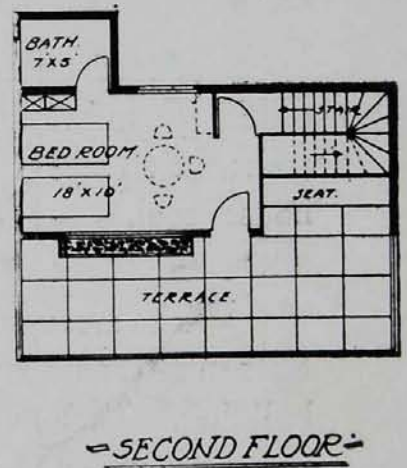


Fig. 61



SCALE 16 FT. TO 1 INCH.

Fig. 62

Floor Area
1998 sq. ft.

]

Plan No. 21.

[

Cost Rs. 7050.

The proper orientation of this plan seems to have been omitted by mistake. It would suit a North or Northwest facing. In this plan the front verandah is just a small vestibule and gives direct access both to the staircase on the right hand side and the drawing hall in front. The drawing hall of 22 ft. by 15 ft. is rather disproportionately large for the cottage. However, it can be divided into two smaller rooms by a thin removable partition or a cloth curtain in normal times. The kitchen is long and narrow with a store room or pantry at one end. The dining room is small but close to the kitchen. The bath room also has not got a happy placement.

The upper floor, however, is very conveniently designed. There are four bed-rooms and one bath room common to all the bed-rooms. Though double beds are shown only in one bed-room all the four bed-rooms are spacious enough to accommodate double beds. The bath room is independently accessible from every bed-room. These bed-rooms get the benefit of the Westerly breeze if the cottage is made to face the North.

In this plan also some partition walls on the upper floor are constructed without supporting walls on the lower one.

Paved terrace is provided almost on three sides of the house on the ground floor. If shady trees are planted all round they would make the terrace very enjoyable and also help to keep the entire house cool.

The arrangement made for lighting the staircase is novel. Slits in alternate layers of concrete are kept in the corner of the building. Each one of these layers is a cantilever R. C. C. beam and the entire upper weight is carried by another such cantilever corner beam of R. C. C. at top just below parapet wall. The arrangement gives a good appearance and provides light over the entire staircase. Sometimes these slits are closed by thick glass to exclude dust.

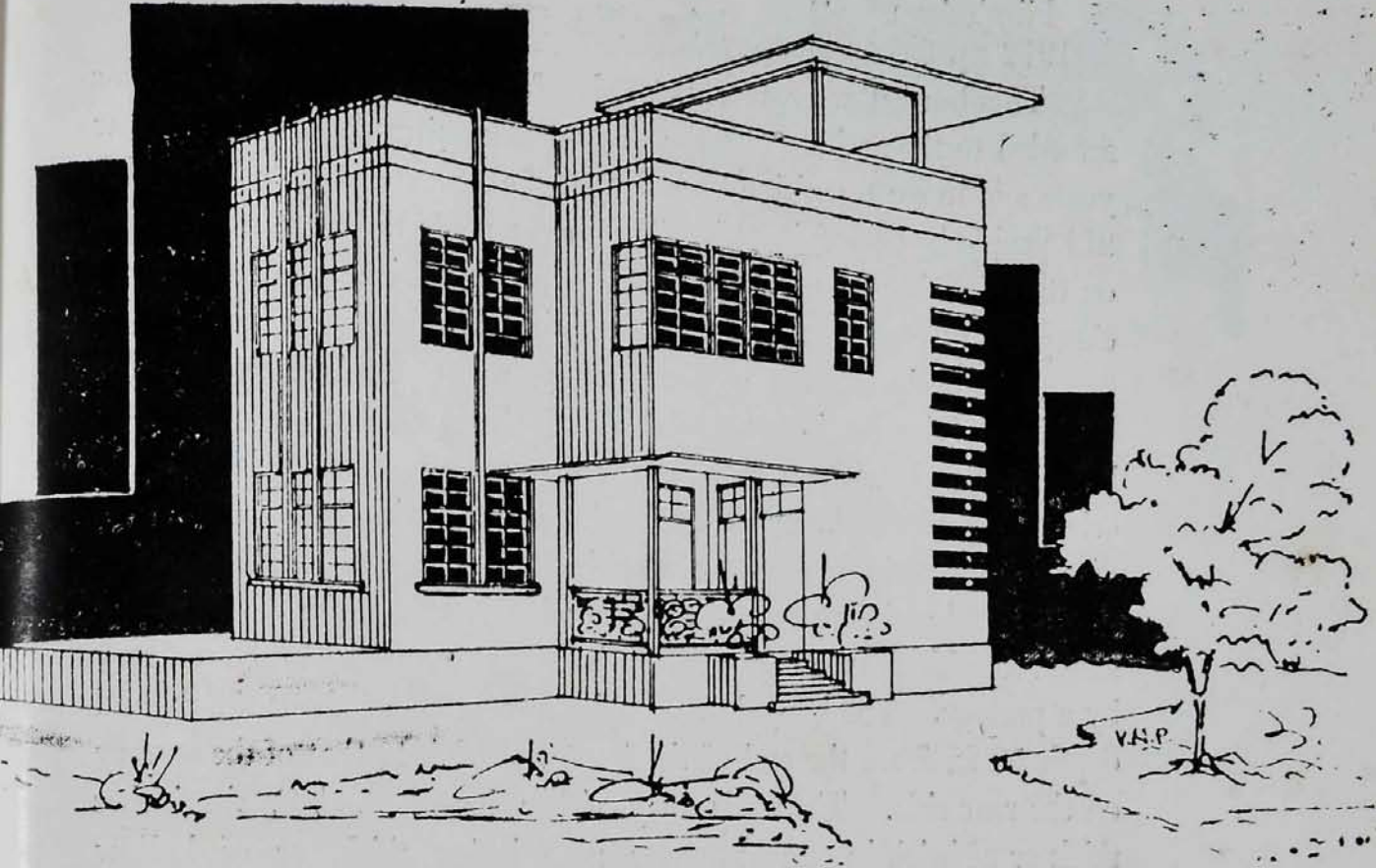


Fig. 63

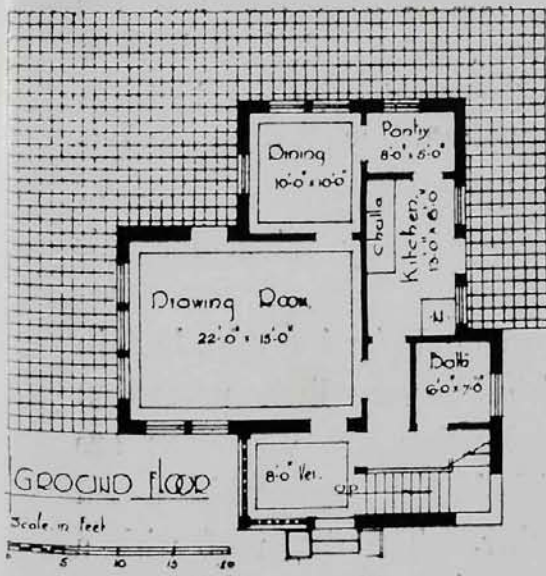


Fig. 64

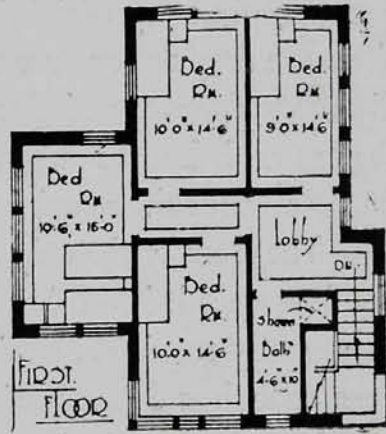


Fig. 65

Plinth Area
1972 sq. feet.

]

Plan No. 22

[

Cost Rs. 7150.

This bungalow represents a plan for which the first prize was awarded to the architect by the Cement Marketing Co. of India a few years ago in a competition for a design of a concrete bungalow in which 271 people had participated. The judges made the eventual selection on the following grounds: (1) general convenience (2) ease and cheapness of construction and (3) originality.

It is designed for a place where water carriage system for flushing privies etc. is not available and therefore, bath rooms must be built outside with an entrance for the sweeper. The principles of orientation, cannot be applied to such designs having bed rooms in all directions round one or two central halls. However, such bungalows are designed and constructed to face the North. The kitchen and store room block is a separate out-building connected to the servery by a passage. The bungalow occupies a frontage of about 52 ft. and depth 50 ft. from the end of the front verandah to that of the servery on the rear side. The walls may either be of R. C. C. six inches thick or of brick in cement mortar nine inches thick, or of hollow concrete blocks six inches thick. The dining-room is 12' × 18'; front hall 12' × 12'; bed-rooms 14' × 10', bath-rooms 9' × 5' and the verandah 7 ft. on sides and 14 ft. in front. Such designs have a common difficulty of lighting and ventilating the central halls as there are deep rooms or verandahs on all sides. To overcome this difficulty clerestory windows are provided at top on all four sides of the central halls, the walls of which are specially raised for this purpose above the remaining.

The front is the only side open to sun and piercing rain, but in the first place it is on the North on which side very little protection is normally required in this country. Further, the verandahs are deep enough and have projecting chhajjahs in front again, which would afford excellent protection against weather. The flat roof with a parapet wall all round, would give an amenity which would be most appreciated in the hot weather season.

The circular pillars can either be of pre-cast rings of concrete or of Hume Pipes, which have a finished surface and can only be laid in position. The bungalow is sure to prove comfortable to live in, simple in construction and cheap in cost and maintenance.

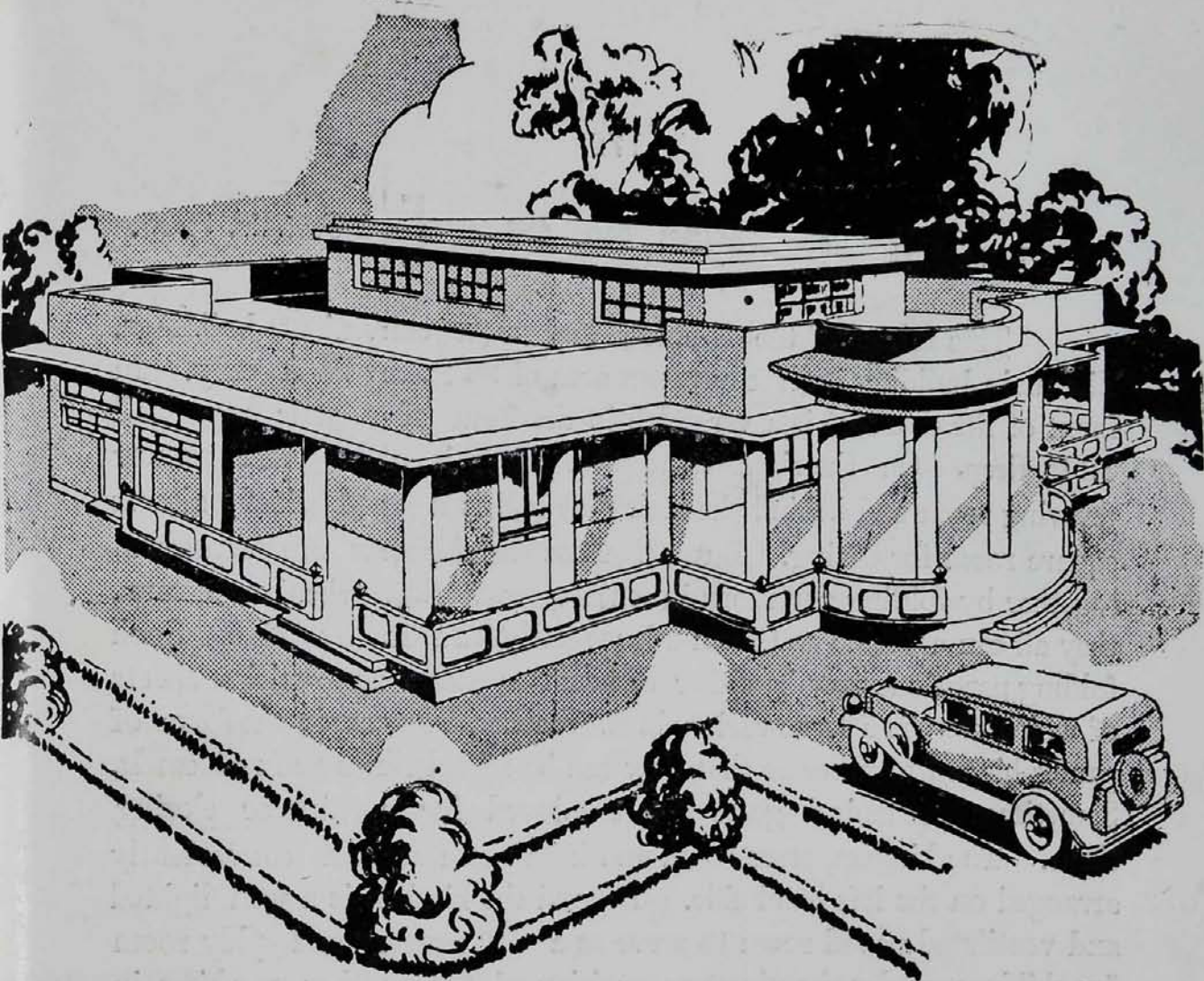


Fig. 66

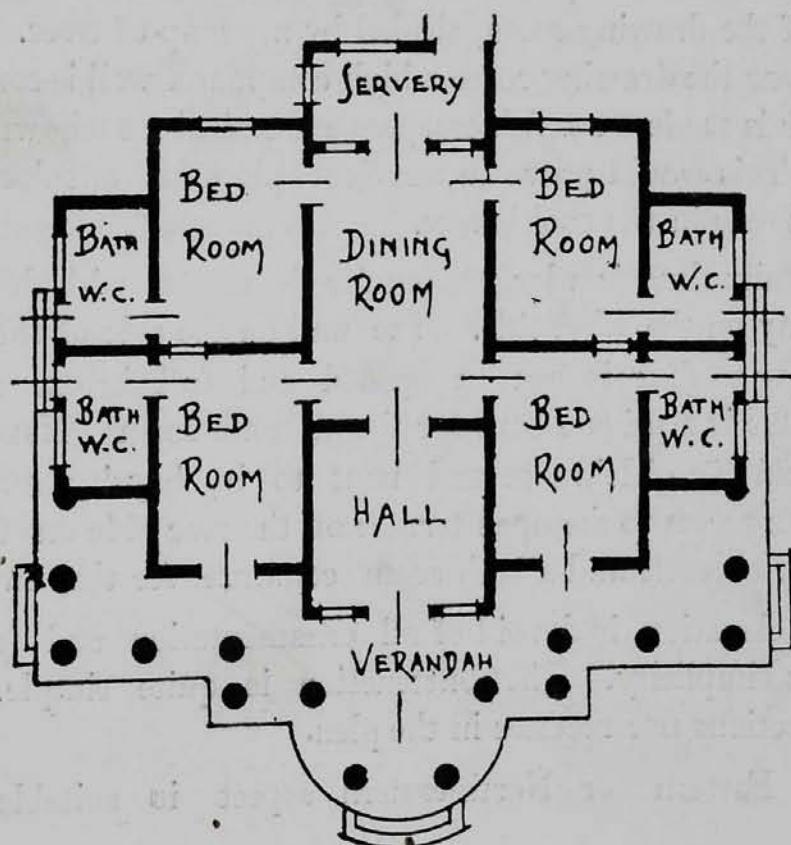


Fig. 67

By courtesy of the Indian concrete journal.
 Architect :—MR. RBNATO DIPIETROMIA, SIMLA,

Floor Area
2160 sq. ft.]

Plan No. 23 [

Cost Rs. 7200.

This is one of the simplest and most convenient buildings. The main building itself covers an area of 36 ft. by 28 ft. only. In front of the entrance is a verandah in the form of a stair case hall 12 ft. deep. On the right hand side of it is a long and narrow drawing room and behind the stair case hall is a good sized, almost square room for dining. But all these three rooms are connected together by folding partitions in such a way that when necessary, they all can combine and form a large hall of 24 ft. by 25 ft. Such folding partitions may be either of wood or patent composition sheets of which there is a large variety in the market. They are in the form of panels hinged together so that they can be folded like a pack of cards. Sometimes mechanical gears are employed for opening or closing them. The kitchen, store room and bath room are all conveniently arranged on the left hand side. Beyond the kitchen is a well lighted and ventilated paved room to serve as a day nursery and play room for children, under the direct supervision of the mother working in the kitchen. There is a paved terrace provided on the back and right hand side of the drawing room, shaded by a group of trees. On the front side near the drawing room a high compound wall is constructed and a bower is made on which creepers are trailed as shown in the elevation. This would prove an excellent place for out-door dining or sitting at ease in the cool breeze.

Upstairs there is a large room for the master with double beds and a balcony on the West side. The wall on the side of the balcony is also folding so that it can be opened and full breeze admitted inside. There is a private bath for the master's room. Next to the master's room is a girls' room and next to it, boys' room. Both these have an access to the open terrace on the rear side on the West. There are two closets and a bath room common for the two rooms.

The elevation is devoid of all ornamentation and is conspicuous by its simplicity. The construction is quite simple. There are no projections nor recesses in the plan.

An Eastern or North-eastern aspect is suitable for the building.

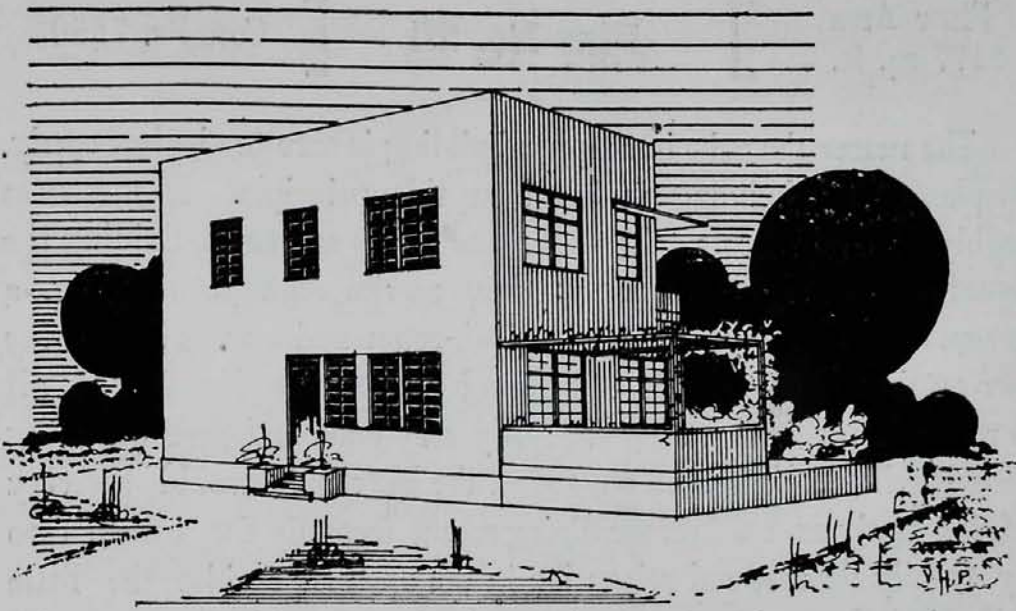


Fig. 68

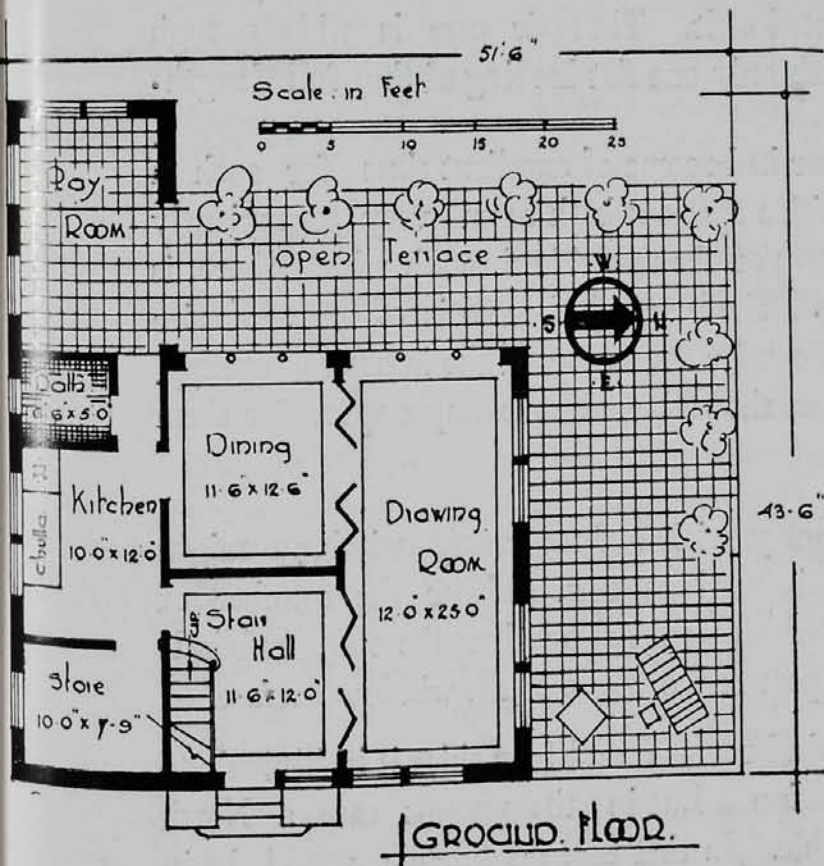
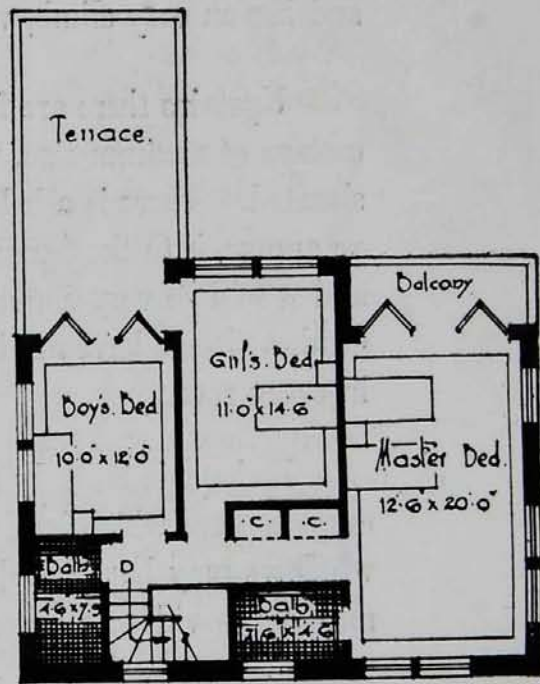


Fig. 69



FIRST FLOOR PLAN.

Fig. 70

Floor Area
2177 sq. ft.



Plan No. 24



Cost Rs. 7250

The nearer the cube in shape, a building is sure to be less costly. The plan of this building is based on this principle. It measures roughly 35 ft. by 35 ft. The stair case serves as an axis dividing the ground floor area into two parts: one, service centre, comprising, a kitchen, store room, dining room, a bath-room and a w. c., and the other on the right hand side, of rest and recreation. The sizes of all the rooms in the service wing are really very good and their grouping also is excellent. The open terrace on the back side would be very useful, firstly as an outdoor dining room, secondly for children to play, thirdly for rest and relaxation in the open air amidst the little family circle forgetting the worries of the day, fourthly for any social function for which the drawing hall, which, though spacious enough, would be found too small. When the folding partition on the rear side of the drawing hall is opened, the open terrace becomes part of the large drawing hall. The 7'-6" wide verandah would amply meet all the requirements expected of it. The stair case is wide enough and has an easy climb, with only one flat landing of the full length.

Upstairs there are four bed-rooms of excellent sizes for such a cottage of medium size, with a spacious bath room very conveniently situated. There is a balcony on the rear side through which there is an approach to the terrace. The largest bed room is of 12' x 15' size and would be very convenient for the master of the house to occupy. Clothes closets have not been shown but there is ample space for them in every room.

Perhaps it is likely that provision of too many windows might cause a glare which is detrimental to rest. Either the number of windows may be reduced, which would also reduce the cost, or blinds may be provided to cover part or the whole of the window surface.

For such a plan with bed-rooms on all four sides it is difficult to prescribe the proper orientation. But in the present case a North facing would be very suitable. In that case the kitchen would be in the North east direction and in that position all the smoke and smell from that room would go away from the house.

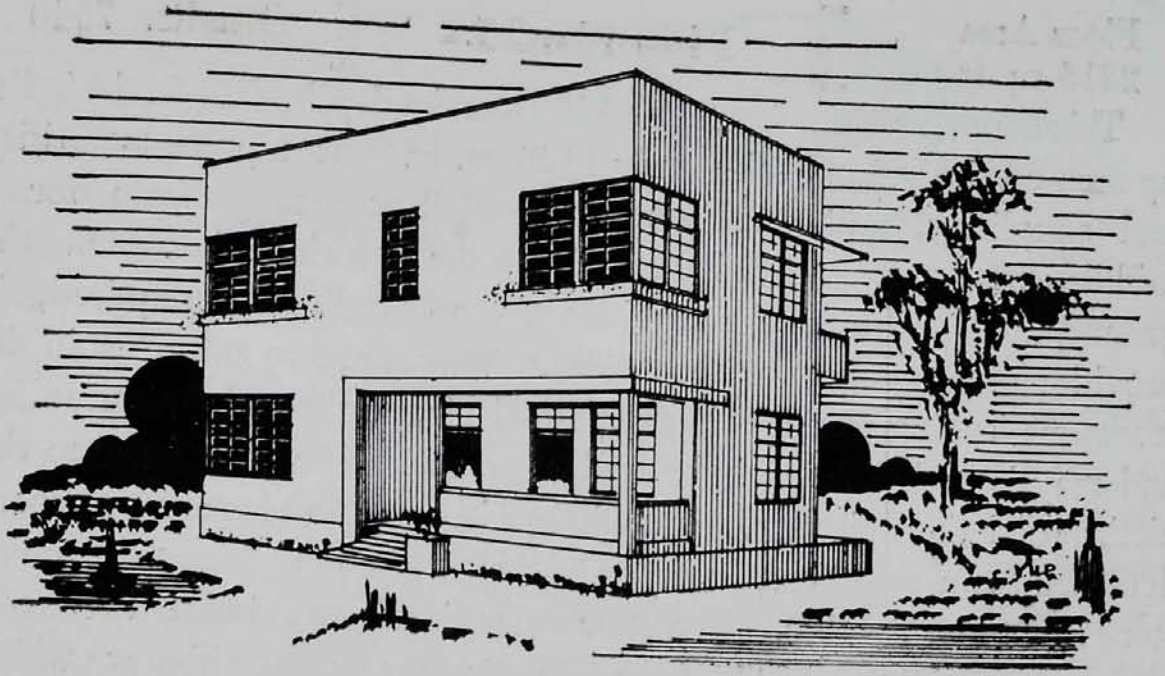


Fig. 71

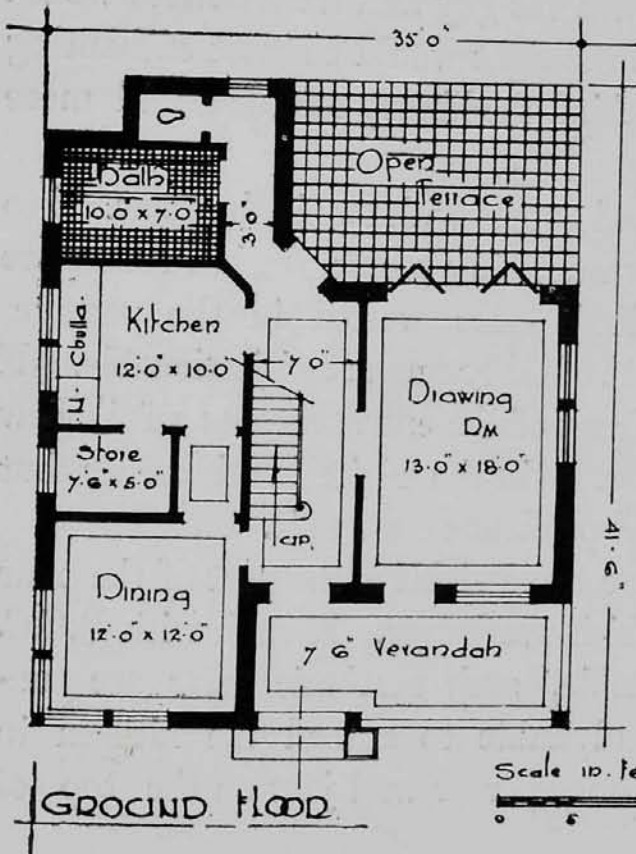


Fig. 72

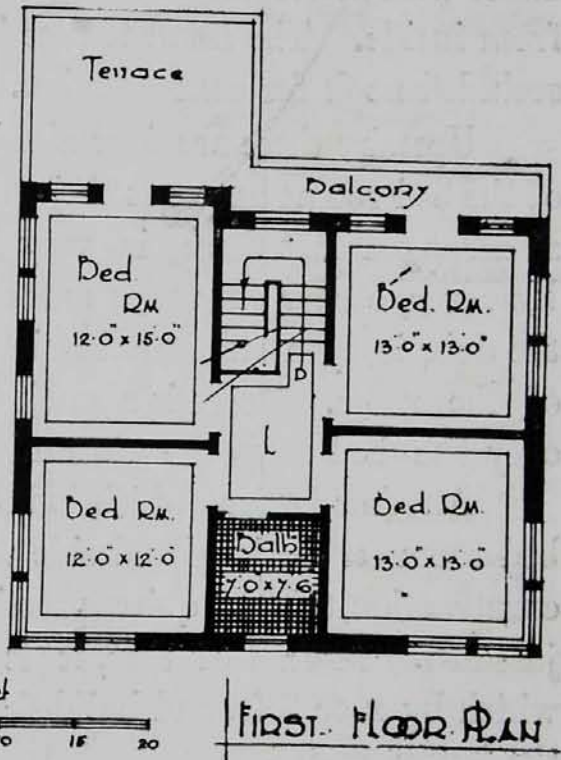


Fig. 73

Floor Area
2215 sq. ft.

Plan No. 25.

Cost Rs. 7340

This house covers a frontage of 46 ft. and a depth of 26 ft. the built-up area on the ground being only 1145 sq. ft. It represents utility and simplicity, and combines some excellent arrangements for a middle class family to live in, a little on the luxurious side. On the ground floor besides all the usual set of rooms ordinarily required, it provides a library open on three sides. There are two entrances in the front one leading to the living room and library through the verandah and may be called the main or trade entrance. The other leads to the kitchen and the stair case. The kitchen is a long and narrow room detached from the other rooms by a lobby on one side and a small store room on the other. The stair case is almost isolated though very conveniently accessible from all the rooms except library which is specially located on one side to relieve it from the hubbub and clatter of the rest of the house. Between the two front entrances is a large concrete flower box, which not only adds to the decorative effect of the outside of the house, but when the gay and fresh flowers would dance with merriness in the breeze the sight would be most enchanting from inside. The small terrace behind the library affords a still more secluded nook for concentration.

Upstairs there are four nice bed rooms with two bath rooms. Two of the bed rooms have got their own dressing rooms, the bed rooms are so arranged that there is very little space wasted in the passage. However, corner entrances to the two bed rooms are objectionable. If the door is open one standing in front of the entrance gets a full view of the room. There is a small terrace in the right hand corner but only one bed room has got an independent access to it.

Another feature which is not commendable is the part of the rear bed room on the left hand side which overhangs. Though with R.C.C. construction this is quite practicable, such acrobatic feats are unjustified. Instead of that, it is advisable to extend the kitchen in width by 2 or 3 ft. and build the outside rear wall just on the top of the lower one.

The third entrance on the left hand side in front of the bath room is unnecessary. The less the number of entrances to the house the more secure it is. Apart from these small undesirable features the cottage has many refinements to commend itself.



Fig. 74

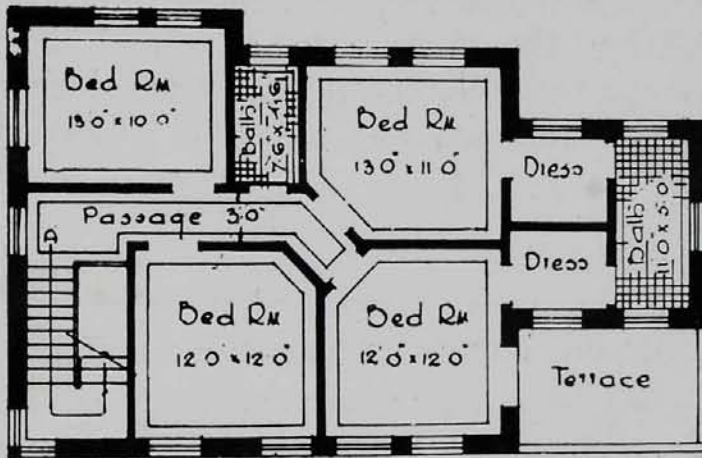


Fig. 75

FIRST FLOOR PLAN

Scale in feet

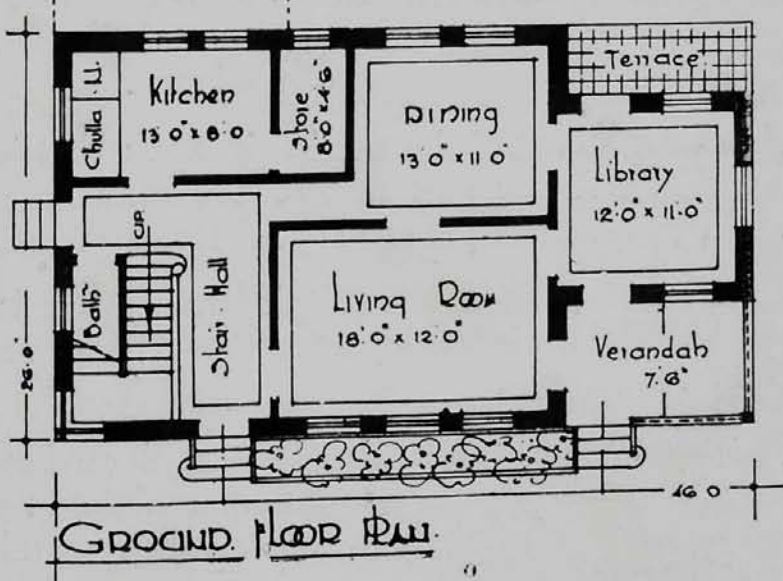
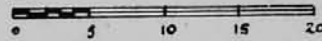


Fig. 76

GROUND FLOOR PLAN

Plinth Area
2063 sq. ft.

Plan No. 26

Cost Rs. 7350

This cottage possesses perfectly symmetrical arrangements both inside and outside. It faces the West and covers an area enclosed by about 55 ft. width and 41 ft. depth. It is more suitable for a family living in the European style. There is a portico of elliptical size 10 ft. deep in front. As the cottage is facing West this would be very enjoyable the whole day except in the after noon and evening till the sun sinks down the horizon. Behind it is a large room, 18 ft. wide and 27 ft. deep, divided by a cloth curtain into a drawing room and a dining room. Beyond this is a small verandah to serve mostly as a passage. On both the sides are arranged two bed rooms in the front and two in the rear, the sizes of which are very good and between these bed rooms are placed a bath and w. c. on either side to be used in common by the occupants of both the bed rooms. The bungalow is built at a place where there are no water carriage and drainage facilities provided. The bath rooms are, therefore, provided with doors from the outside for the sweeper to come and serve. At such places a small septic tank built on scientific principles serves the purpose best and ends all the troubles, as flushing arrangement can in that case, be easily made; the purification of sewage takes place automatically inside the septic tank. Still services of a sweeper are occasionally required for keeping the sanitary wares clean, since, in India ordinary servants, belonging to any class but the sweeper, would not touch them. Hence, an entrance for a sweeper has to be kept.

A small store room on one side and pantry on the other are symmetrically placed on the rear side. The bed rooms on the rear side are spread out a little beyond the front sides just to accommodate a window facing the West. Thus the rear bed rooms also derive the benefit of the Western breeze. A stair case from the back verandah is provided to reach the terrace on the top of the house.

The height of the ceiling of the portico is 8ft.; that of the bed rooms on either side is 10 ft.; and that of the drawing and dining room is 14ft. In this extra height are kept clerestory windows.

The cost per square foot of the plinth area is rather high because the materials used, the workmanship and the general finishing are of a superior order.

The outer walls are of brick in lime plastered on both sides 14 inches thick; the side walls of the drawing and dining room are of brick in cement mortar, 9 inches thick, and all the remaining ones 4½ inch thick in cement mortar.

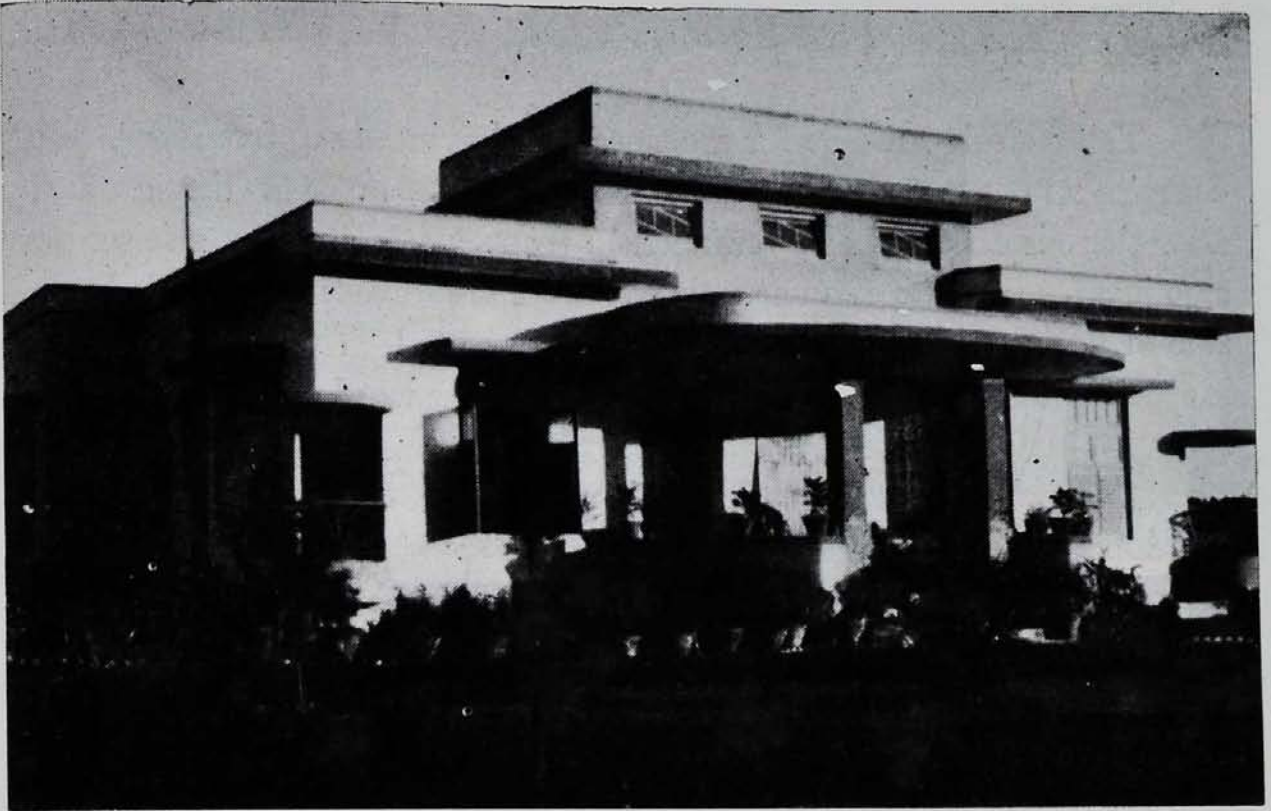


Fig. 77

Architects :- K. R. BHANSALI & Co., BOMBAY.

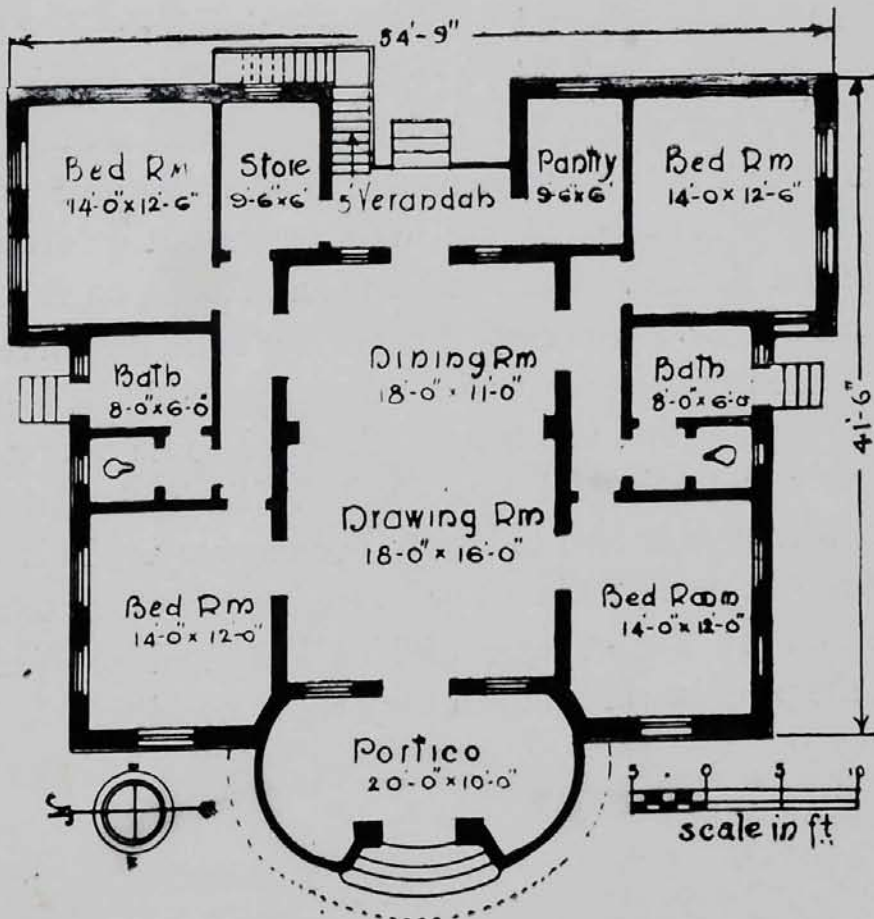


Fig. 78

Floor Area
2234 sq. ft.

]

Plan No. 27

[

Cost Rs. 7400

This plan is suitable for a corner plot having two frontages. It occupies an area on the ground of roughly $50' \times 27'$. On the ground floor there is an eight feet verandah in front with a quarter circular side just for the sake of an artistic effect. The staircase on the left hand side of the verandah is very conveniently situated. The drawing room is spacious enough and has a half hexagonal bay window. The dining room is situated between the verandahs both in the front and the rear. The bath room is between the kitchen and store, but if need be the positions of the bath and store could be easily interchanged, as it is more convenient to have the store close to the kitchen. In fact, the kitchen is so large that ordinarily there should not be any necessity of a separate dining room. The terrace in front of the kitchen is virtually a roofed verandah.

On the first floor four spacious bed rooms and one common bath room are arranged and a terrace is constructed over part of the verandah and the drawing room. Part of two bed rooms viz. the one in the front on the left hand side and the other in the rear on the right hand side, are made to project by overhanging. This may be practicable with R.C.C. construction, still such acrobatic feats are objectionable. It was a simple and not expensive matter to provide a pillar in the rear terrace just in continuation of the wall between the drawing and dining room and R. C. C. beams with one end resting on it to support fully the upper floor. The cost of providing extra reinforcement for supporting these overhanging portions would probably be the same as for providing a pillar and two beams. A broad house with a tapering top is certainly natural, and more stable. Such deviations from the natural order neither lead to beauty nor economy. This is given here just to show how an architect or an engineer is often tempted to show himself off at the expense of his client, and to give him a warning of the pitfalls which he can very easily avoid.

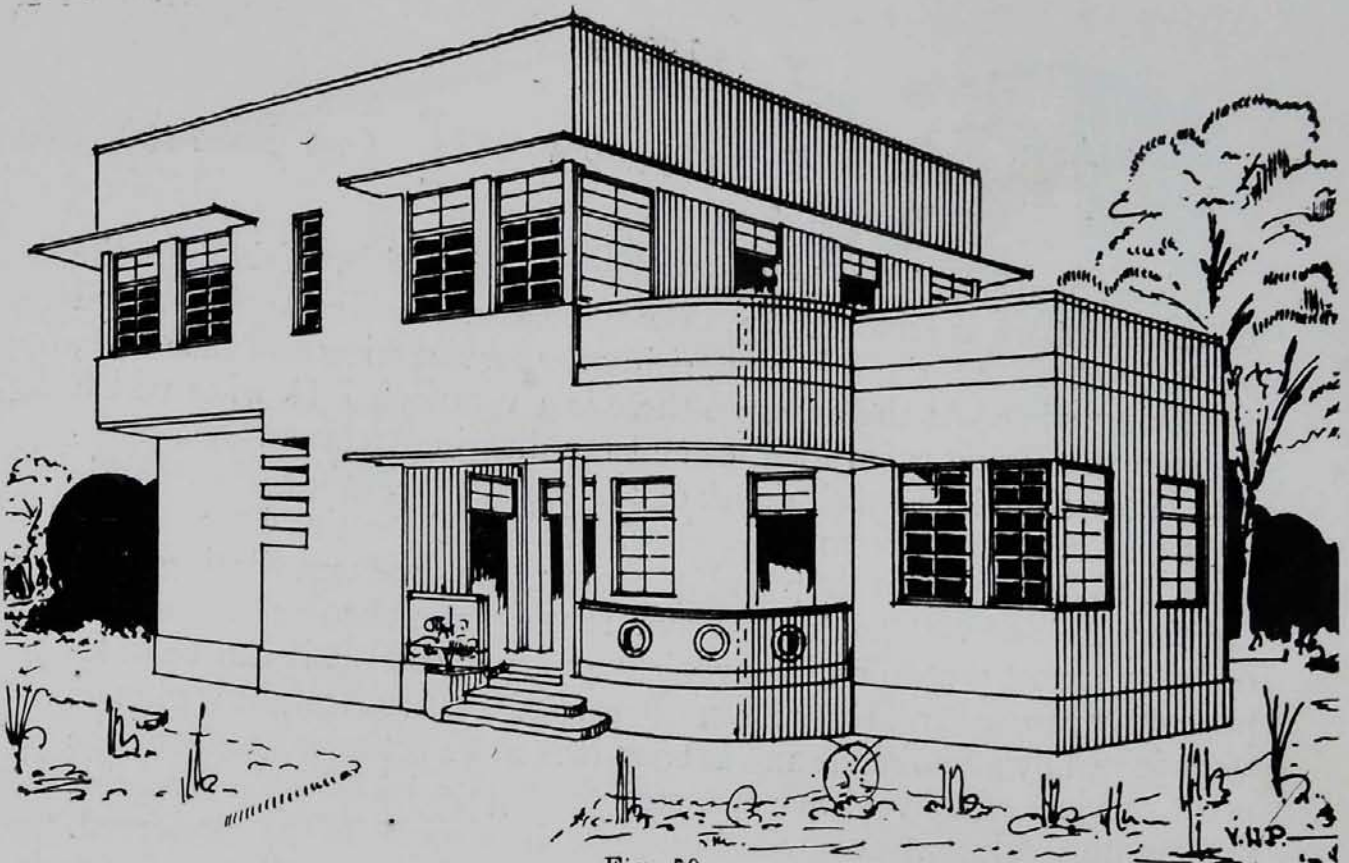


Fig. 79

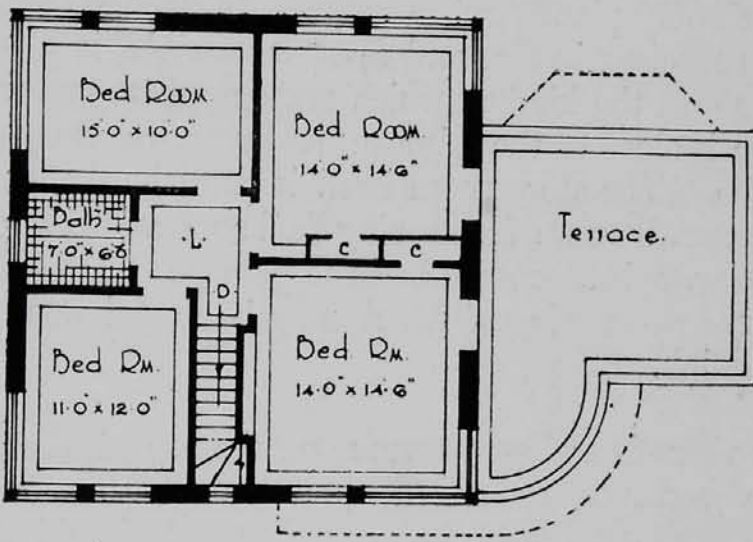


Fig. 80

FIRST FLOOR

0 5 10 15 20
Scale in. feet.

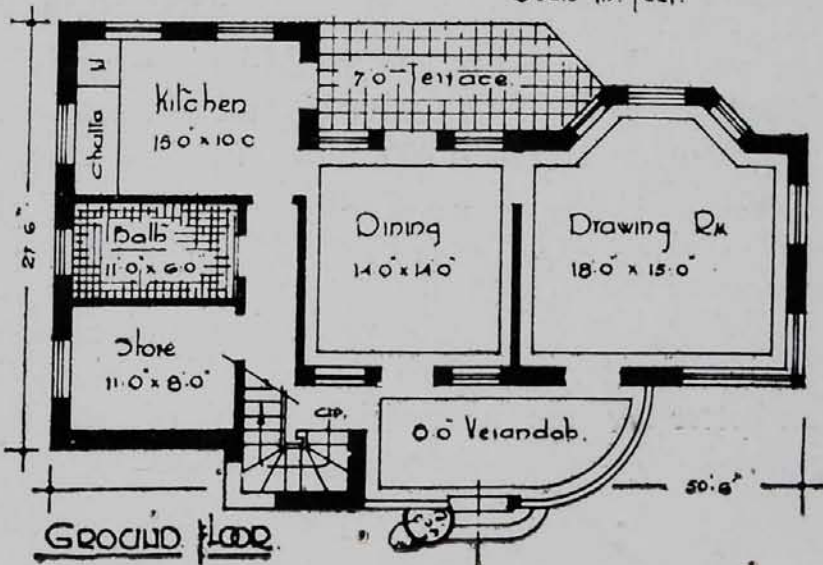


Fig. 81

GROUND FLOOR

Floor Area.
2269 sq. ft.

Plan No. 28

Cost Rs. 7490

This plan has the main entrance on the East side, although the elevation drawn is from the South-west corner. It is slightly L-shaped with the short leg of the L comprising the service wing and the other, the living wing. At the entrance there is a verandah 7 ft. wide which leads to the dining room in front and the drawing room on one side. The latter occupies the full depth of the cottage and thus commands light and ventilation from three sides. In fact the entire cottage may be said to be one room deep and possesses the best ventilating and lighting facilities. The dining room is very spacious. The staircase occupies a most central and convenient position, so that it can be independently reached from any room. It consists of two straight flights of steps joined by a semicircle and as such it is more artistic, but from the point of view of convenience two straight flights joined by a straight, flat landing, without any winding steps is always to be preferred. (Vide page 67). The kitchen is spacious and the large dining room is very conveniently placed with respect to it. The general bath room though sufficient in size and easily accessible, is placed between the store room and the kitchen which some families may not like. If the store room is close to the kitchen it saves the lady unnecessary trips to and fro. The store room itself is sufficiently large and has again, another small room for storing fuel such as firewood, charcoal, or coke. The w. c. is at one end of the passage. The drawing room is L-shaped, the shorter leg of which may be useful as a small vestibule or a verandah.

Upstairs there is an open terrace on the top of the kitchen and there are three bed rooms, a verandah and two bath rooms. Another alternative of having a bed room on the top of the kitchen, a bath room on top of the lower bath room and a terrace on the top of the store room, fuel room and part of the verandah, would be better. Because in that case, all the bed rooms would be in a straight line and the benefit of the terrace would be derived by all of them instead of by only two as at present. The bath room also in that case would be independently accessible and could be used in common by the occupants of the two smaller bed rooms, leaving the one behind the staircase for the exclusive use of the master occupying the larger bed room. The building has only one projection and all corners are square. There is absolutely no space wasted. The orientation shown would be even better for the alternative plan of the upper floor suggested above.

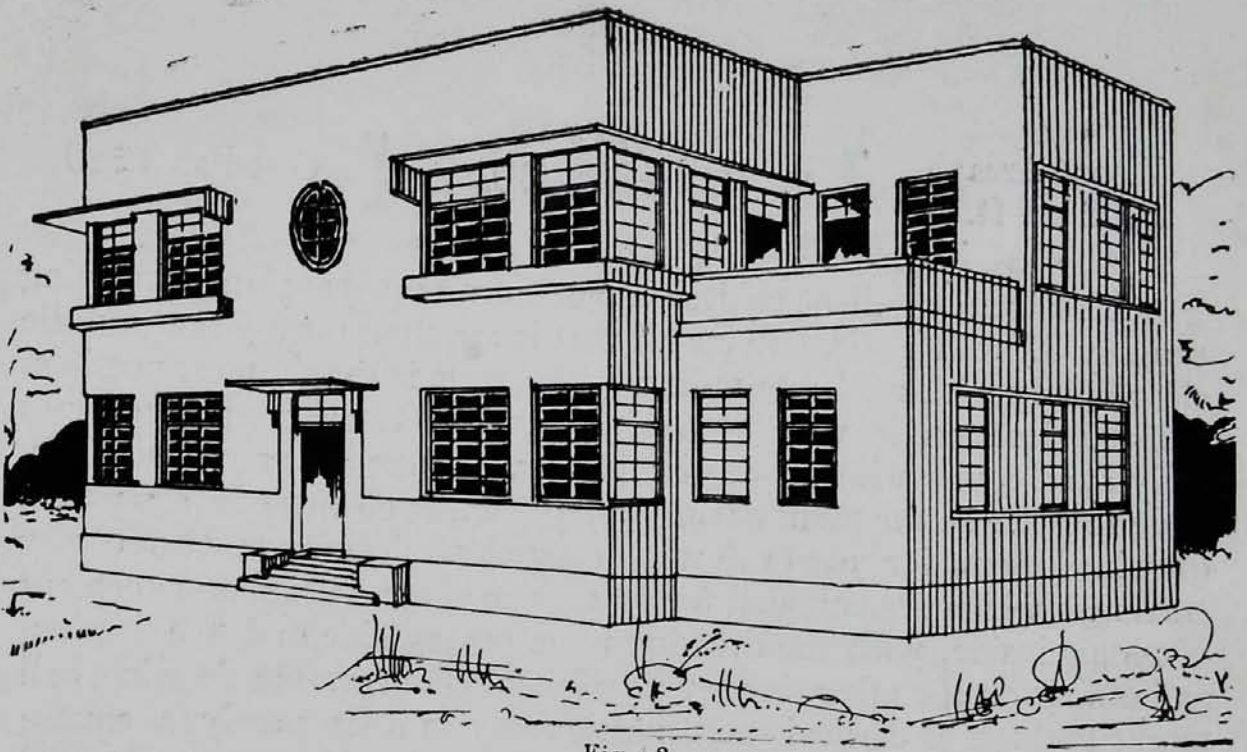


Fig. 82

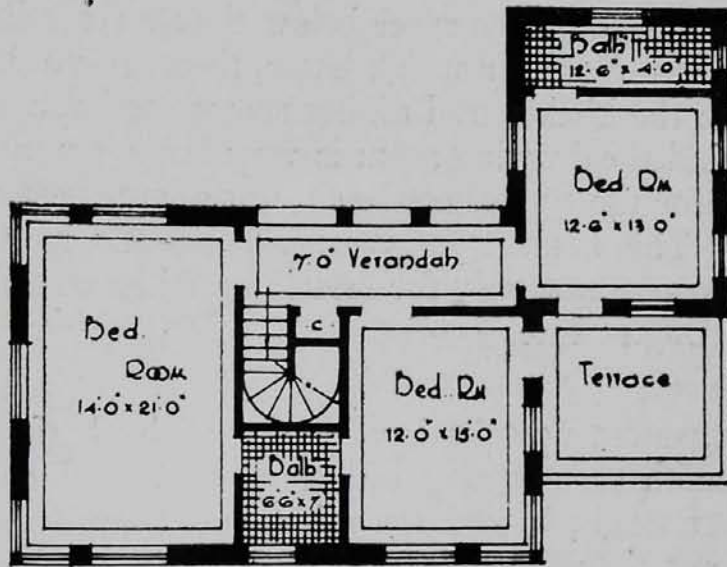


Fig. 83

FIRST FLOOR PLAN.

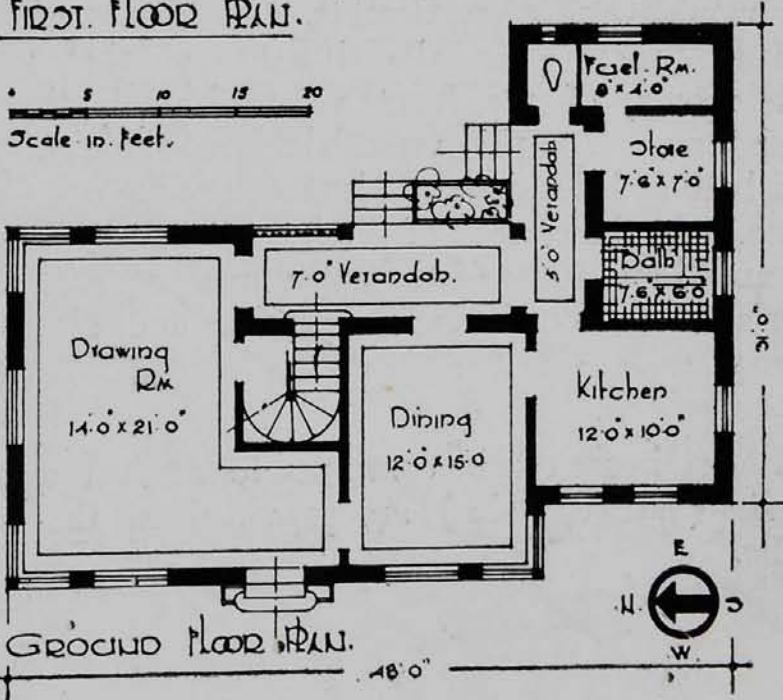
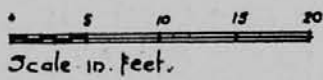


Fig. 84

GROUND FLOOR PLAN.

Floor Area
2302 sq. ft.

Plan No. 29

Cost Rs. 7520

This is an excellent cubical home on a square plan occupying roughly $37' \times 36'$. It contains all that is required for a large middle class family with moderate means. The style is the simplest possible, still the elevation is very attractive and the interior arrangements fully synchronise with the outside beauty. There is a verandah 8 ft. wide to serve as the main sitting out place though there is a separate drawing room for use on formal occasions. There are two corner entrances which are rounded for an artistic effect. The arrangement of rooms inside, with the drawing room on one side and the kitchen and dining on the other, is very simple and efficient. The drawing hall might perhaps be deemed small particularly as it is nearly a square room. The staircase is in one straight flight very centrally and conveniently arranged. The space below the staircase is enclosed and turned into a store room for which latter, there is no separate space devoted. Both the kitchen and dining rooms are large enough. The bath room behind the drawing room is very large, perhaps, disproportionately large for the typical cottage. But a large bath room is often an advantage. There is a 6 ft. verandah on the rear side, which would be very useful not only for certain activities outside the kitchen but also for sitting at ease.

The arrangement upstairs is very good with a bath room centrally placed for common use and four bedrooms one in each corner. The bedrooms are rather small, but a large middle class family requires rather more small rooms than fewer large ones. Again, as they are oblong in size they would be more serviceable. Another special arrangement is that every room gets the benefit of the verandah, the front bedrooms, of the front verandah and the rear rooms, of the rear one. As the verandahs are sufficiently wide they can be used both as balconies and also as sleeping out places on hot, sultry nights. As the corners of the front verandah on the ground floor are rounded and those of the upper made square, the latter have to overhang a little. But it is inexpensive and also adds to the artistic beauty.

The same staircase can be continued to reach the terraced roof. Concrete *jalis* (latticed slabs) are provided in the corner of the parapet walls.

Fig. 85



GROUNO. FLOOR.

FIRST. FLOOR.

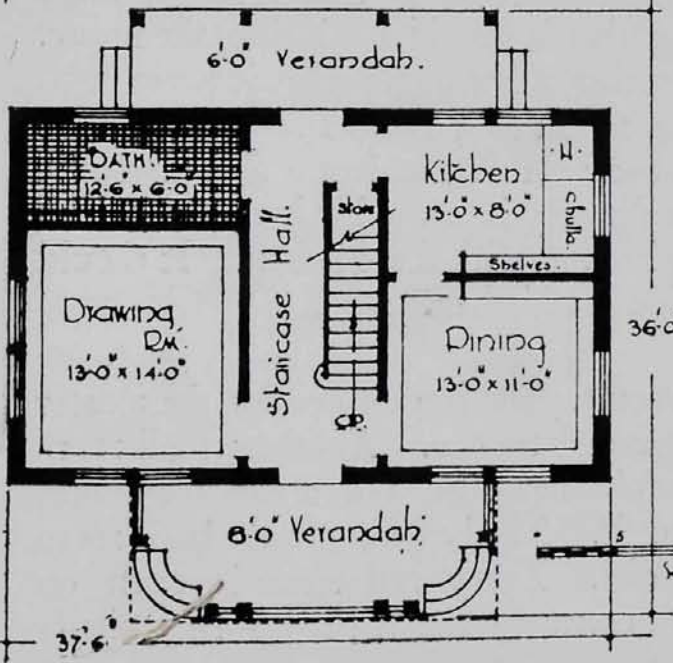


Fig. 86

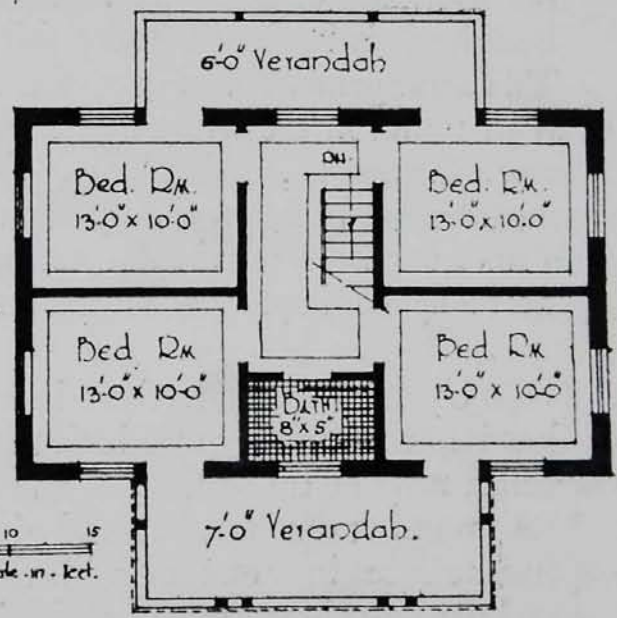


Fig. 87

Floor Area
2326 sq. ft.



Plan No. 30



Cost Rs. 7600

This cottage, which is plain in its outline and in exterior treatment relies entirely on the fenestration and mass effect in accordance with the modern trend. The outline of the plan is just an oblong rectangle 53 ft. long and 26'-6" broad. The orientation is not shown in the plan. However, the building would be suitable for a plot facing South, so that the garage faces the North or the open terrace is on the West side. At the entrance there is a seven feet wide verandah with a small study room on one side of it. The living room itself is not large, still, it has verandahs on two sides and an open terrace on one side. The dining room is sufficiently large and conveniently situated with respect to the position of the kitchen. The store room and the kitchen have received a very good position in the N.E. corner. The small cubicle named box in the plan would be very useful even as a pantry as it is midway between the kitchen and the dining room. The staircase occupies a very good central position, so that it can be conveniently approached independently from any room in the home. The motor garage is housed under the same roof of the main building. This is also in keeping with the modern trend. In the days of the horse-driven coach, the stable was necessarily required to be away from the house to avoid the nuisance of smell of the horse-dung, flies and the noise of the tramping of the horses. As the motor car is free from all these troubles it is in the fitness of things that it should be inside the house. This arrangement has got the further advantages that it saves two walls; that in the wet weather one need not go under an umbrella to reach the garage, and thirdly, that after a return from shopping the mistress can bring in the purchases directly into the kitchen, for which a door has been provided communicating with the kitchen. It should normally be kept closed from inside the kitchen.

Upstairs there are three bed rooms. The largest one for the master has its own dressing and bath rooms and terrace. Another small room which may be called the girl's boudoir has also got a dressing room, bath-room and a terrace attached to it. The boy can use the bath room and terrace in common with the girl. Every bed room is open on at least two sides, one of which is necessarily the West insuring plenty of breeze. The store room and part of the garage are roofed with corrugated asbestos cement sheets.

The open terrace on the ground floor on the west side, if shaded by an ever green tree and suitably screened for privacy, would serve as an excellent out-door dining or sitting place.

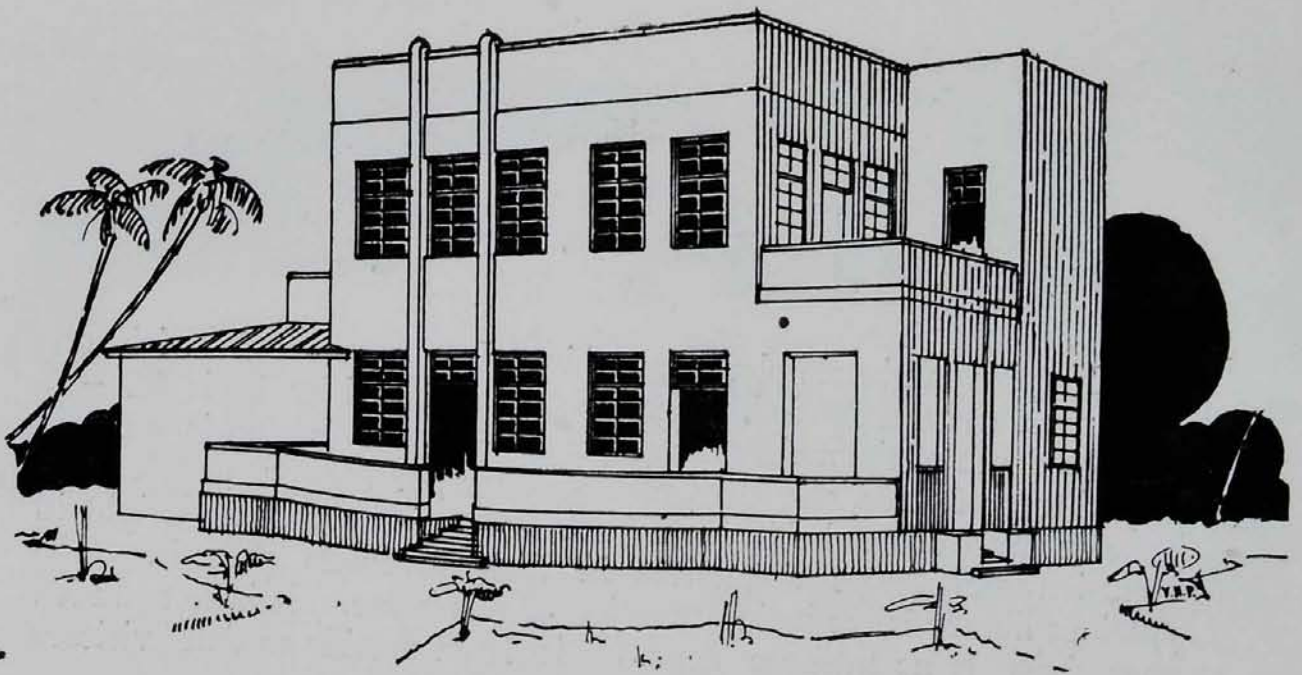
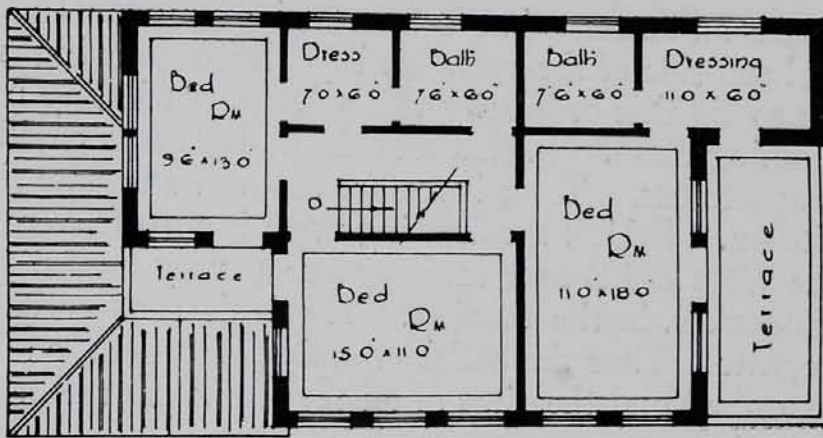


Fig. 88



1st FLOOR PLAN

Fig. 89

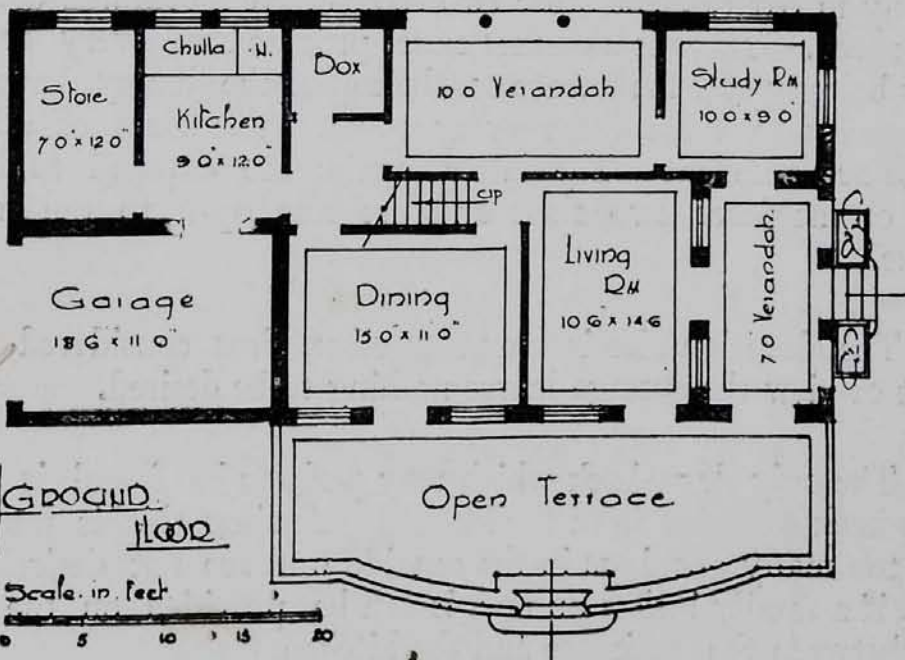


Fig. 90

Floor Area
2365 sq. ft.



Plan No. 31



Cost Rs. 7700

No plan can be simpler than this. Just a rectangle with one room in a corner extended. The frontage occupied by it is 52' - 6" and the depth of the main rectangle is 28' - 6". This plan is sure to appeal to professors, scientists, men of letters, artists or people who have cultivated some hobby, and such others who take a delight in seclusion and forget themselves in their favourite pursuit. The spacious library is the main attraction of this home. It is so secluded that there is no entrance kept to it from outside so that visitors might not come and disturb the work.

There is an entrance in a corner to the verandah 10 ft. wide. On the right hand side of the verandah is a large drawing room. The kitchen is so big that ordinarily there should not be any necessity of a separate dining room. In that case the dining room could be used as a female apartment. There is a store room of adequate size attached to the kitchen. Behind the drawing room is a 10 ft. verandah again, facing the West and thus is sure to serve a very useful purpose for indoor games etc. in the evening. The bath room occupies a convenient corner. Thus the entire grouping of rooms on the ground floor is excellent and the sizes of all the rooms are rather on a luxurious scale.

Upstairs there are three large bed rooms. The master's bed room has a separate dressing room and bath, a terrace behind, and a balcony in front. The other two rooms have a common dressing and bath room. There is a clothes closet provided in every room. The front balcony and the terrace on the top of the library have independent access to them from every room. The sizes of all the bed rooms are excellent. The latter, again, are exposed to direct sunlight on at least two sides and are also open to the south-west breeze.

The elevation also is very attractive, thus considered from any point of view the cottage leaves nothing to be desired.

The only draw-back which may perhaps be found is that there is no back entrance from the kitchen. Against this it may be said that too many openings in the outside wall are not desirable. However, if a family insists on one, it can be provided on the left hand side between the staircase and the kitchen.

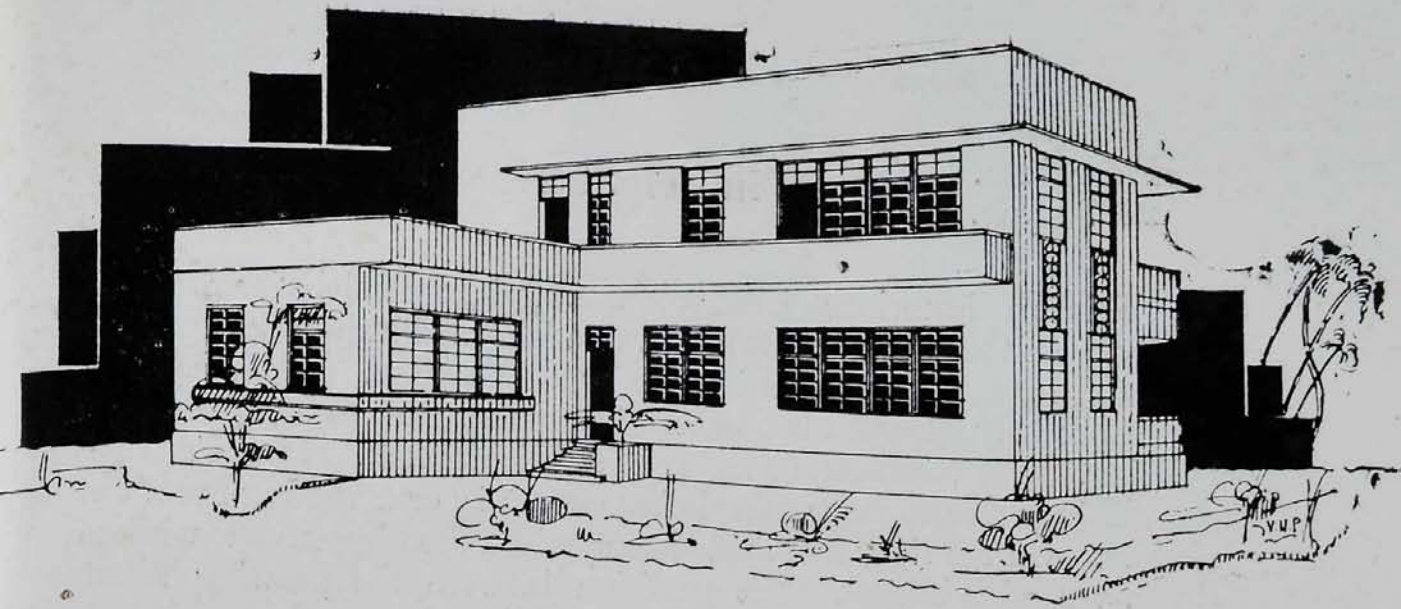


Fig 91

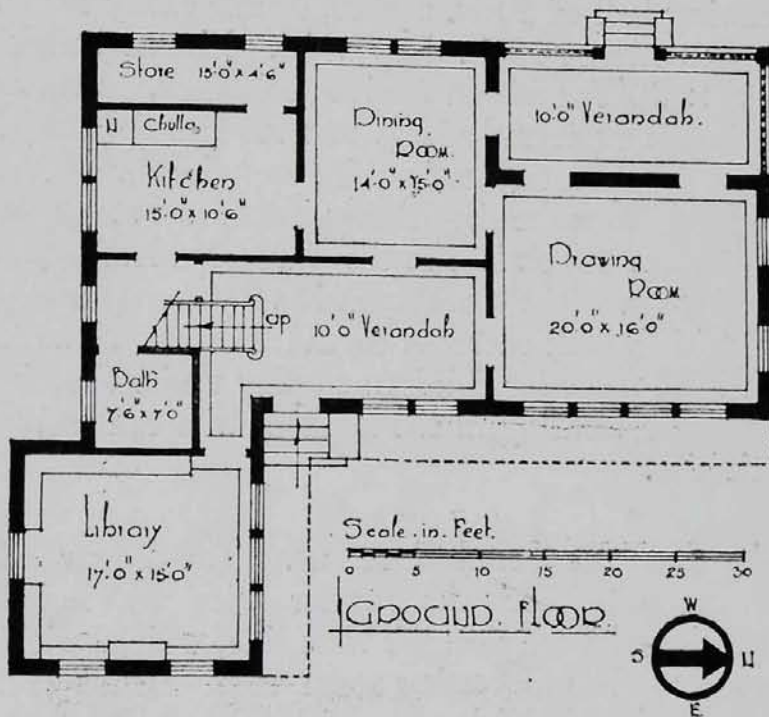


Fig. 92

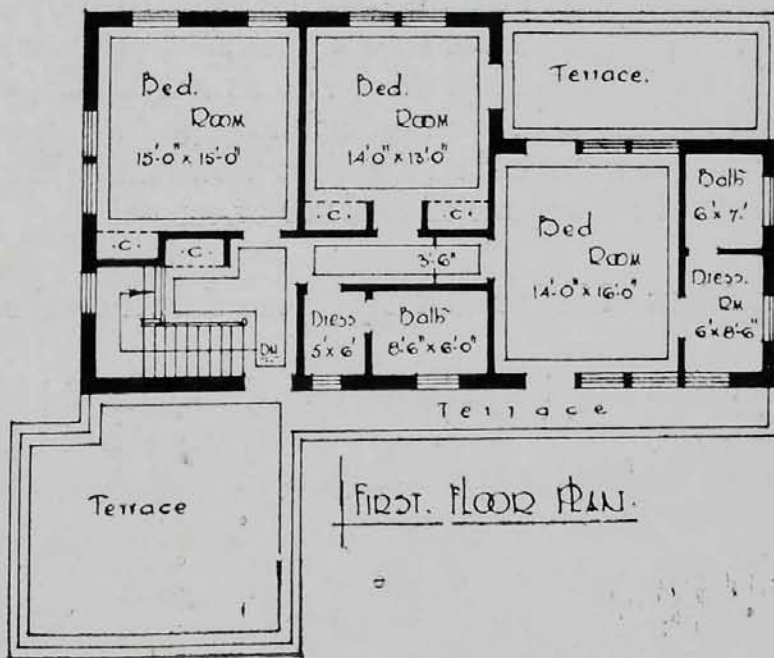


Fig. 93

Floor Area.
2417 sq. ft.



Plan No. 32



Cost Rs. 8450

This is a luxurious cottage on American model for a small family. At the entrance there is a verandah in which an attractive staircase is placed just opposite the main entrance. A front staircase if properly designed is capable of becoming a central feature in a building. The verandah, or rather the staircase hall, is itself sufficiently large either to serve as a sitting out place or a waiting room for visitors. On the right hand side is a spacious drawing room with a six ft. verandah behind. The partition between the drawing room and the verandah can be opened out by folding the panels so that a spacious drawing hall of 20 ft. square, can be easily made. There is, further, an open terrace 10 ft. deep which ultimately makes the drawing room 20' × 30' for use on festive occasions. On the left hand side, the kitchen is sufficiently large to serve also the purpose of dining and if need be the open terrace is quite opposite for out-door dining. It is thus possible to make the dining room serve as a "comfort room" (vide page 68) as it has the further advantage of the bath room attached to it. The store room is very conveniently placed and allows by its side a back entrance to the kitchen. The open terrace would be an ideal place for children to play under the direct supervision of the mother working in the kitchen, who can easily keep an eye on their activities.

Upstairs there are three bed rooms. The larger one would be a veritable paradise, for the master with an independent bath room and spacious balcony on the west side, which, with the help of curtains can be used as a dressing room also. There is a bed room for boys and another for girls also, with a large bath room for common use and a spacious terrace on the west side, also for common use. The lobby is spacious enough to serve as an upper staircase hall and there are cupboards in it on both sides of the window. A seat in the window would command an excellent view of the landscape. The lobby can be used for a game of cards or of carom.

The positions of beds and tee-boys are shown on the plan.

The elevation is quite plain, and absolutely devoid of ornamentation and still, very enticing. Thus the cottage is in every respect *de facto* one of the ideal homes satisfying all the requirements.

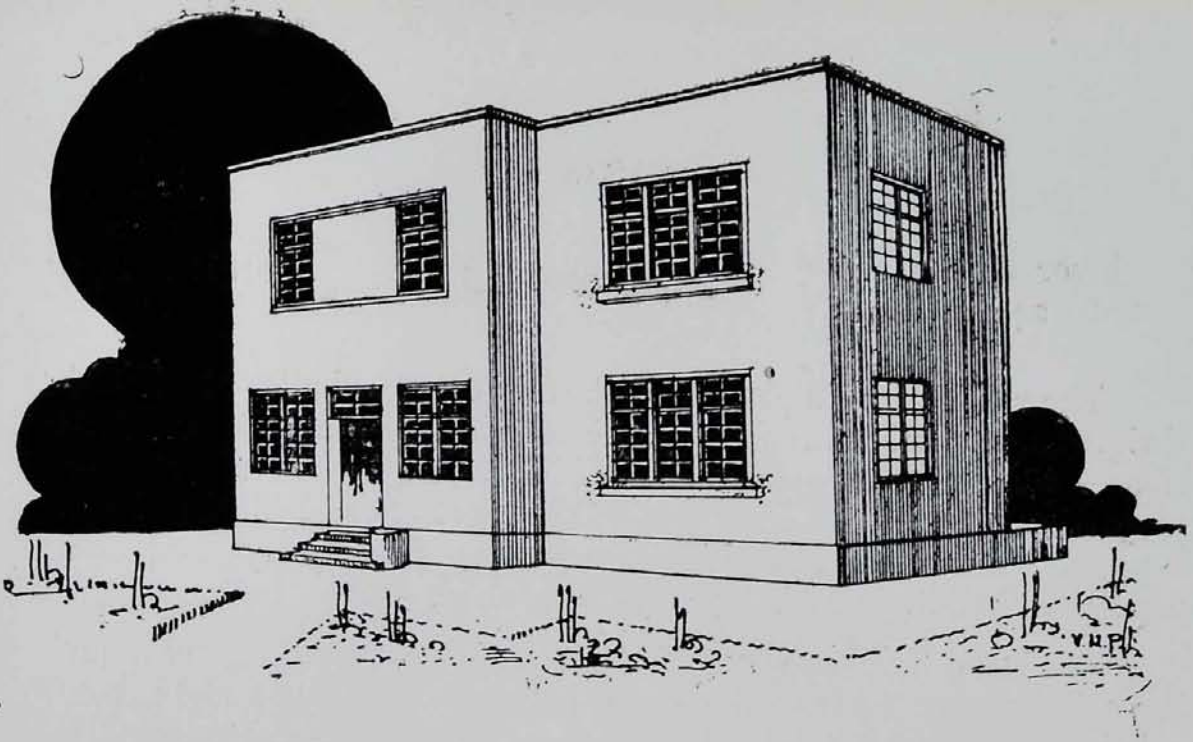


Fig. 94

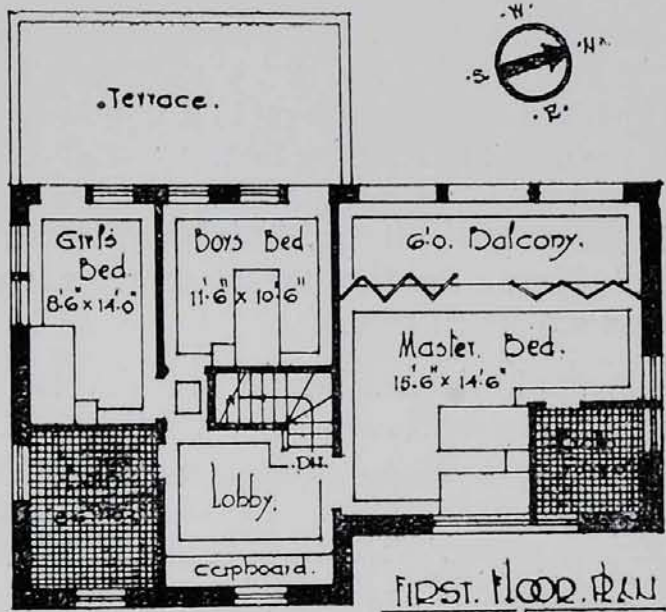


Fig. 95

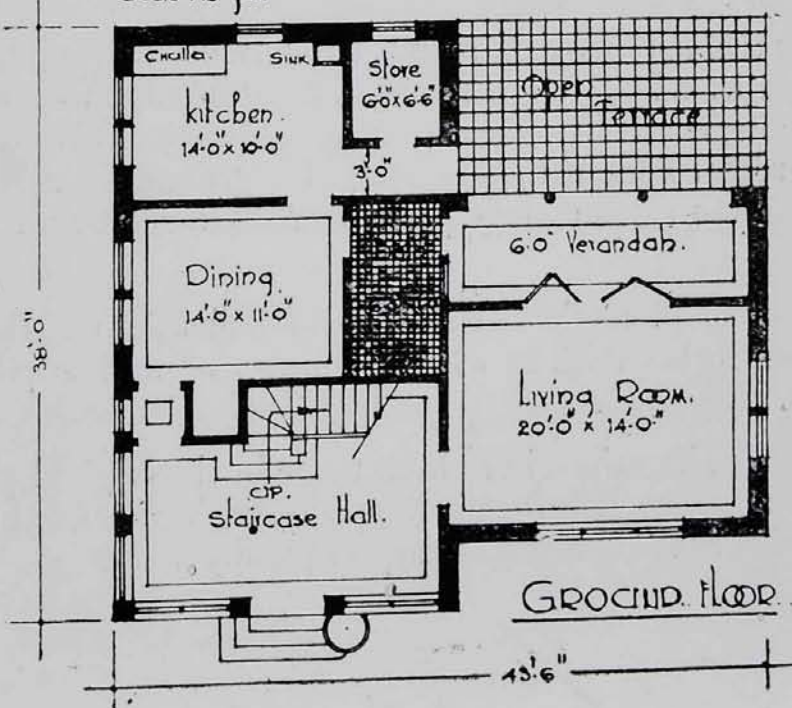


Fig. 96

Floor Area] **Plan No. 33** [Cost Rs. 8340
2520 sq. feet.

The writer was impressed with this cottage built at Zurich, Switzerland. It is extremely simple both in design and in construction — quite a rectangular plan without a single curve, recess or projection. Such buildings necessarily cost less both in initial construction and annual maintenance and yet provide no less comforts than buildings with ornamental features.

The house covers an area of about 1300 sq. ft. of ground and has a frontage of 44 ft. The main entrance is on the right hand side into a verandah 8 ft. wide. The special feature of this verandah is, that there is not a single post or pillar, the two sides of its roof are anchored into the walls, the other two sides being left overhanging. The ceiling light is in a recess inside. On the left hand side of the verandah is a spacious drawing hall with a very wide window. The dotted lines in the drawing room and library show window seats. The large room allotted to the library is in a secluded corner away from the hubbub of the rest of the house. This room would serve also as a "comfort room" since in the Northwest corner it will remain cool and also command Western breeze.

The apartments in the row behind are devoted to the service side of the home. The right corner is occupied by a spacious dining room, next to it comes a room of adequate size for the kitchen, then follow the store-room, bath-room and the back entrance, all located at the most convenient places. The w. c. is placed below the landing of the staircase. The latter is so placed that it is approachable from any room of the house without disturbing the privacy of the other. It has four straight flights without a single winding step.

Upstairs there are five bed-rooms, two terraced balconies, one bath-room and one w. c.. Two bed-rooms are pretty large with a common large terrace in front. The short passage midway, secures the privacy of each bed-room. Thus if the library on the ground floor is reckoned as a bed-room the small cottage provides six bed-rooms of adequate sizes.

Unlike other plans the central longitudinal wall on the ground floor is fifteen inches thick in which a number of wall cupboards can be provided.

Numerous alterations have been made in the original plan to suit Indian conditions, though to suit the photograph the front and the right hand side have been left as they originally were.



Fig. 97

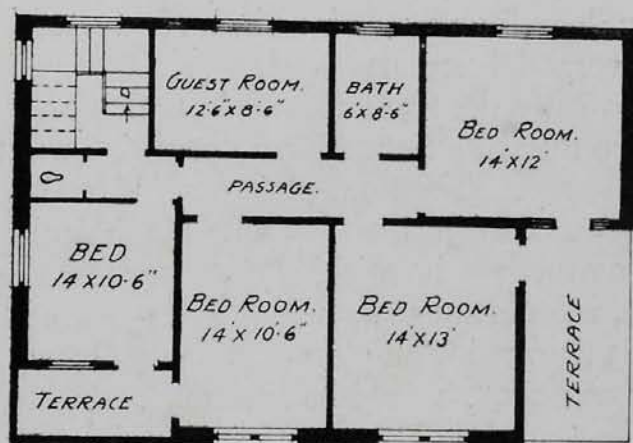


Fig. 98

= FIRST FLOOR =

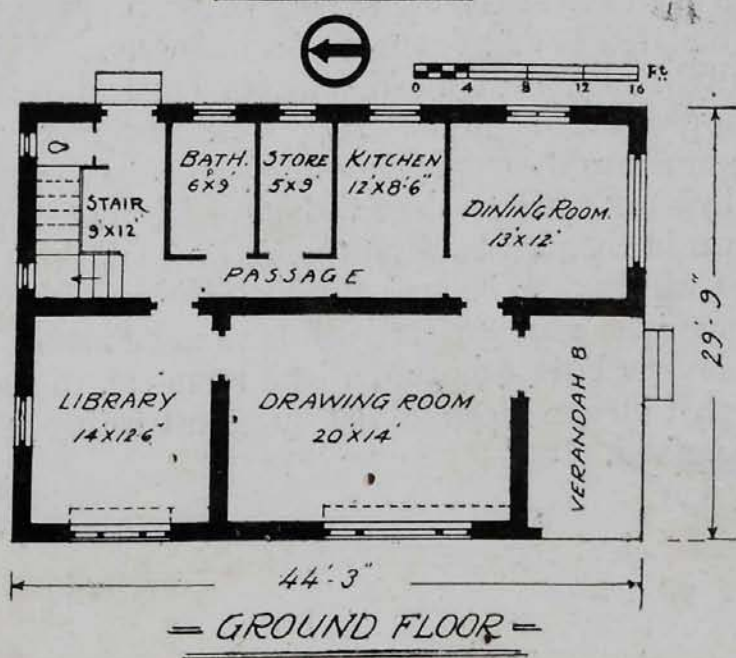


Fig. 99

= GROUND FLOOR =

Floor Area]
2632 sq. feet.

Plan No. 34

[Cost Rs. 8740

The design of this handsome cottage will appeal to many people as it is planned, on principles of sound common sense and possesses a very attractive elevation. It covers a frontage of 33 ft. and a depth of 46 ft. The built-up area on the ground is roughly 1400 sq. ft. At the entrance is a verandah 6'-6" wide, on the right hand side of which, is a large study room, which, in fact, can be used as a bed room. Opposite to it is an almost square room to be used as a drawing-room. Behind it are the kitchen and the dining room opposite each other. Both these rooms possess ample dimensions. The store room in the corner opens into the kitchen and by its side is the bath room which has entrance from the back verandah. The latter is seven feet wide. The staircase starts in the lobby opposite to the drawing room and in this position it occupies a central place, easily approachable not only by the inmates, but also by visitors if necessary.

The orientation of the plan is not shown, however, it would be appropriate for a south or southeast facing.

On the upper floor four good sized bed rooms, a bath room, a toilet room and a verandah are arranged. The occupants of the two front bed rooms can use the front verandah, and the toilet room in common. The two rear bed rooms have got their own terraces, even to sleep out if necessary. The same stair case if continued can give an access to the terrace on the top of the building. However, in order to accommodate it within the available space without increasing the rise, a few triangular winding steps would be necessary on the landing as shown in the plan of the first floor. A roof slab also on the stair case room would be necessary. There is a separate canopy provided on each floor over the verandah and these have enhanced the beauty of the elevation.

It is possible to treat the upper floor as an independent flat to let if it is contemplated to do so at some future date. This, however, should be fully thought out in the beginning and some necessary alterations in plan made before starting construction. For instance, a separate entrance to the upper flat would be necessary and this can be provided by substituting a door with steps in front in place of the window shown in the plan between the kitchen and the w. c. The stair case also will have to be pushed a little backwards. On the upper floor, also some such arrangements will have to be made, by which, it would provide four bed rooms and a bath room etc. to start with, but can be converted into a separate flat by constructing a few partitions when required.

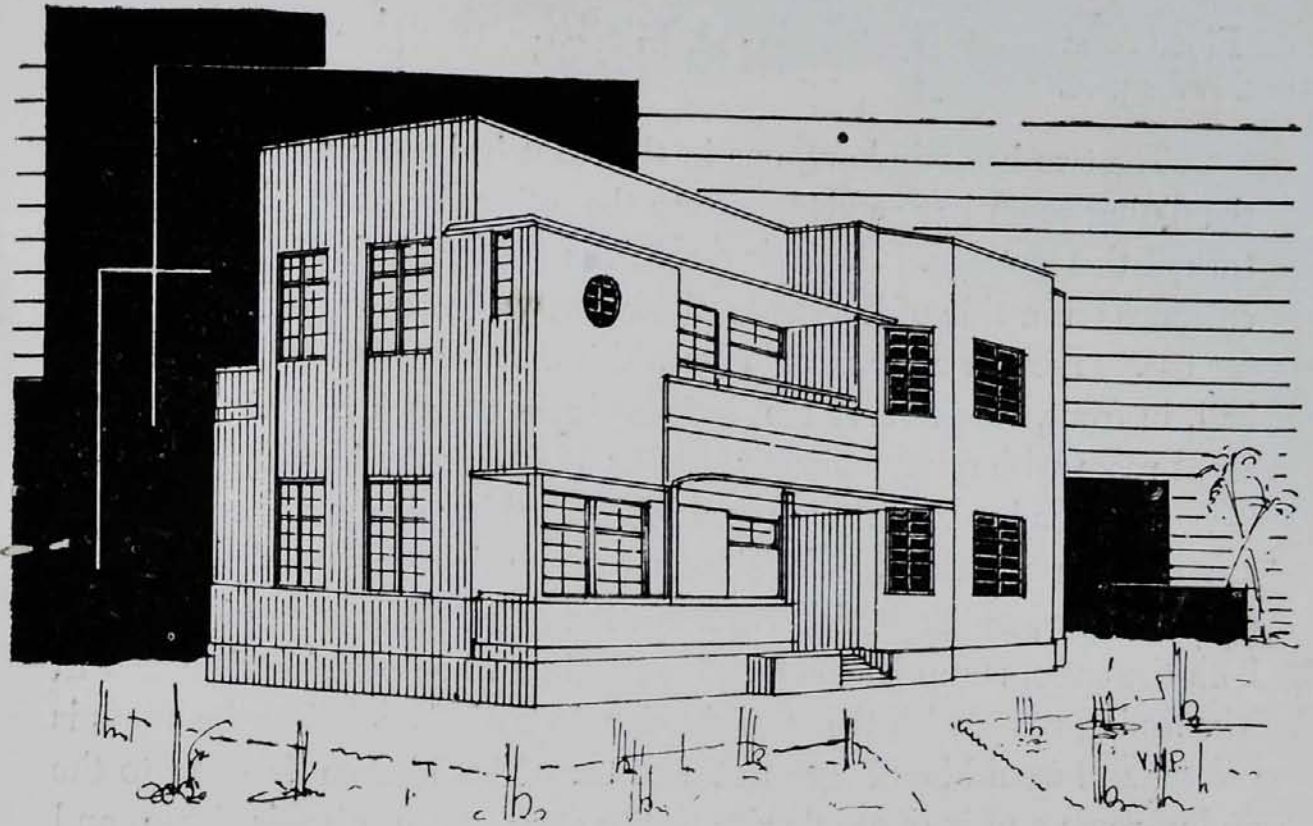
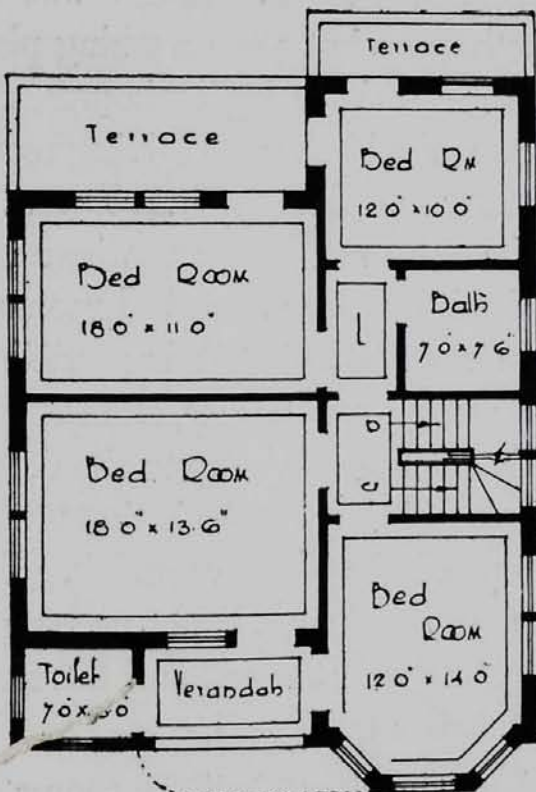
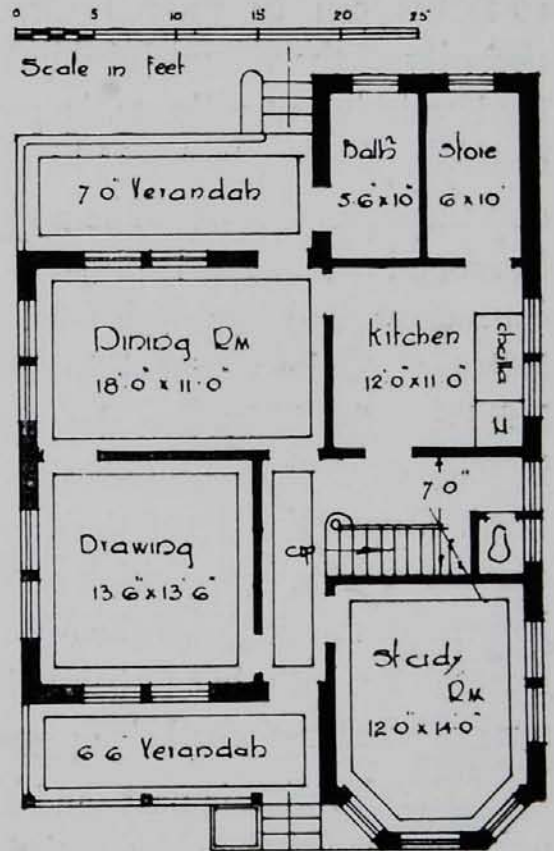


Fig. 100



FIRST FLOOR PLAN.

Fig. 101



GROUND FLOOR

Fig. 102

Floor Area
2677 sq. ft.

**Plan No. 35**

Cost Rs. 8860

The two bay windows, one in the front bed room and the other in the dining room have added spice to the otherwise quite plain architecture of this cottage. There is a spacious verandah in front, with an entrance on a side of it so as to allow the whole space on the verandah for use. There is a spacious lobby which may be called even a staircase hall, in front, to preserve the independence of each room. The large front room with a bay window facing West would be very enjoyable. The staircase has its entrance in a lobby making it easy of access from any room in the house. The drawing room is square and not a large one; however, as the partition between it and the dining room is foldable, both these rooms can be combined any time when occasion demands it. The dining room with the semicircular bay window facing the West is oblong and would be of greatest service. The kitchen is close to the dining room and is of ample size. The store room also is large and placed at a convenient situation. The bath room is isolated by a lobby, so that it can be entered directly from any room. There was no necessity of the verandah behind the bath room but some washing place for burnishing utensils etc. is required for a maid in Indian homes, and as far as possible, it should be away from the kitchen and living rooms and therefore, this would be a most convenient place for it. The w. c. has found a very good place below the staircase landing, where it is convenient and inconspicuous. On the upper floor three bed rooms, a bath room and a verandah in front, are arranged, but it is possible to build even five bed rooms also; the fourth on the rear terrace, and the fifth in place of the bath room if the latter is extended right up to the dotted line i. e. upon the top of the washing place below. The bath room in that case can be pushed back on the top of the 5'-6" verandah. The bath room required near bed-rooms in Indian homes is not necessarily for taking a bath, but to be used as a general toilet room, and therefore, a room of even a small size serves the purpose quite well.

The elevation is neat and attractive. The sizes of all the rooms are quite decent for the class of the cottage.

A side entrance near the staircase is specially provided to meet the contingency of treating the upper floor as an independent flat if and when required.

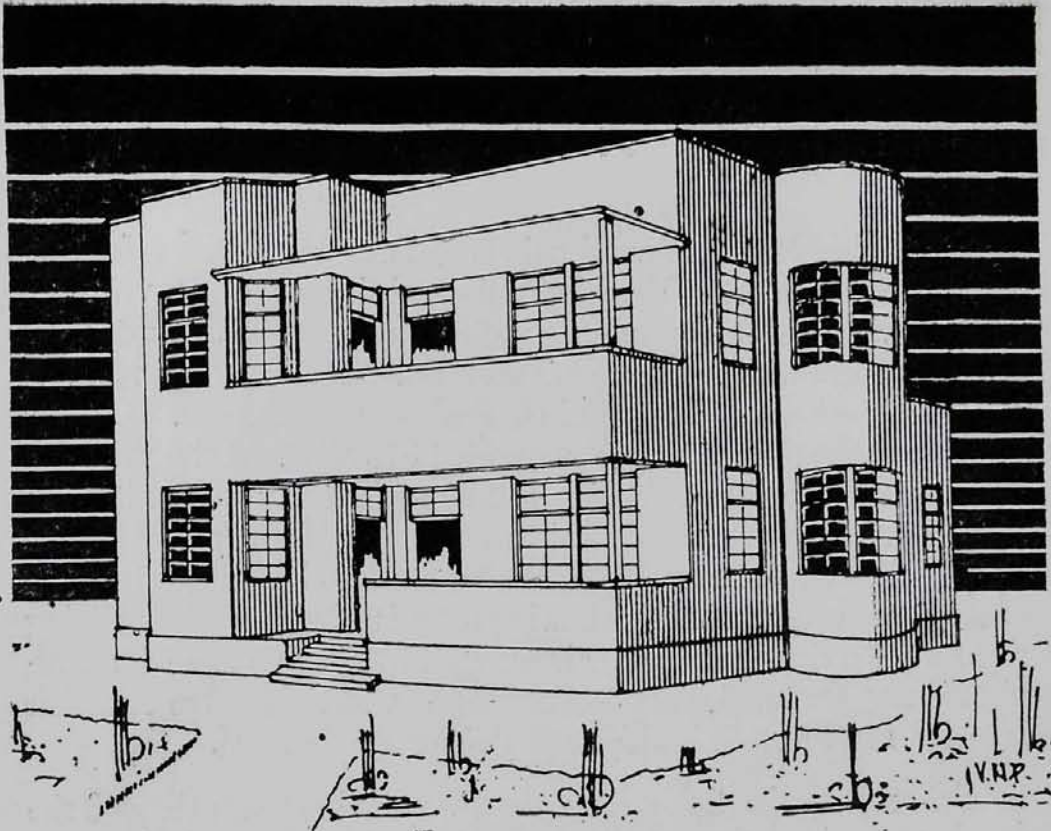


Fig. 103

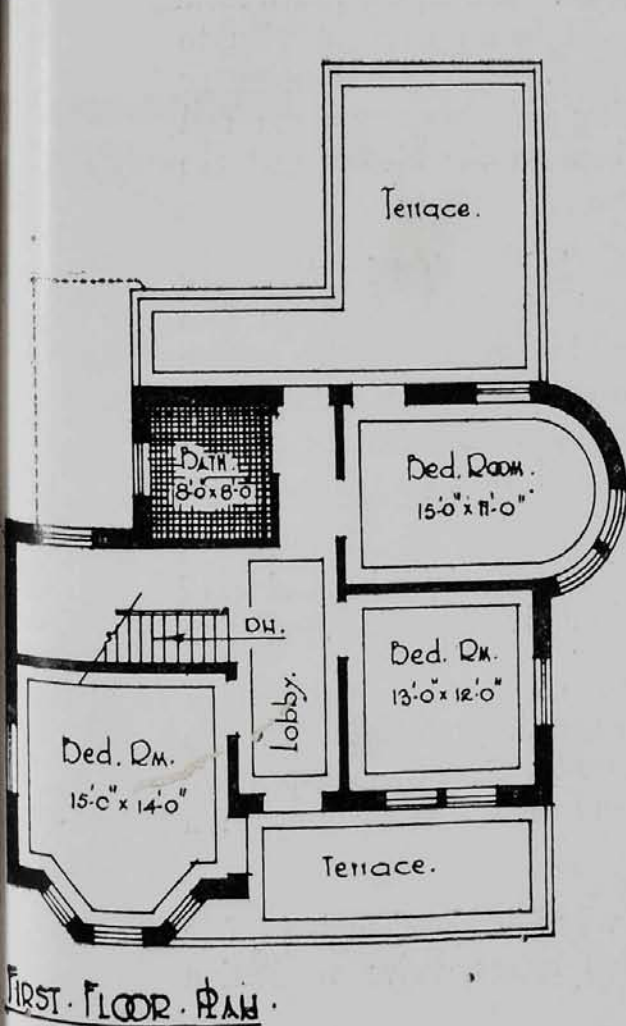


Fig. 104

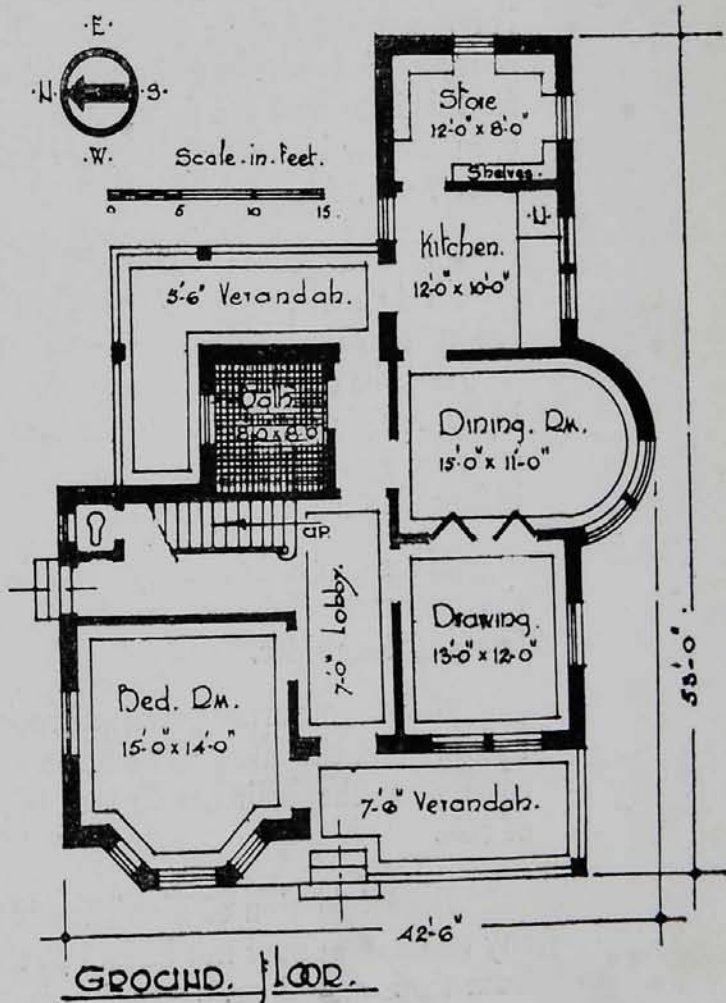


Fig. 105

Floor Area. 2724] **Plan No. 36** [Cost Rs. 8875

This plan possesses several unique features which make for convenience and comfort. The delightful semi-circular front verandah enjoys a vista and breeze from three directions. On the left side there is a guest room with a bath room attached. The drawing room is located in the heart of the house in a spacious square room. On the right hand side there is a large verandah 11 ft. wide. This verandah may be partly enclosed and a small study room formed out of it. The kitchen with ample cupboards and two windows is compact and the additional feature of a smoke outlet adds much to its value. In front of the kitchen and behind the drawing room is a commodious dining room and the right hand corner is occupied by a bath room of convenient size. The small space between the bath room and the verandah is enclosed and formed into a small Puja or Prayer room.

For reaching the dining room the guest need not pass through the drawing room, but through the verandah on the left hand side and enter through the door near the Puja room. If a separate bath room is not required for the guest room it would be an excellent plan to convert it into a store room near the kitchen. All that is necessary for this is to close the door communicating with the guest room and open another in front of it in the wall between the kitchen and the store room.

The staircase is wide and easy to climb. Upstairs there are three bed rooms, the special feature of which is that each enjoys free breeze from three sides and that the small bath room or rather a toilet room can be entered independently from every bed room through the lobby, and further that the verandah and open terrace can be used in common by the occupants of all the three bed rooms as there is an independent approach to them.

If a small bed or study room be built on the right hand side of the open terrace on the rear side, it would derive light and ventilation from all four sides.

If the same arrangement of rooms as on the ground floor is made upstairs and the latter flat let as a separate tenement the independent entrance to the staircase on the left hand side would admit even of this.

The orientation of North would be very suitable though in fact any orientation may not be bad as the bed rooms derive ventilation from three directions.

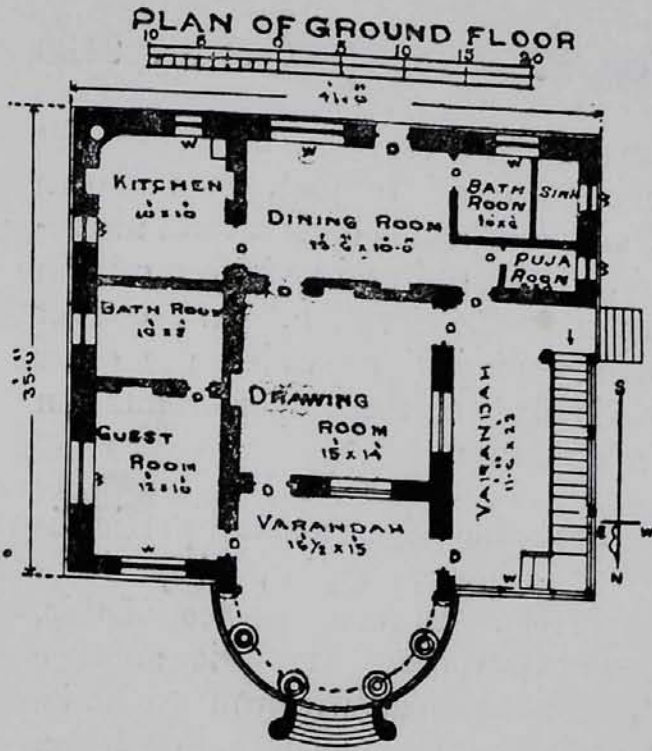


Fig. 106

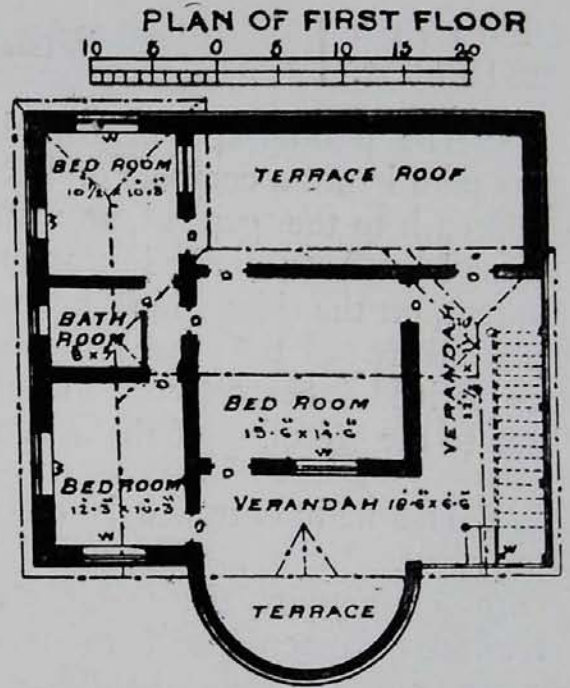


Fig. 107

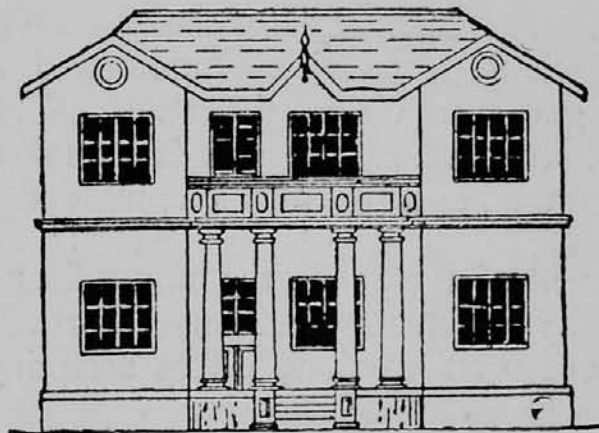


Fig. 108

Floor Area]
2518 59 ft.]

Plan No. 37

[Cost Rs. 9150

The photograph of this house shows a very nice elevation, but the plan is not a compact and economical one. In fact, to make an approach to the general standard adopted in this book several alterations have been made in the original plan to improve it to a certain extent, on the sides which are not seen in the elevation. In the first place there are too many recesses and projections which are quite unjustified. Secondly no attention is given to the proper orientation nor to the grouping of the several apartments.

The main entrance is on the East side where a small portico is provided. The steps are arranged inside, and thus, they have encroached upon the space in the portico. In consequence of this, the latter is too small to serve any purpose. There is another entrance in the right hand corner to a verandah which may also be called a stair case hall. This verandah has become more or less a passage and therefore, though it is 9 ft. wide it loses much of its value. The position of the stair case is not a happy one since in order to reach it one must cross at least one of the living rooms. There are three rooms called 'parlour' 'sitting room' and 'drawing room' in the plan, all of which serve the same purpose and therefore, are not necessary for the class of the cottage. The sitting room can be used as a bed room but its location with respect to the adjoining rooms and the positions of doors are not suitable to afford it the necessary privacy. The kitchen faces the West and therefore, the nuisance of smoke is likely to arise. Similarly the w. c. and the bath are in a wrong corner viz. southwest. The long verandah on the West side is indeed very nice, but it should have been at least 8 ft. in width to be used as a place for sleeping out.

The arrangement of rooms on the upper floor is not so good in the building actually constructed. Many improvements have been made in the plan of it by the writer, before accepting it.

The elevation, however, is very beautiful. The concrete jali in the tall and narrow window on the first floor above the entrance in the West enhances the beauty of the elevation. The terrace on the first floor consists of a layer of asphalt felt on R. C. C. slab over which, are laid mosaic tiles in cement. The flooring in all the living and bed rooms consists of terazzo i. e. marble chips laid in situ in beautiful designs in coloured cements and polished by machine. On the whole, the material used and the workmanship is excellent but as the planning is not done skilfully all the money seems to be wasted,

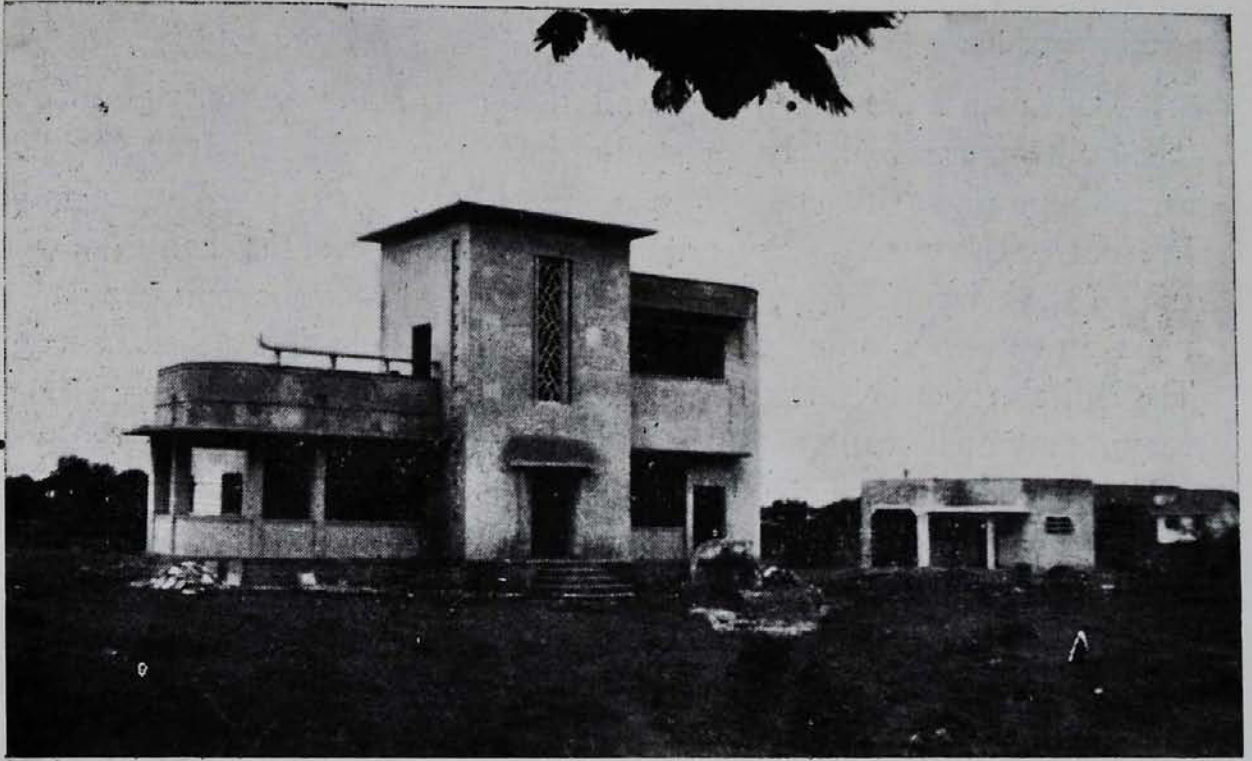


Fig. 109

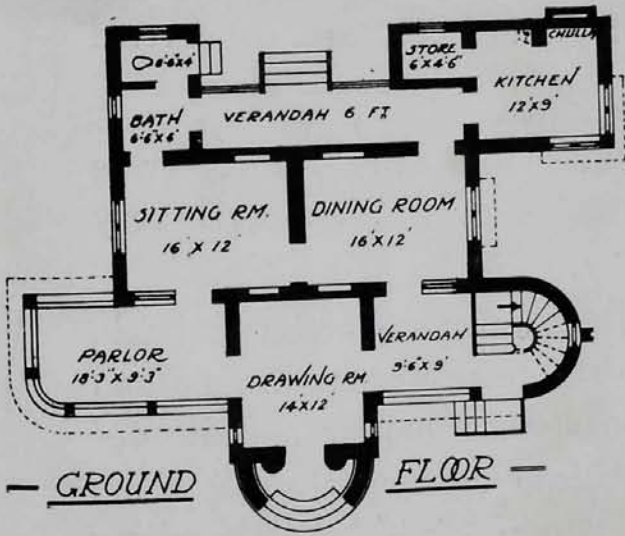


Fig. 110

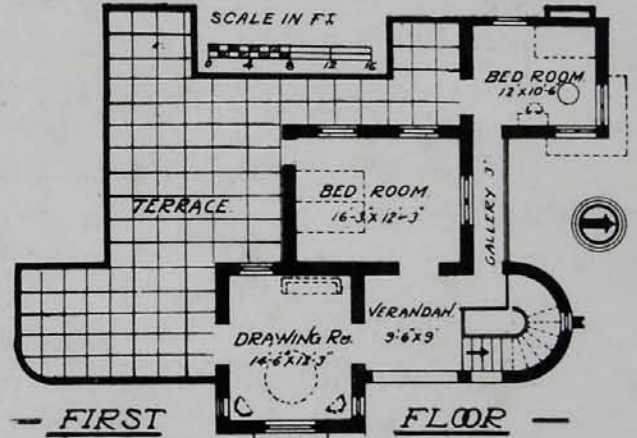


Fig. 111

Floor area
2663 sq. feet.]

Plan No. 38

[Cost Rs. 9200

This plan represents a very well designed home actually built. The built-up area is nearly square and measures 1855 sq. ft. After ascending a flight of curved steps one reaches the verandah 6'-6" wide in front. There is a spacious drawing room on the right hand side with a semi-circular bay window. The large bed room beyond, would make an excellent 'comfort room' with the private bath attached to it. The ladies' room is in the centre, the dining room beyond it—both very roomy apartments. There are a w. c., a toilet room and a bath room on one side separated from the central apartment by a lobby. The kitchen is rather small but as a large dining room is just close by, it matters little. A store room in the corner is situated at a convenient place. The stair case is in the front verandah with a few winding steps. It is accessible from every room of the house.

On the upper floor only two bed-rooms are provided with a covered terrace and stair case hall in front. The covered terrace or the verandah would make an excellent lounge. There is a bath room and a dressing room on the rear. As they are to be used in common by the occupants of both the bed rooms, entrance to them from inside any bed room is not provided. All the remaining area is covered with China mosaic paving.

The only ornament used is in the form of the wrought iron grille in windows. The corner window for lighting the stair case is very attractive.

The house faces Northwest. The walls are of burnt brick, plastered with cement on both sides. The outer ones are in lime and 14 inches thick and the inner ones in cement mortar and are 4½" thick; The R. C. C. floor slab is supported on outer walls and pillars inside. The other details are: The plinth 2' - 6" high, the ceiling of both floors 10 ft. high above floor; Moulmein teak panelled doors and glazed windows; Polished Tandur paving in all the living rooms, R. C. C. stair case with wooden railing and balustrade, steps of stair case topped with polished Tandur slabs with rounded edges. Door and window fixtures of rustless steel; concealed electric wiring. The outside is kept cement grey.



Fig. 112

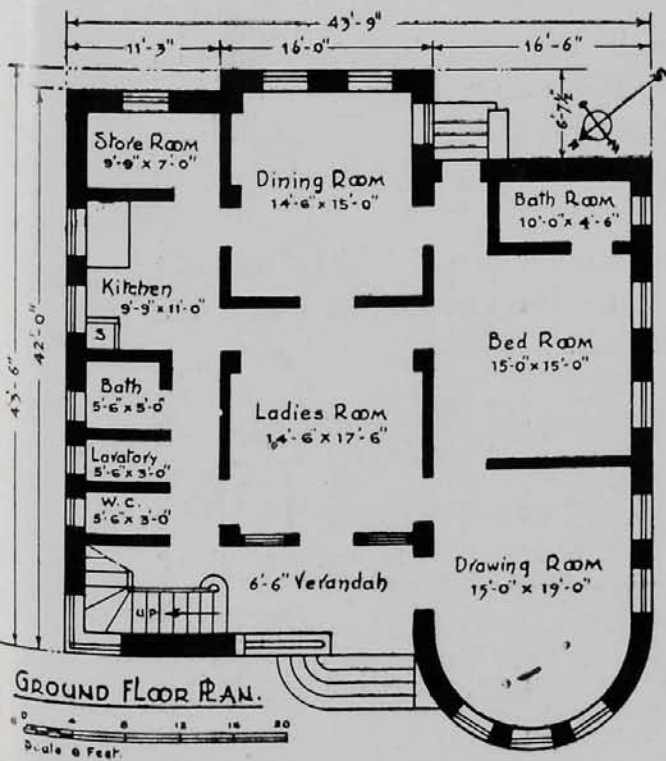


Fig. 113

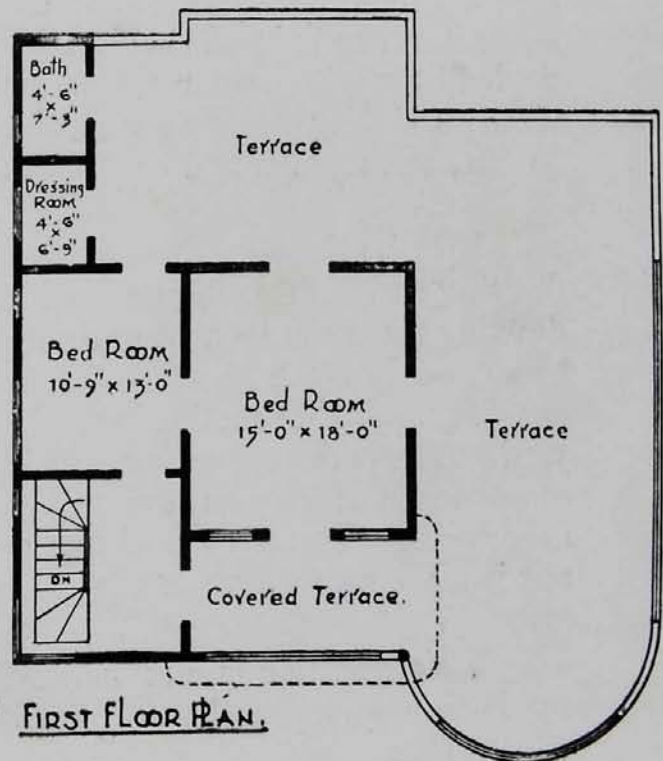


Fig. 114

Floor Area
2830 sq. ft.

Plan No. 39

Cost Rs. 9325

This home which embodies convenience and comfort is planned on altogether different principles. The usual tendency both of house-owners and also of architects is to make the front attractive by means of bay windows, porticos, porches etc. and to further beautify it by giving it a good setting of a nice landscape garden. But in this plan the garden is in the back yard and the bay-window of the library is also on the back side looking over the beauty of the garden. Rationally this is correct. A house is built for the health, comfort and happiness of the inmates and not for the pleasure of outsiders. If you, therefore, embellish the front part of your house, it is only for a show. You can't enjoy it, the passers-by may do it at your expense. On this principle the modern trend is to plan the main landscape garden in the back yard for out-door living in the rear, where privacy and safety for children are assured and thus the family can enjoy themselves better. (Vide page 83).

In this plan the drawing room is placed in an extended part of the main house isolated from it. In this position the size of the drawing room does not affect the main building. The latter is 31'-6" in front and 41' in depth. At the entrance is a verandah 15'-6" deep in which, features an attractive stair case. All the rooms including the kitchen, bath and store are very spacious. Their mutual positions with respect to each other are ideal. There is a back entrance into the garden. The drawing room is very large but as it is independent of the remaining house it can be reduced in size. There is an open terrace behind it, shaded by a pair of ever green trees. There is a large room called library which commands a view of the garden through the bay window. In fact, this room would be an ideal " comfort room " (Vide page 68).

Upstairs there are three spacious bed rooms two of which have got dressing and bath rooms attached to them. The terraced roof over the drawing room can be used in common by all.

The special attraction is the beautiful landscape garden in the back yard. The pathways are paved with roughly squared stones. The high compound wall screens the garden and affords it privacy from the neighbours. There is a pool in a corner with a seat in front. Another seat is made near the vegetable garden.

The orientation is not indicated on the plan. Still East facing would be very appropriate. Next best is South.

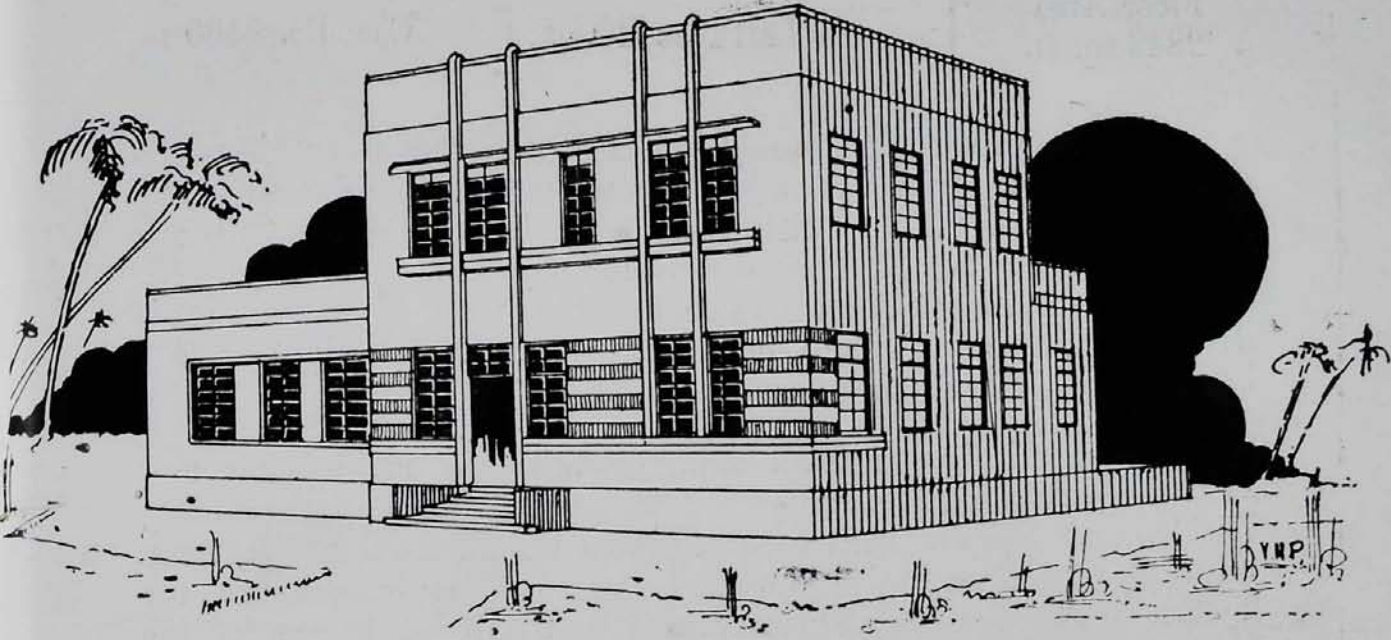


Fig. 115

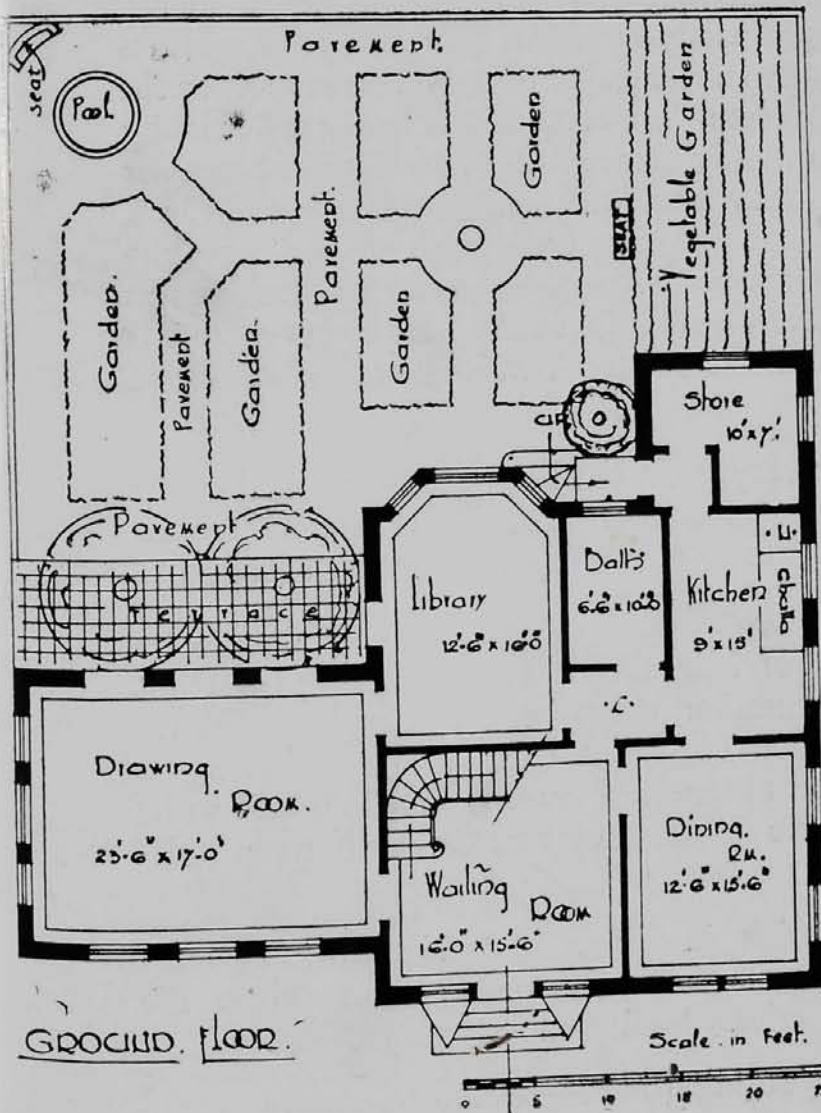
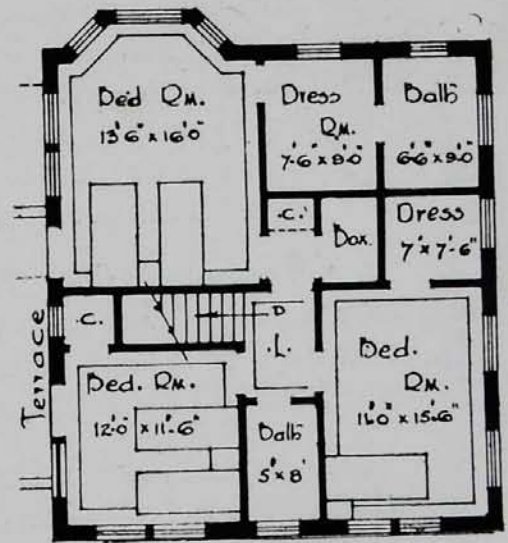


Fig. 116



First Floor Plan.

Fig. 117

Floor Area
2848 sq. ft.

Plan No. 40

Cost Rs. 9400

The plan of this home was designed for the special requirements of a family living at a place where protection from high winds and piercing rain was required rather than from heat. That is why no verandah is provided either on the ground or on the upper floor. The sizes of rooms are rather on the side of luxury than economy. It is designed for a south facing ; however, with slight alterations it can be made to suit a Northern aspect also.

There are in front a small dining room on the right hand side and a large drawing room opposite to it, separated by a spacious lobby 7'-6" wide. The excellent sized bed room behind the drawing room would serve as a very good "Comfort room" as it is close to the kitchen and bath and would remain cool and full of breeze in the Northwest corner. The kitchen is a spacious oblong room, and as such, very useful. There is a side entrance behind the kitchen in a lobby. The latter makes the bath room easily accessible from every room in the house. The store room is quite conveniently placed, with respect to the kitchen and is a fairly large room. The stair case is in the front lobby and has only one flight. Normally there should be sufficient space for cycles available below the stair case, but if more is required for a perambulator etc. it is provided in the nook at the extreme end of the lobby. As there are no drainage and sewerage facilities at the place a privy is not placed inside the home. If, however, one is required it can be built behind the bed room with an entrance through the space reserved for cycles.

On the upper floor five very good sized bed rooms, a small study room and a toilet room are arranged. The study room may be substituted by a large bath room or a dressing room either attached to one of the bed rooms or used in common.

The bay window in front and the simple lines bordering the front entrance are the only ornamentation, if they be called so, in the elevation of the house. As the house is planned for a place having a severe winter and wet season the upper terrace is not intended to be used as a deck and therefore no means of easy access such as a staircase have been provided.

The outer walls are of brick in lime, 18 inches thick, cement-plastered on the outside, inner ones are nine inches thick, since the site is cheap and ample, and bricks, locally made, very cheap.

The area covered by the building is roughly 39 ft. square.

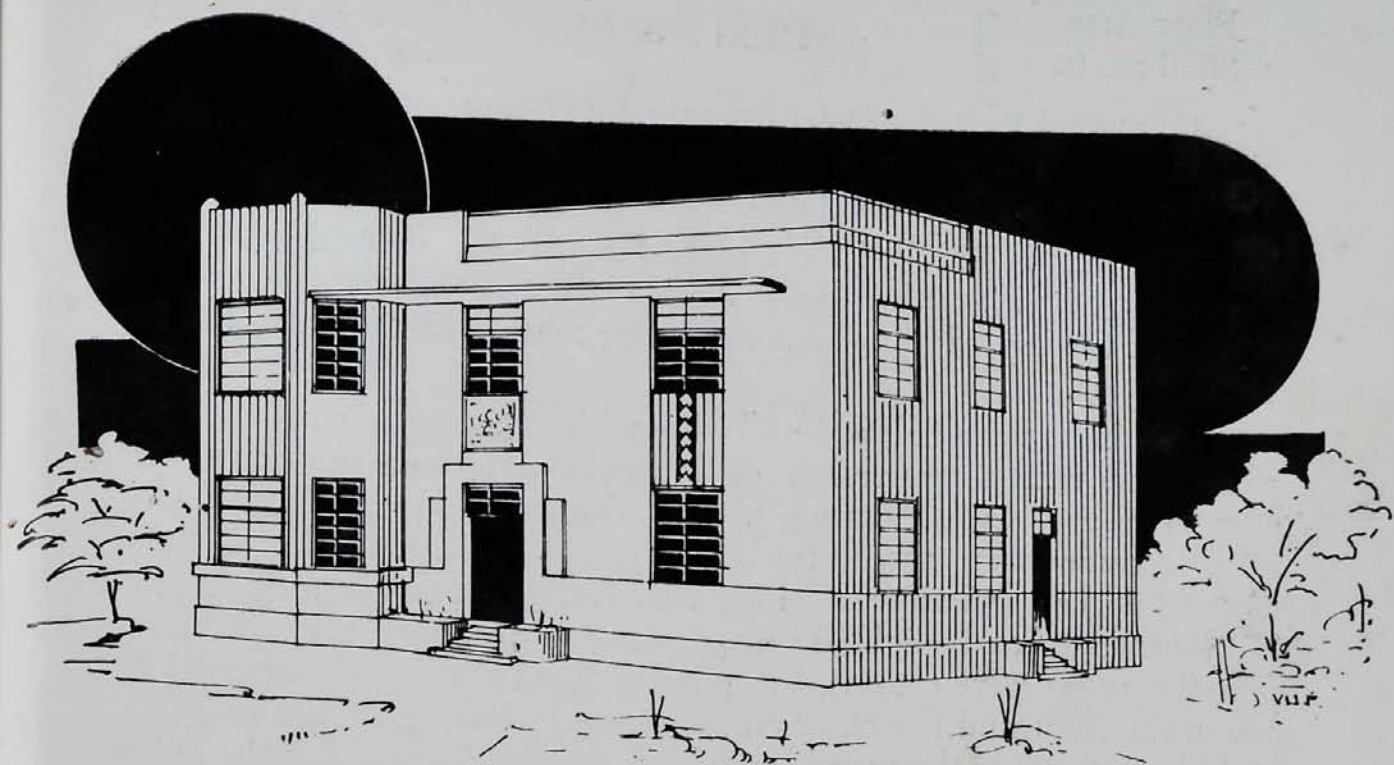


Fig. 118

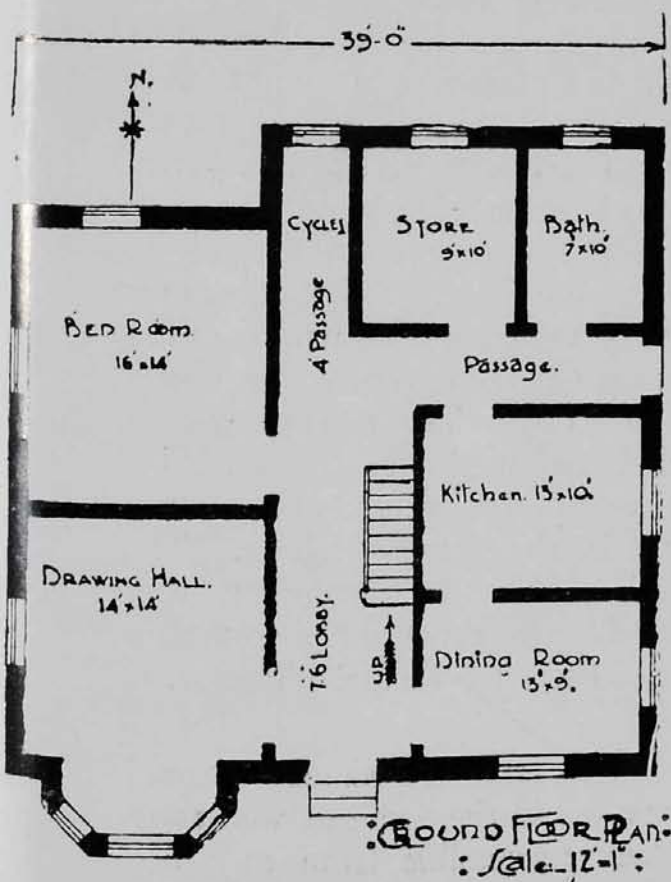


Fig. 119

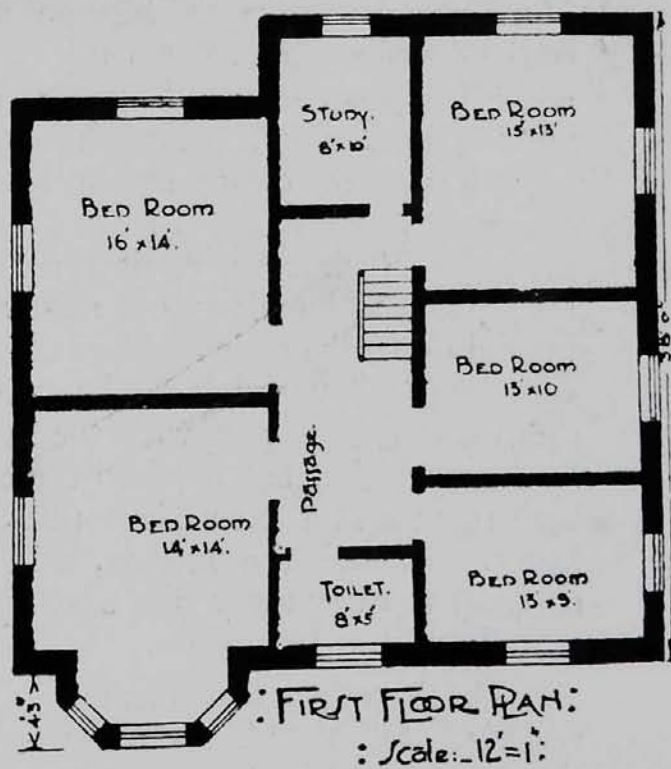


Fig. 120

Floor Area
2976 sq. ft.

Plan No. 41

Cost Rs. 9500

Compared with the cost, the accommodation provided in this plan is not much, because the sizes of the rooms are large. It is therefore, suited for a higher class of family with a large income.

The plan is designed for a plot facing West. It would also suit a corner plot, with the front verandah facing the street on the West and the bay window of the drawing room facing the road on the North.

The front verandah is 7'-6" wide with entrance to it at one end so that the remaining portion of it would afford an unobstructed space for use as a sitting place. Just behind the verandah is a commodious room for the drawing hall with a half hexagonal bay window facing the North. The drawing room is ventilated and lighted from three sides and the greatest prominence is given to it by placing it between two verandahs, one in the front and the other on the rear. In fact, if we imagine the central stair case as the axis of the house, the drawing room is the only room on the left hand side of the axis. The stair case is very conveniently situated in the central lobby and is in one straight flight. The verandah on the rear is ten ft. wide and though it is separated from the kitchen and placed close to the drawing room, it can still serve as a work verandah of the kitchen as it is screened by a blind wall of the drawing room. On the right hand side is the dining room, which is also an equally large room with an attractive semi-circular window in the front. The kitchen is so large as will certainly provide enough space for dining and in that case the dining room can be converted into a nice bed room on the ground floor. A bed room on the ground floor is a necessity and is very valuable if a member of the family falls sick or is an old man who cannot be expected to climb up and down the stair case several times a day. The store room is very small; however, it can be extended and made 14 ft. long by altogether doing away with the small verandah in the corner of the kitchen, which is not required there and is, therefore, a waste. The bath room is at a convenient place and as there is a common wall between it and the kitchen, it is possible to construct a common chimney to carry away the flue gases of both the rooms. The w. c. is well screened from sight.

On the upper floor there are three very large bed rooms of equal size viz. 14' x 20'. A terrace is provided in the front as well as in the rear and both of them are independently accessible from any bed room. There is at least one window in each bed room, open to the West.

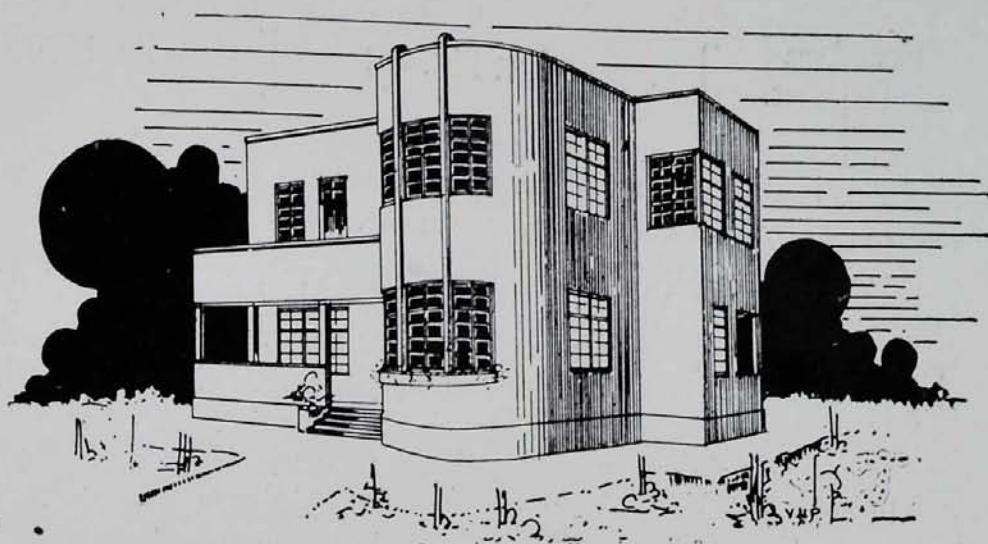


Fig. 121

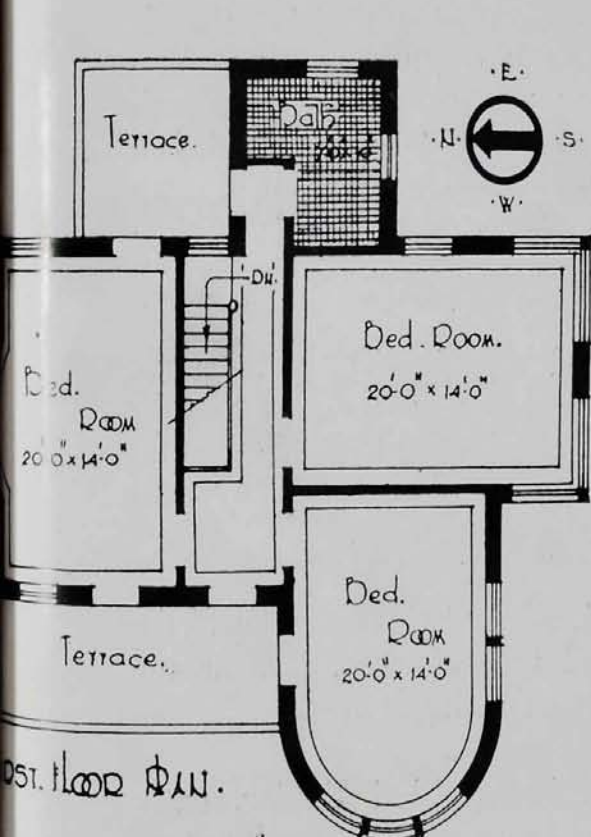


Fig. 122

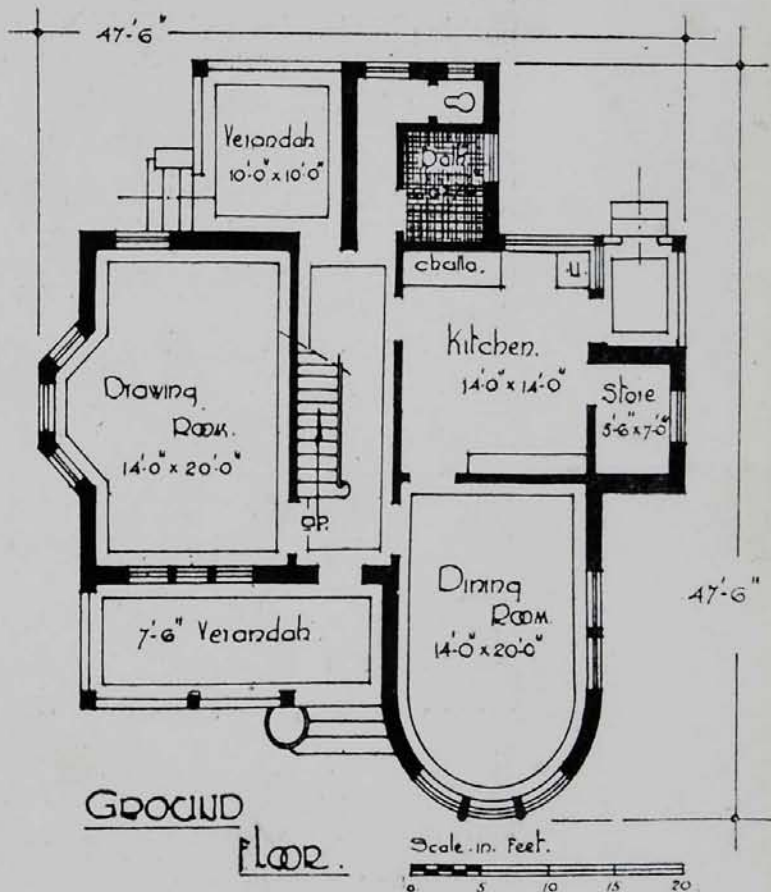


Fig. 123

Floor Area
2860 sq. feet.]

Plan No. 42

[Cost Rs. 10700

This is a plan of one of very good houses. It is designed and constructed by an engineer for his own use. The main entrance is on a side on the left hand corner leading through a lobby to the reception room. The latter, with a semicircular side and a bay window in it, is approximately a square and a charming room. Going through the lobby one meets with the ladies room on the left hand side opposite which, there is a side entrance and a back stair case. A stair case, other than the main one, adds greatly to the convenience in respect of circulation, and particularly for servants it is a necessity. A kitchen on the right hand side and the dining-room opposite it, form a very good grouping. Attached to the kitchen is a small store room. The kitchen itself is a spacious room capable of providing seats for dining for the school going children's hurried meals or for the morning tea. Behind it there are two w. c.s in a row in an inconspicuous position hidden from view. At the extreme end of the lobby there is a washing place with a sink, which, the ladies will very much appreciate. There are twin bath rooms adjoining the passage to the back entrance, opposite one of which, there is an entrance door to the kitchen below the bottom landing of the back stair case. A spare bath room on the ground floor in addition to the one for general use is a refinement which ladies will appreciate most.

The main stair case is easy and wide enough. The arrangement upstairs is almost similar to that on the lower floor except that in place of the bath rooms there is a stair case leading to the terrace and that in place of the store room on the ground floor there is a small wash-room attached to the bed room, and a bath-room.

On the second floor again, there is a large bed-room on top of the drawing-room with a fully equipped bath attached, and on the entire remaining space a terrace with mosaic tiling is made.

The paving in all the living rooms is of polished Tandur, outer walls are of chisel dressed stone in lime 18 inches thick, partitions of brick in cement mortar $4\frac{1}{2}$ inches thick, the flooring and stair cases of R. C. C., height of plinth $2\frac{1}{2}$ ft., that of floors 10 ft. and concealed electric wiring. The sweeping, curved lines of the chhajjahs and ornamental w. i. grille work in windows enhance the beauty of the home. Perhaps the only architectural defect is that the building is too tall as compared with the width.

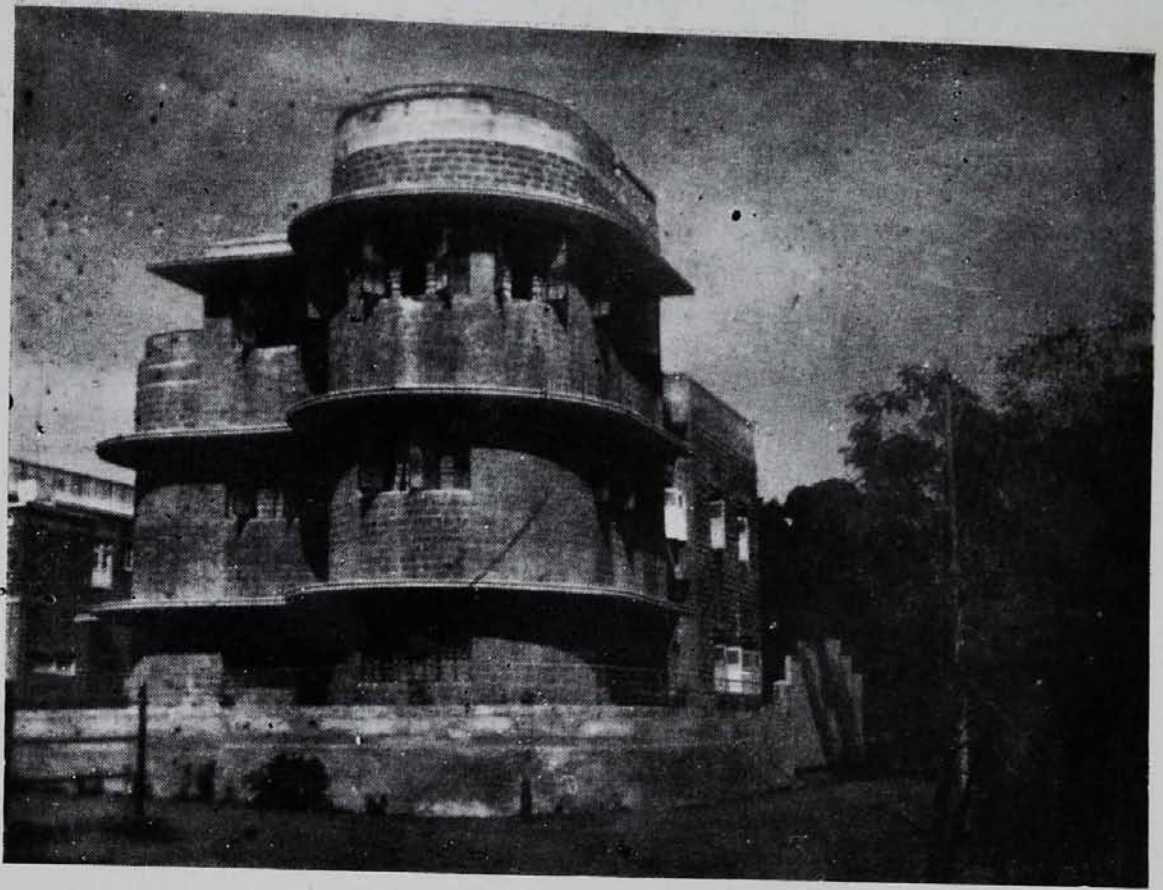


Fig. 124

GROUND FLOOR

FIRST FLOOR

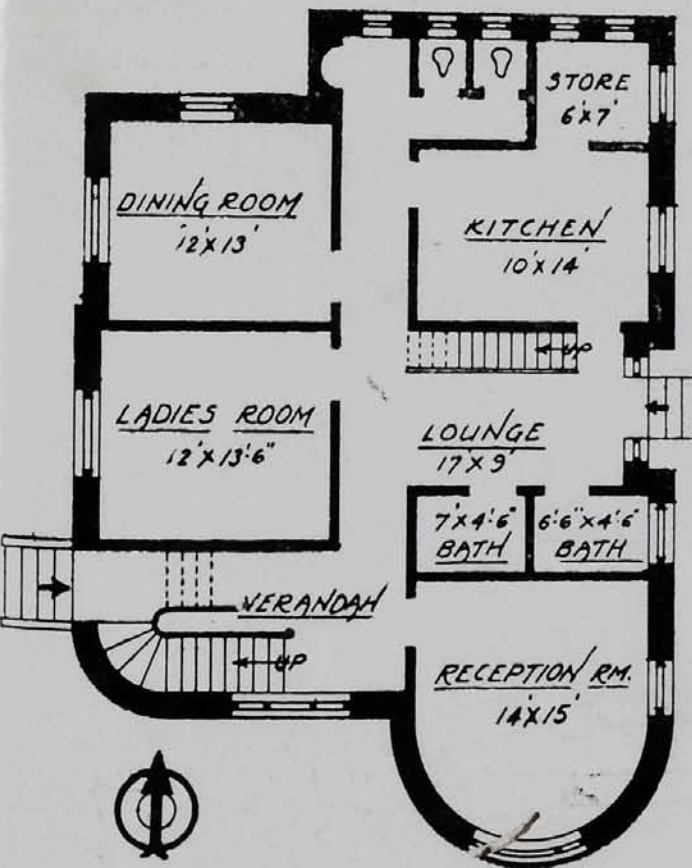


Fig. 125

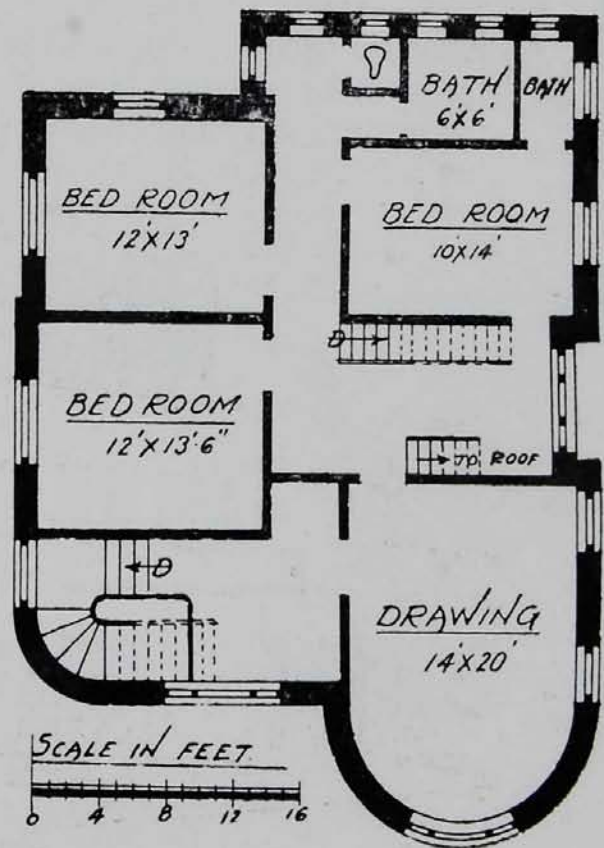


Fig. 126

Though quite a plain, box-like house, it is designed for comfort and convenience and embodies all the present day trend. The entrance opens into an open terrace on the right hand side enclosed by a long line of a hedge, from where a door into the 8 ft. verandah is provided. Behind this verandah is a spacious drawing room. On the left hand are arranged the store room, kitchen and the bath room—all grouped together very conveniently. There is a folding partition between the dining room and drawing room which allows them both to be combined together when necessary. There is a spacious verandah in front of the kitchen and behind the dining and drawing room. Along one side of it is placed a stair case which has only one straight flight of steps. In front of the dining room and along side the front verandah is a large open terrace enclosed for privacy by a hedge about five ft. in height. This terrace would serve as an excellent out-door dining place. The ample open terrace on the right hand side, which also is enclosed by a long line of high hedge would prove an ideal place, for children to play under the supervision of the lady, in the ladies apartment, or an outdoor sitting room under the shade of trees, where two lounge chairs and a tee-poy are shown just to show its usefulness as an outdoor resting place of the family. The arrangement on the upper floor is equally modern. All the five bed rooms are open to the South-west breeze. Though the two middle bed rooms are small, each of them has an ample clothes closet of 6' x 3' size, which is provided in an extra space. There is a wide balcony, in front, but as it faces west, a long projecting canopy over it is a necessity for protection from the rains and evening sun, though it is not shown in the elevation.

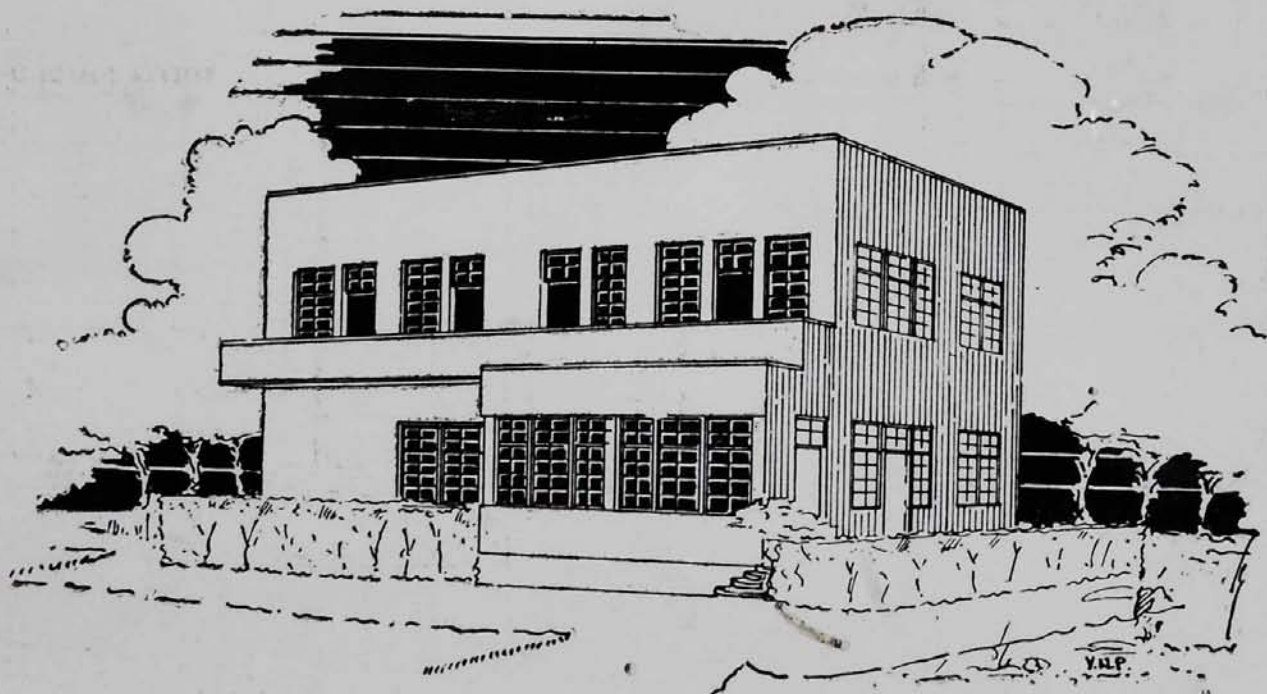


Fig. 127

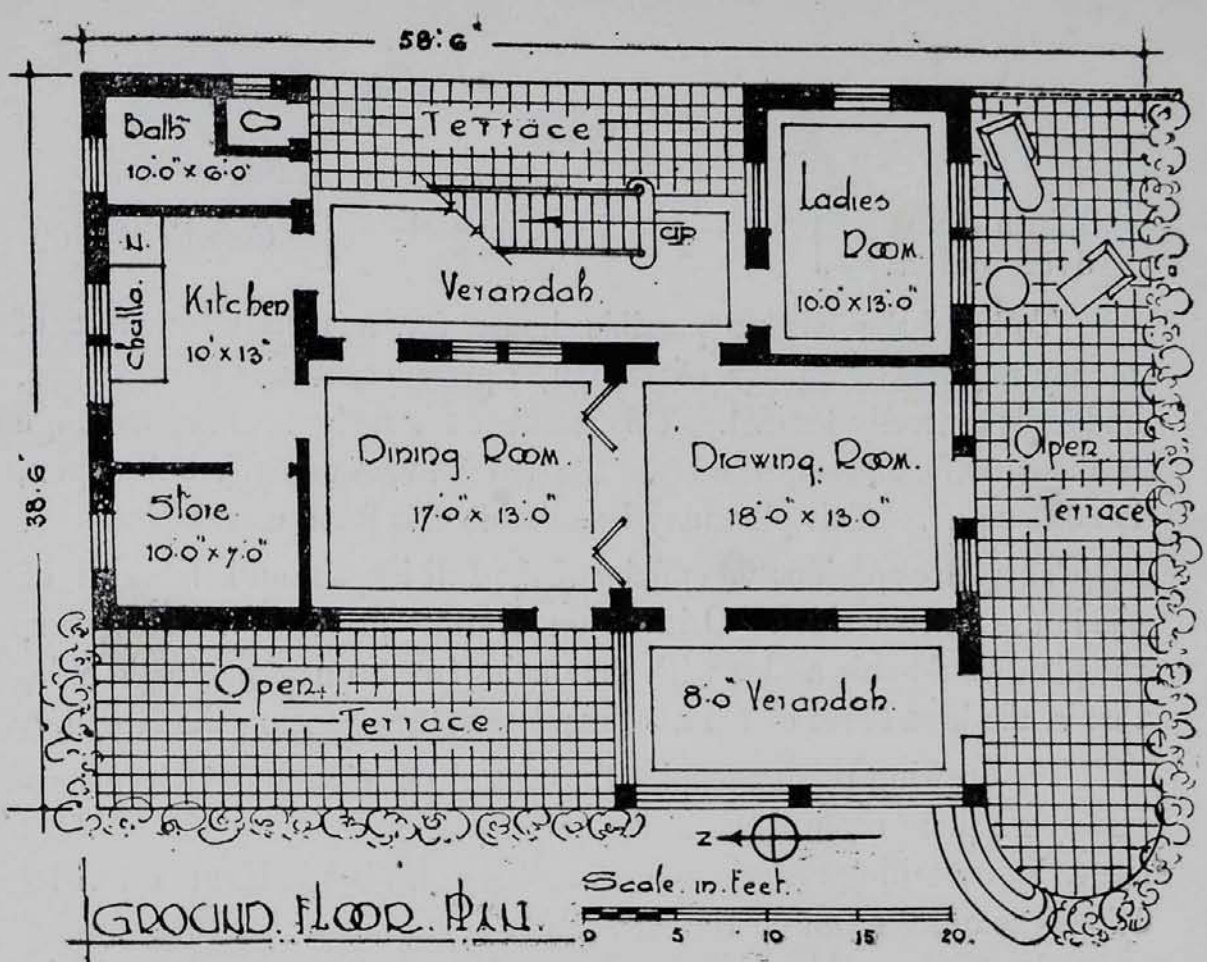
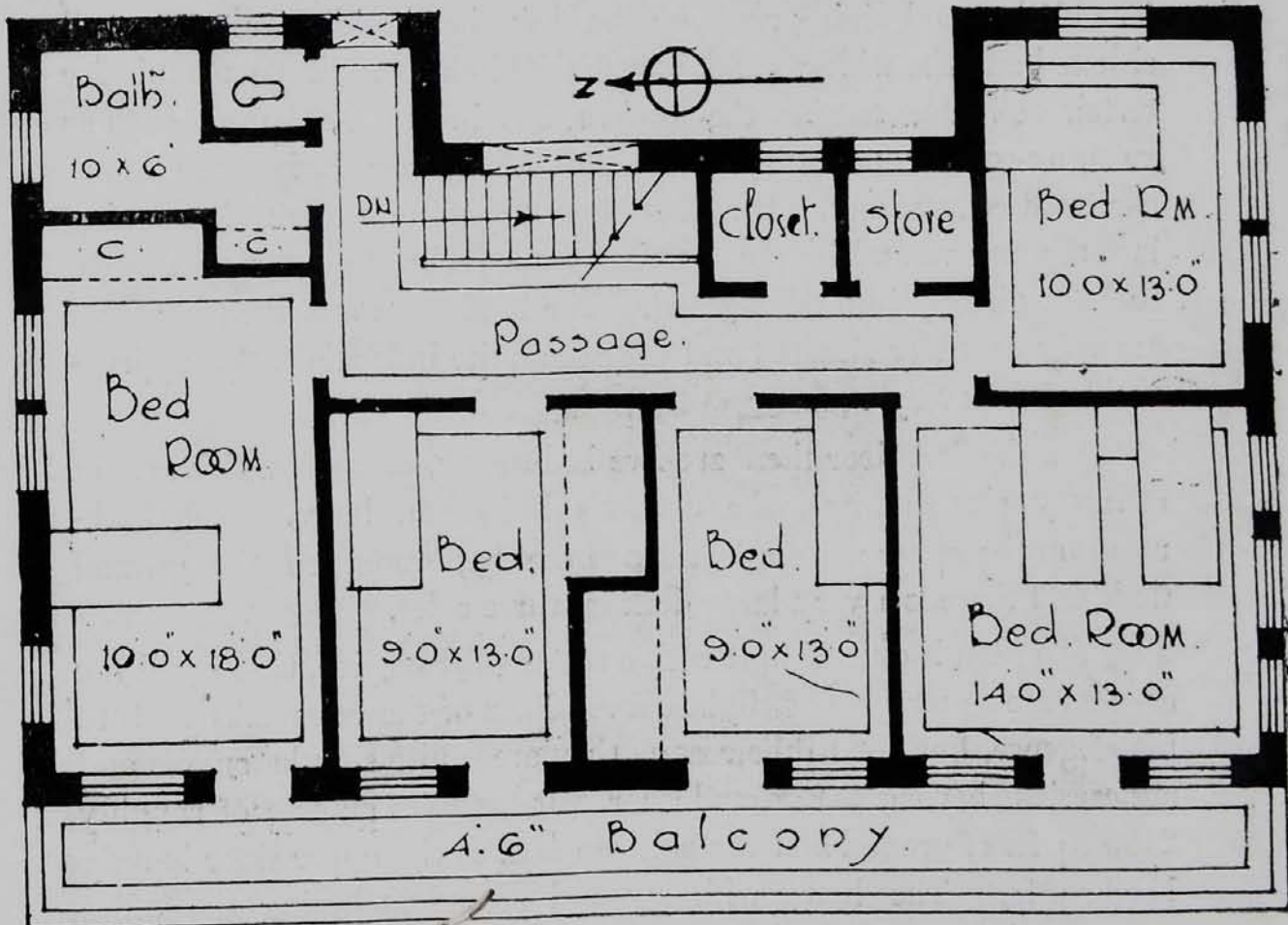


Fig. 128



FIRST FLOOR PLAN.

Fig. 129

Plinth Area
3185 sq. feet.

Plan No. 44

Cost Rs. 10960

To build the largest possible house for a certain amount of money requires simplicity of design, square corners, square rooms, and halls centrally located. This is one such design. The frontage is about 60 ft. and depth 35 ft. The ground area actually built upon, is 2085 sq. ft. This plan may be suitable also for a corner plot.

There are spacious verandahs of the full length and breadth of the house on two sides. Orientation is not prescribed. However, the plan would suit a plot with the main front on the North side, that is, the broad side of the house and the garage facing the North.

The drawing room occupies the central position and is approximately a square room. However, it can be made a couple of feet larger by curtailing the width of the passage behind it from 6 ft. to 4 ft. The office room on the right hand side can be used as a bed room also, and would make a very good "comfort room" as it is situated on the West side and not far from the bath-room and kitchen. The kitchen and dining room on the left hand side are very well situated and the wide verandah near the kitchen would be useful for certain activities outside the kitchen but inside the house, such as grinding corn or, pounding spices etc. The garage inside the house is a great convenience. If a door be provided in its rear wall, opening into the rear verandah, the purchases made in the market can be brought directly into the kitchen. The bath-room and the stair case are very centrally situated and they are quite independently approachable from every room.

On the first floor there are five bed-rooms, four of which are of ordinary size and one, the master's bed-room, large. The bath-room on the upper floor is just above the bath-room on the ground floor and there is a very large deck on three sides.

The plan is quite simple with a rectangular outline, that is, all the corners are square. The slight curved lines of the verandahs add to the elegance, but not to the cost as they are quite simple curves and not carried beyond the ground floor. It occupies an area of roughly 2100 sq. ft. of ground and the built up area of the upper floor is only 1100 sq. ft. The house with six bed rooms including the office room, on the ground floor, would be very suitable for a large family.

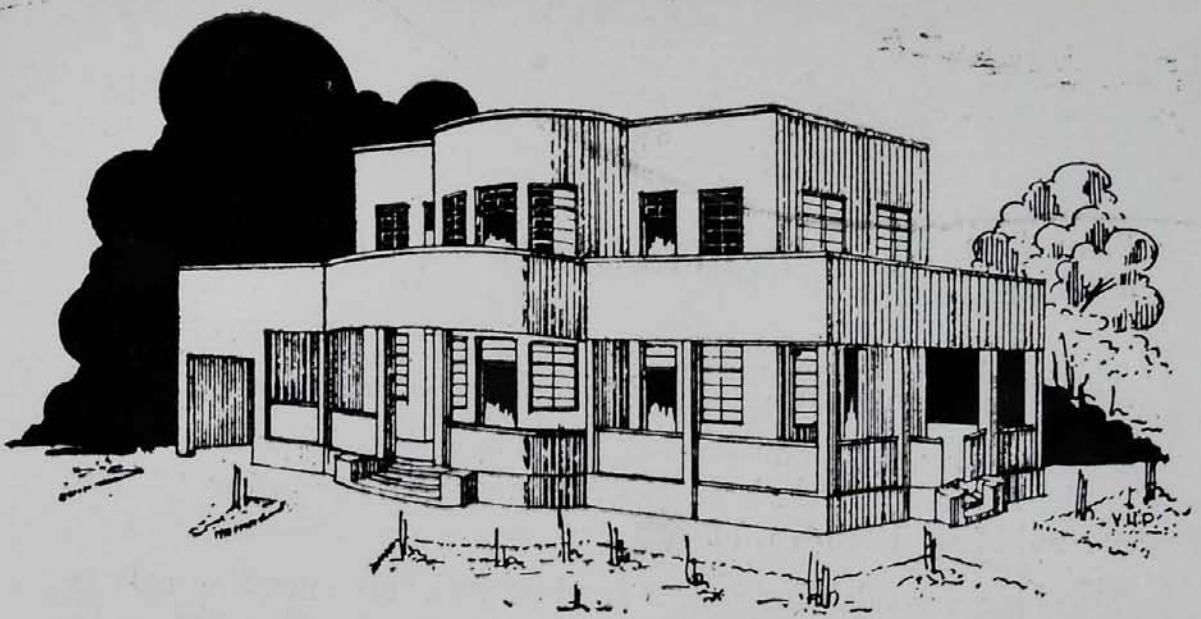


Fig. 130

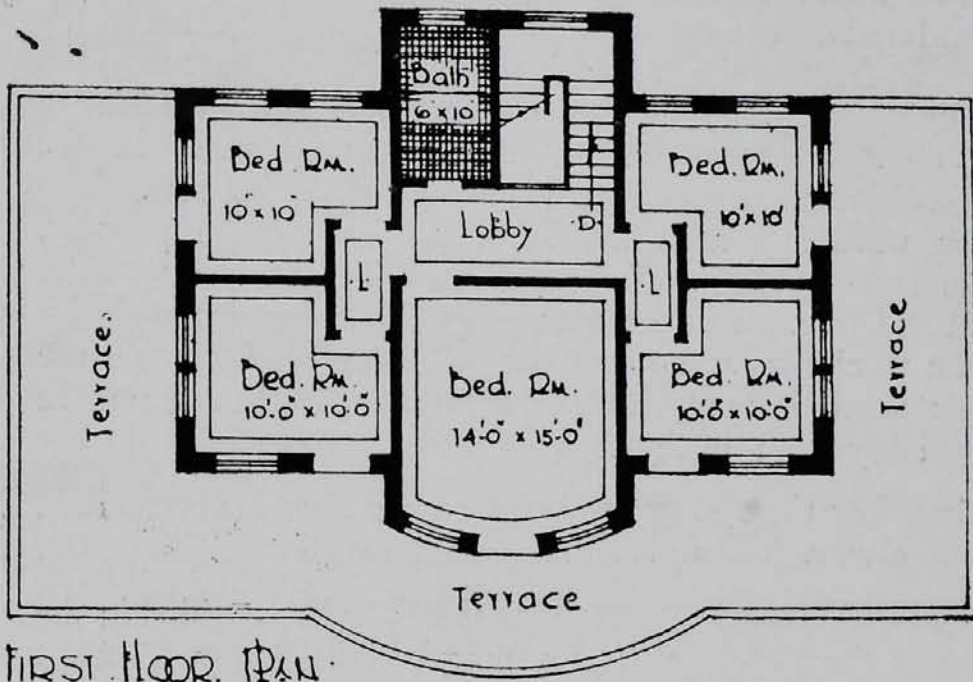


Fig. 131

FIRST FLOOR PLAN

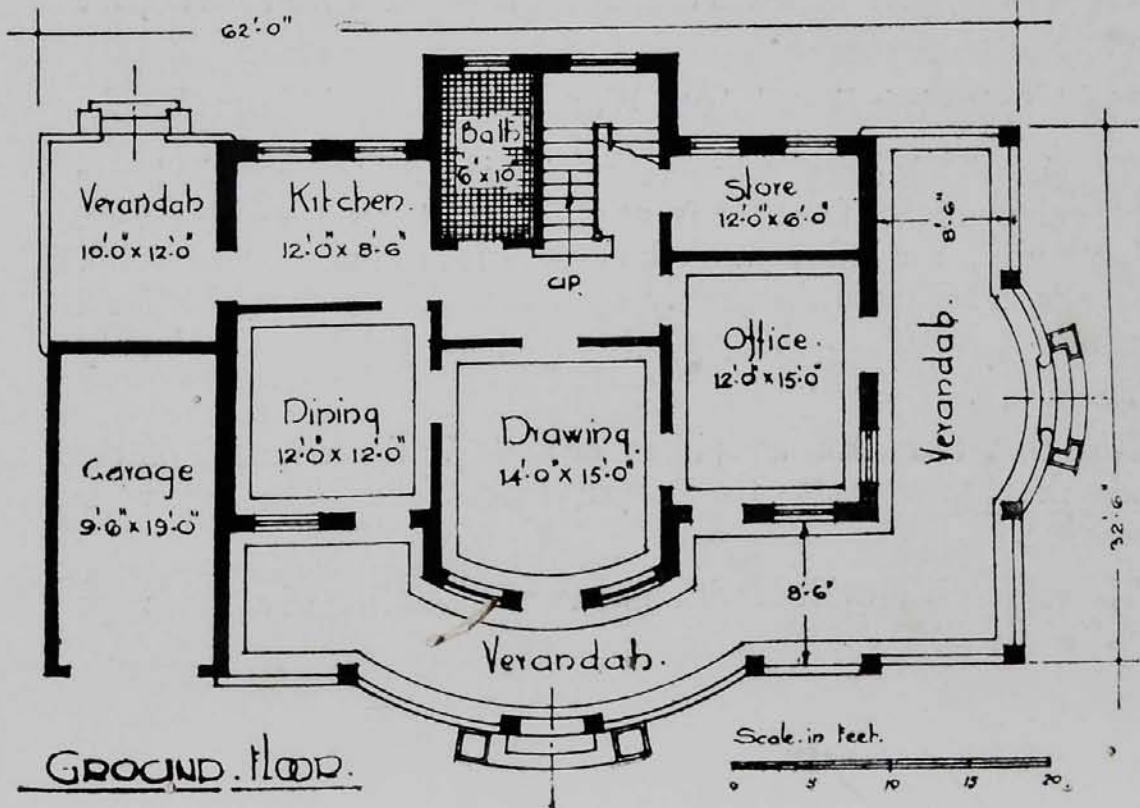


Fig. 132

GROUND FLOOR

Floor Area
3266 sq. ft.]

Plan No. 45

[Cost Rs. 11200

This design represents utility, simplicity and combines some excellent arrangements of plan to suit the particular needs of the family for whom it is intended, and for their use it is a perfect home in every way. Size of the structure is 51 ft. broad and 41 ft. deep, the ground area covered being 1828 sq. ft.

There is a verandah in front, 8 ft wide with an entrance at one end so that the entire remaining space could be freely occupied. On the left hand side of it is an isolated large room which could be used either as a drawing room or a bed room. It is the largest room in the whole house. In front of the verandah is a drawing room, and by its side, a small dining room. Very often dining rooms are unnecessarily made large. The dining room constitutes the least used space in the house, and, therefore, the modern trend is to reduce its size. The kitchen is large which is also in keeping with the modern practice, because, it can accommodate a few seats for dining also occasionally. The bath room and w. c. are very conveniently situated and the lobby in front of them would serve an excellent place for work outside the kitchen. The staircase has got a very good position, so that it can be approached from any room in the house.

On the first floor there are three bed rooms, a spacious verandah, a bath room and a w. c. There is also a large terrace.

It would add much to the convenience if a door be provided in the large bed room on the ground floor, opening into the lobby in front of the bath room just below the one on the upper floor for entering the terrace.

North facing is indicated, but a Western aspect would be preferable.

The elevation is completely modern. To a casual observer the house presents an appearance from the front of twin cottages joined together. Architecturally, the bed room block on the left hand side looks solid, while the open railing in the already open verandah on the right hand shows an opposite effect. Thus the two portions enhance the beauty of each other by contrast.

Note that there are no pillars or posts in the verandah on the ground floor to support the upper verandah. The latter is over-hanging.

The cottage is provided with an excellent setting of a landscape garden.

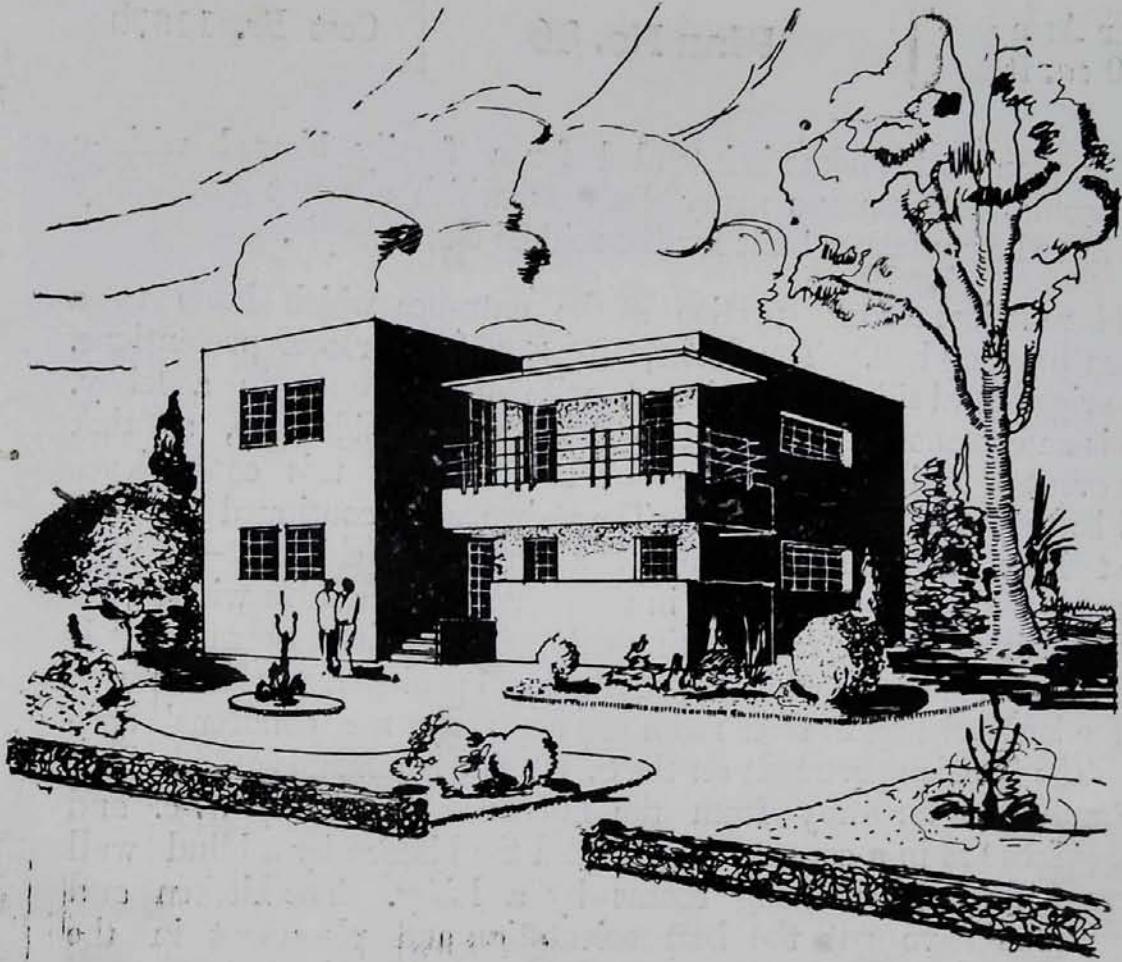
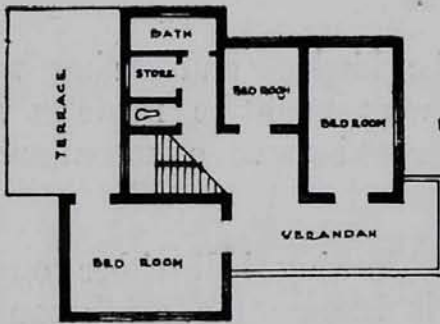
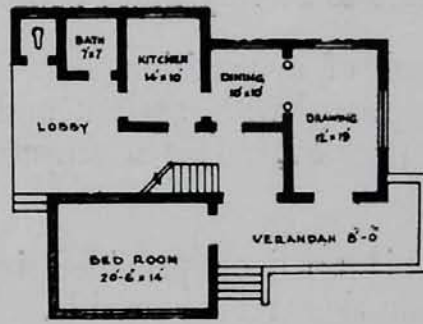


Fig 133



FIRST FLOOR PLAN



GROUND FLOOR PLAN

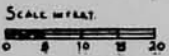


Fig. 134

Fig. 135

Floor Area
3340 sq. ft.

Plan No. 46

Cost Rs. 11670

The plan of this home is intended for a family blessed with a large income. It possesses many features which are not commonly found in ordinary homes built for the middle class people.

There is just a small portico at the entrance which leads to a spacious drawing hall. The latter, 15' × 25', is rather pretentious. On the right hand side is a staircase, with its entrance in a lobby. There is an entrance to the staircase from the outside also, so that in the event of letting the upper flat to a family this convenience would be very much appreciated. The staircase is continued right up to the terrace. Beyond the staircase is a nursery for children — a very good room with a single window in the South and a double window on the West, supplying the room with plenty of fresh air. Beyond this is the female apartment to which there is a door opening from the nursery. Thus the ladies sitting in their room can supervise the children's activities. The female apartment on the S. W. side commands an excellent breeze and is not far away from the kitchen. The bath, w. c. and washing place are in a corner, cut off from the kitchen by a blind wall and separated from the living rooms by a lobby. The kitchen and dining rooms have got the best orientation and placement in the house. There is a back staircase at a very convenient place — an amenity sure to be very much appreciated.

Instead of a partition between the kitchen and dining room a deep cupboard with shelves and drawers might be made as suggested on page 57. This arrangement serves both as a screen and a storing space.

There is no door provided in the drawing hall either on the dining room side or the rear side. This is because the gentleman for whom this home is designed is a businessman and expects very frequently strangers to visit and occupy the drawing room.

On the upper floor either the same arrangement as below may be made or, as many as five bed rooms, with one of them having a large dressing room, can be arranged. The sanitary service rooms are placed just on the top of those below.

The elevation is quite modern. The surfaces are smooth and plain and the entire reliance for beauty is made on the bold outline, mass effect, fenestration and landscaping. The effect, however, is marvellous as will be seen from the way in which it soothes the eye.

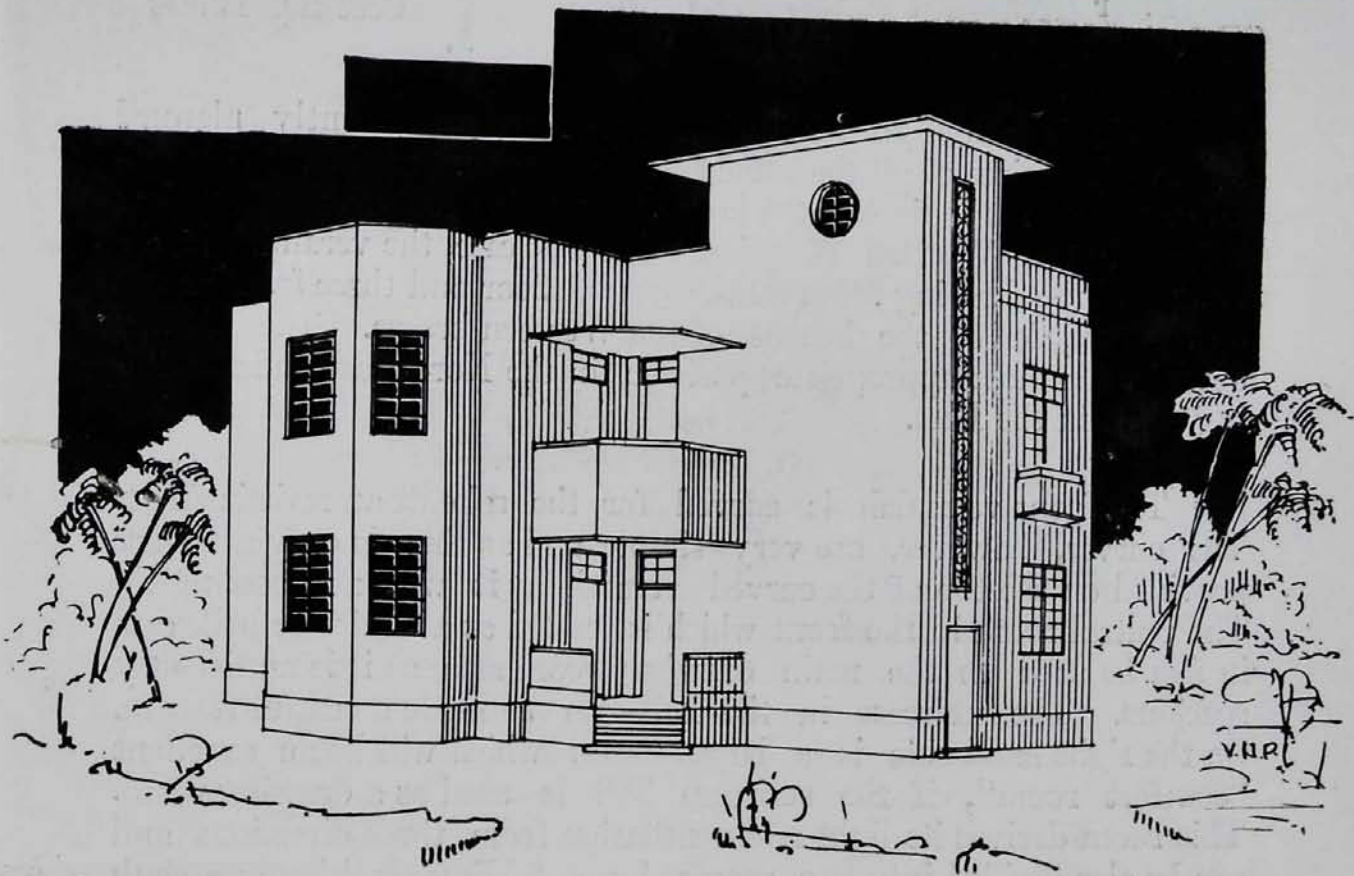


Fig. 136

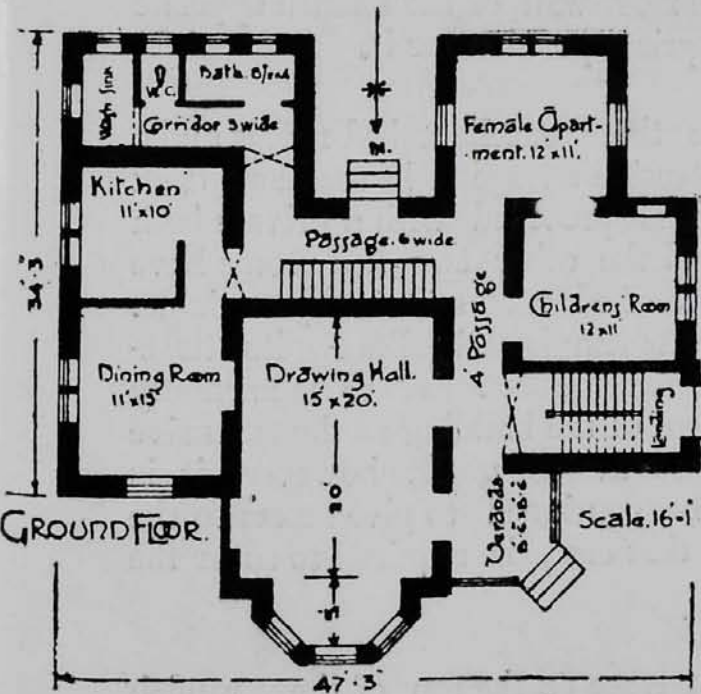


Fig. 137

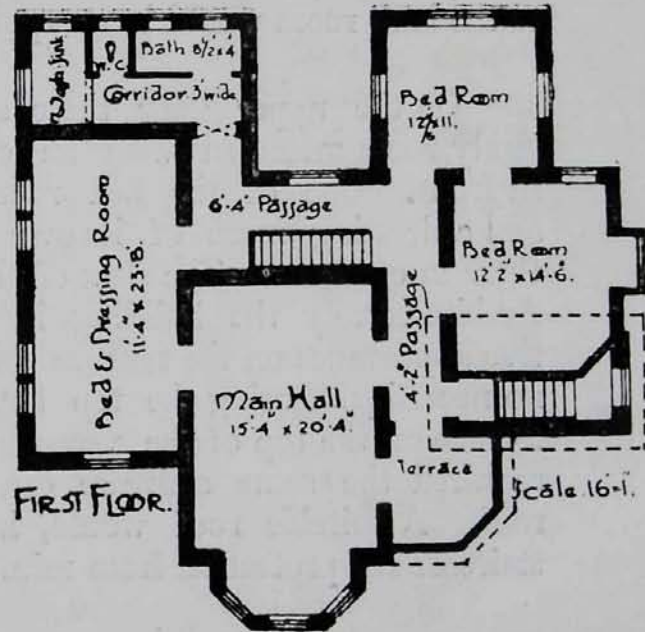


Fig. 138

Floor Area
3385 sq. ft.

Plan No. 47

Cost Rs. 12900

This is a design of a simple, roomy, conveniently planned house. The sizes of all the rooms are on a luxurious side. Although no orientation is indicated, the house would give the greatest comfort if faced in the Western direction. In that case, the verandah in the front and the drawing room on the ground floor and three front rooms on the first, derive the benefit of the Western breeze. The kitchen occupies the most appropriate position in the North-east and the dining room in the East.

The front verandah is curved for the sake of an artistic effect. The curves, however, are very simple and as there is only a terrace provided on the top of the curved verandah, it will not cost much. The central room in the front which is treated as a staircase hall, can, in fact be used as the main drawing room also, as it is sufficiently spacious. The staircase in the hall can be made a central feature. On the right hand side is a large room, which will be an excellent "comfort room", if the staircase hall is used as a drawing room. This room derives its light and ventilation from three directions and can be also divided into two rooms by a folding partition or a cloth curtain. The kitchen is larger than ordinarily required and with a good sized store room attached to it, should prove a delight of the lady. The bath is also conveniently situated. There is no back door provided, but the corner in the rear wall of the kitchen opposite to the bath room would be an appropriate position for it.

On the upper floor there are three excellent bed rooms and a study room arranged with an extensive terrace to be used as a deck in front. One of the bed rooms is provided with a private bath and a dressing room of its own and the other two bed rooms have these in common. The sizes of all the bed rooms are really enviable. Architecturally the building is quite simple and relies for its attractive appearance on the texture and fenestration. There is normally no necessity of using the top terrace of the building as the extensive terrace on the top of the verandah is available. If, however, it is required the same staircase can be continued to give access to the roof. A suitable roof would, in that case, be required to cover the staircase for protection from rain.

The curved portions of the terrace on the top of the verandah on sides are over hanging. This adds to the artistic effect.



Fig. 139

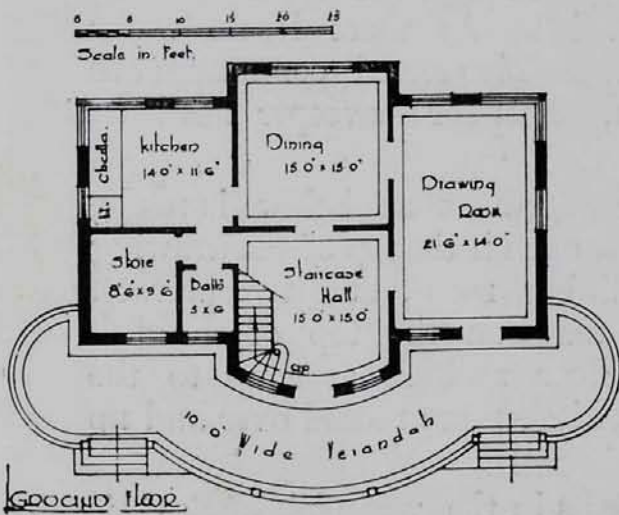


Fig. 140

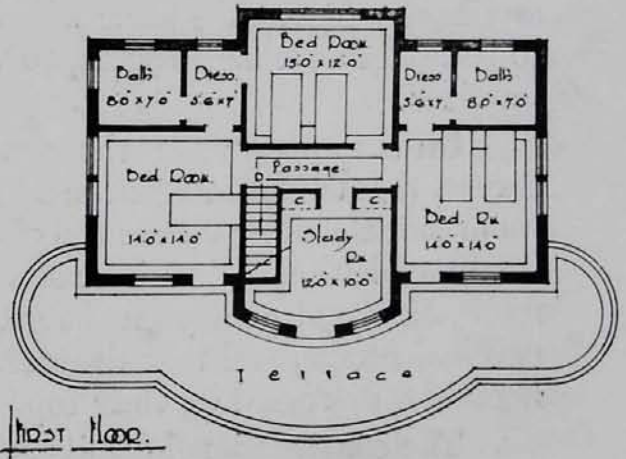


Fig. 141

Floor Area
3712 sq. ft.

Plan No. 48

Cost Rs. 14680

The home represented by this plan blends all the best elements of the modern as well as traditional architecture. It strikes one with its air of domesticity and a promise of comfortable living inside. Thus there is the long projecting R. C. C. chhija, simple open pipe railing, large windows and absence of ornamentation and at the same time a snug tiled roof and conventional arrangement of rooms.

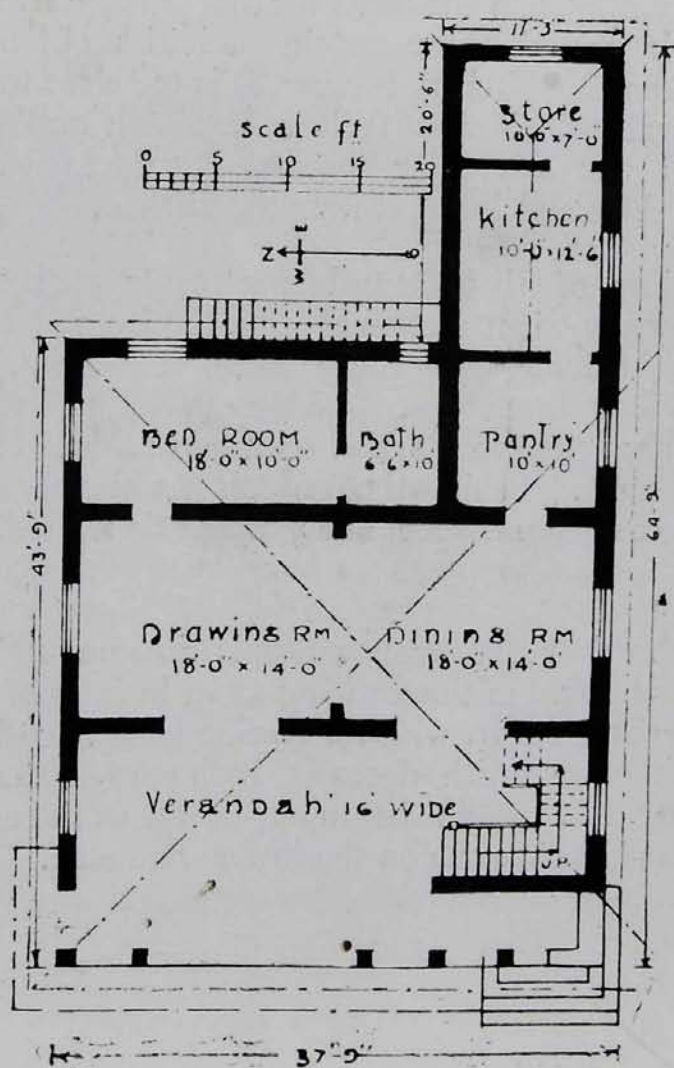
The entrance into the open verandah is on the right hand corner. The verandah is very wide, viz. 16 ft. which is an unusual feature. At one end of it is an easy and comfortable staircase, which can be treated as a feature in front of the entrance, so that the first impression upon entering the house is very pleasant. The verandah serves as an excellent lounge in the midst of the cool breeze in the morning or after dark. Behind it, is the conventional arrangement of a drawing and dining room separated by a removable cloth curtain. Behind this is a bed room in a corner with a bath attached to it. This room though not open to breeze in the hot weather season, would remain cool throughout the day, as it is in the North-east corner and would derive the benefit of the cheerful morning sun. This room would be a very suitable 'comfort room'. There is a pantry in the corner near the dining room and the store and the kitchen are in an extended wing. A back exit from the kitchen is necessary and would have been very convenient, but it is not provided. The house is designed for a family living in the European style. There is no general bath room provided on the ground floor which is very essential for the Indian manner of living. A separate back staircase for servants or a sweeper has been provided. As there is no water carriage system at the place where the house is erected commodes are to be used in the bath rooms, to which, access for a sweeper has been provided.

On the upper floor the same arrangement as below is made, except, that two bed rooms are arranged, one on the top of the drawing room and the other on the top of the dining room, and two private, combined bath and dressing rooms are made on the top of the bed room, bath and pantry on the ground floor and are attached to the two bed rooms, and that the store and kitchen are roofed over and no floor is constructed on their top.

The constructional details are : Posts in the verandah of R. C. C., all outer walls of burnt brick in lime 14 inches thick, inner partitions of burnt brick in cement mortar (6 : 1) $4\frac{1}{2}$ inches thick ; terrazzo flooring in all the living rooms ; R. C. C. staircase with wrought iron railing and wooden balustrade, steps being topped with terrazzo. Railing of chromium plated pipes.



Fig. 142



Plan of Ground Floor

Fig. 143

Architects: MESSRS GREGSON, BATLEY AND KING, BOMBAY.

Floor Area
3807 sq. ft.]

Plan No. 49

[Cost Rs. 14000

This is a plan of a house on traditional lines both in design and in construction. However, it has been found a very comfortable home by experience of over seven years by the family for which it was built. It is situated in a small town where stone is very cheap and therefore, most of the walls are built 18 inches thick. The family wanted also a number of wall cupboards which can be provided if the walls are thick. There is, at the entrance, a very commodious verandah with a semi-hexagonal front. The pillars in the front verandah are round and of R. C. C., ten inches diameter. Behind the verandah, is the drawing room, centrally situated. This is the largest room in the home. As there are four windows, two in the front wall and two in the rear, and two doors, this room though situated in the heart of the house will be adequately lighted. Still, during early hours of the morning and late hours of the evening, it is likely to be slightly dark. There is a spacious verandah behind the drawing room. The utility of this verandah is rather problematical. There is no necessity of it for sitting out purposes as there is a larger and more attractive verandah in the front for that purpose. It will not be so useful as a work verandah for certain activities of the ladies which have to be done outside kitchen, because, it is too close to the drawing room. In conventional houses such a verandah on the rear side of the drawing hall was a regular feature, but the modern trend is to remove it from there and locate it near the kitchen.

On both sides of these central apartments, are rooms arranged almost symmetrically when looked at from the front. There are four bed rooms in all including the office room, a kitchen, a large bath room and a spacious store room. The latter, too, is a little away from the kitchen. When close to the kitchen it saves a lot of labour on the part of the housewife. Behind the office, is a staircase 3'-6" wide as the main entrance to the upper floor, which is treated as a separate flat.

On the upper floor the arrangement is the same as below, except that a partition is placed in the drawing room in front of the staircase, so as to make a passage 3 ft. wide for reaching the verandah, either on the back, or on the front with doors at both ends. The front verandah on the upper floor would be more useful as there is no central passage through it like the one on the lower verandah.

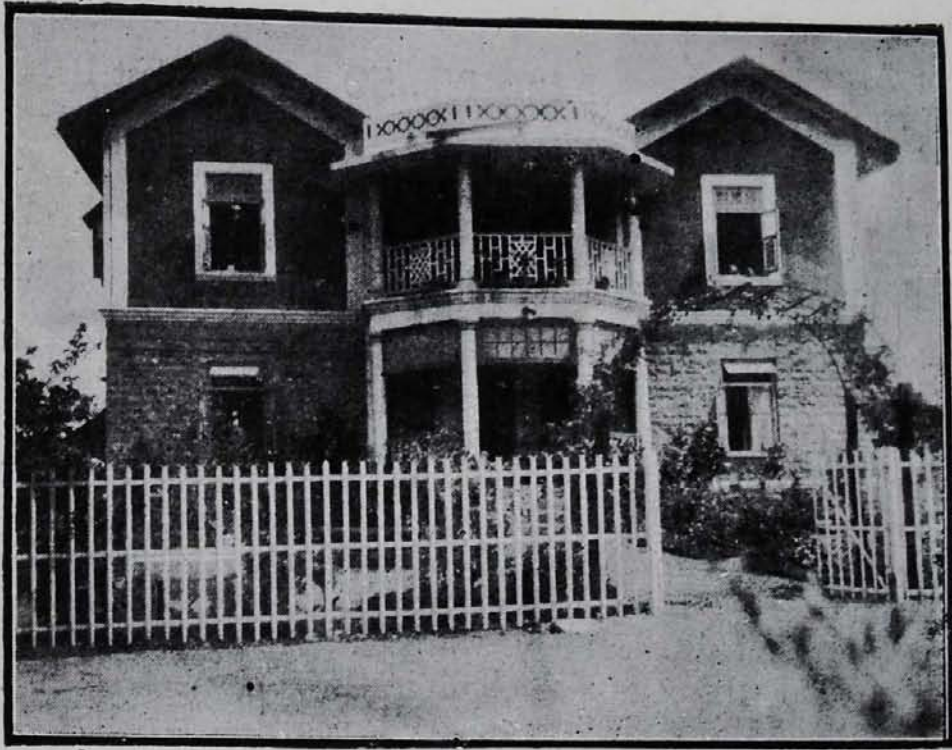


Fig. 144

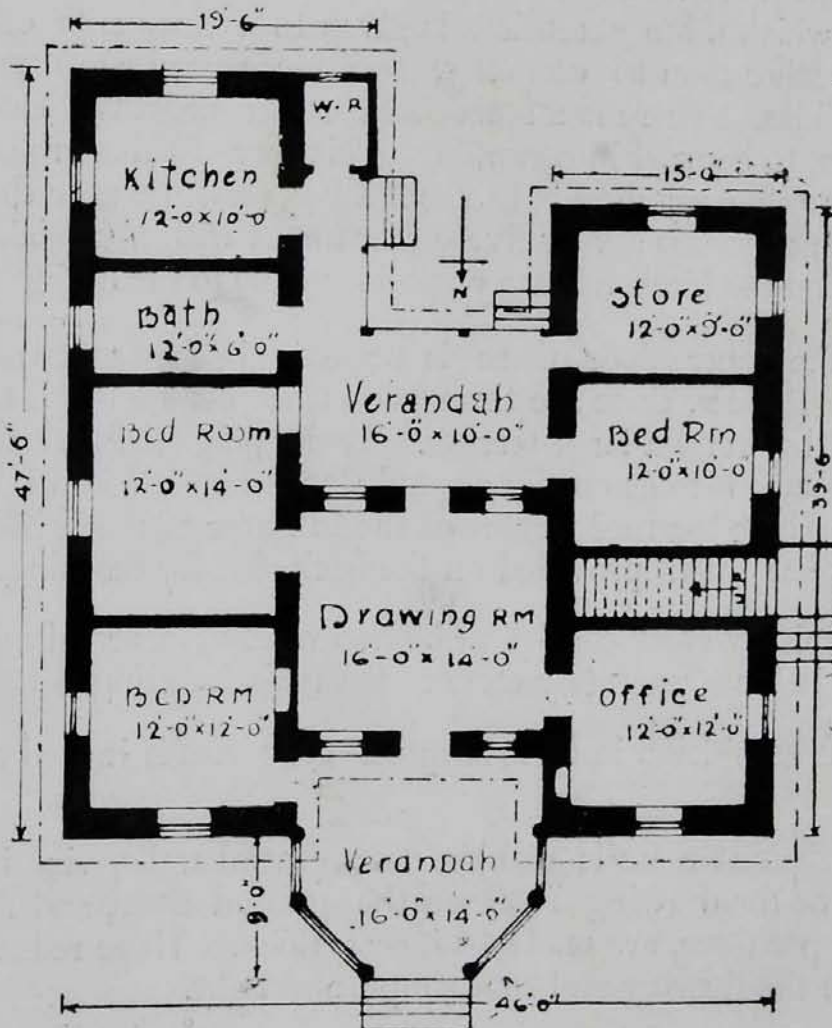


Fig. 145

Plan of the Ground and First Floor

Floor Area
3765 sq. ft.]

Plan No. 50

[Cost Rs. 15000

A house of chhajjahs and balconies may be appropriately called in the case of this charming villa. The weather shades of the front verandah and the gallery above, are shaped like overhanging arches.

The central verandah is projecting about a foot beyond the sides for an architectural effect. On the right hand is a spacious and easy staircase lighted in front and on one side. The position of the staircase is such as would admit of the upper floor being used either by the same family or by another if it be separately let. On the left hand side there are two bed-rooms and a small room which may be used either as an anti-room or a study room. The central bed-room has an attractive semi-circular bay window. A large drawing room is centrally placed with verandahs both in the front and the rear. In an ordinary cottage the drawing room is usually treated as a common room and if bed-rooms are arranged on its sides, a passage is usually provided to them through the drawing room. But in this particular plan, in which more attention is given to refinements of a civilised family, rather than to economy, separate passages are provided on both the sides. There is a small bath room provided close to the bed-rooms, to be used in common. This is a further refinement as there is another common bath room for general use near the kitchen. The dining room is a very lively apartment with a semicircular bay window and the kitchen is very spacious close to the dining room.

On the upper floor there is a gallery in the front and balconies at sides. Besides, there are three good sized bed-rooms, a large living room, a bath and a large terrace. It is possible to arrange a full suite of rooms here as on the ground floor, and let it to a separate family. There is a roof terrace of the full area of the building and a staircase has been provided on the back side for reaching it.

A sanitary block consisting of two w. c. s., a urinal and a washing place is built separately close to the main building.

Thus considered in all the aspects the house is indeed a luxury to live in.

All the outer walls and the two central walls, viz. in the front and rear of the drawing room on the ground floor, and living room on the upper floor, are made 14 inches thick. These reduce the span and make the flooring and roof simple and light.

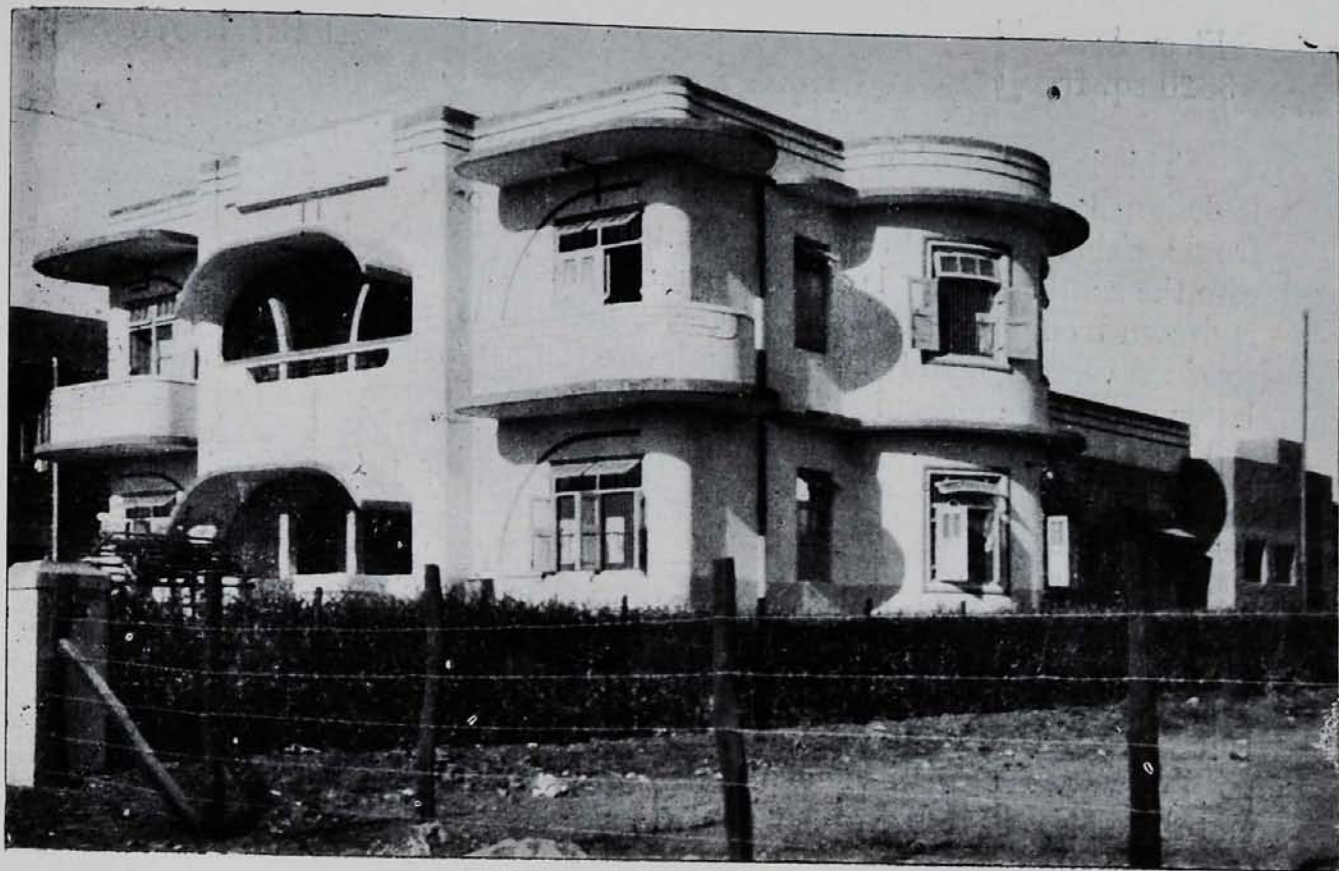


Fig. 146

GROUND FLOOR

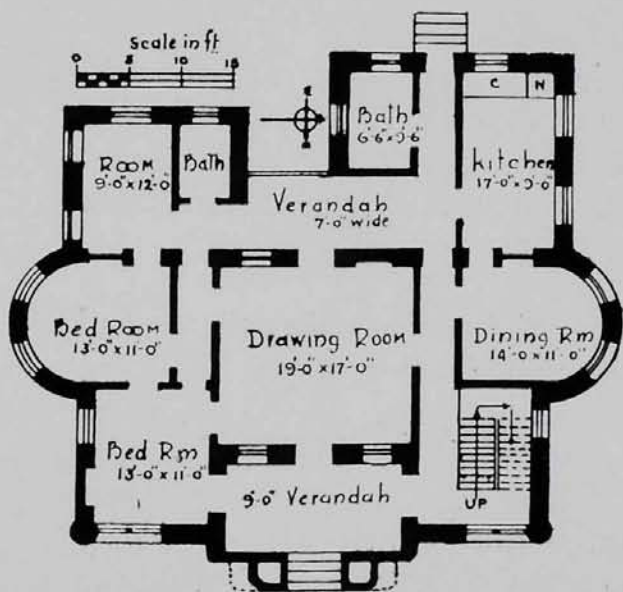


Fig. 147

FIRST FLOOR

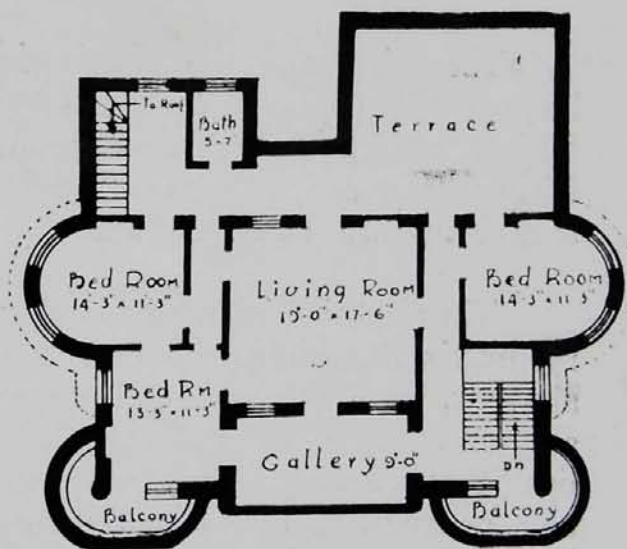


Fig. 148

Architects :— MESSRS. WAGLE AND BHANDARKAR, BOMBAY.

Floor Area]
3820 sq. ft.

Plan No. 51

[Cost Rs. 16370

This is a plan of a more artistic and luxurious building, which is designed more for comfort than for economy. There are two fronts, either of which, can be treated as the main. In the present case the southern front is treated as the main entrance and elevation is drawn from that side. However, as there is a more open and spacious verandah and a larger staircase hall on the North side, the latter would be more suitable as the main front.

The dining room, a nearly square apartment of 14' × 15' is in the centre. The drawing hall is pretty large. It has got three doors in the inner long wall. One of them could be preferably cancelled. Too many doors interfere with privacy, come in the way of furniture and also cost a good deal. Beyond the drawing room is a study room. The right hand wing is occupied by the kitchen, store, bath and a ladies' apartment, all of which are grouped together in the best possible way. A home of such niceties does require, two staircases and these also have been provided.

On the first floor five bed rooms and a bath room are arranged, with a terrace on the top of the verandah below. The sizes of two bed-rooms are very luxurious and it is possible to provide private baths for these rooms. The class of people occupying a home of such pretensions does require these facilities, which, by habit, become necessities with them.

The staircase on the North side is specially so arranged as to leave sufficient space in its "well" for an electric or hydraulic lift. Of late automatic lifts working on electric energy are efficient and fairly cheap and a house of such a size and internal refinements should need the additional amenity of a lift.

The elevation is very beautiful; one might expect that the central rooms viz. the dining room on the ground floor and the bed-room above it, are likely to be a little dark and gloomy. However, there are as many as five door openings provided in it. When these are open there would be any amount of light and air coming there, and as regards the upper bed-room, the four walls of the same may be raised about four feet above the remaining, and low windows with glass shutters provided, in the raised portion for the lighting and efficiently ventilating the room.

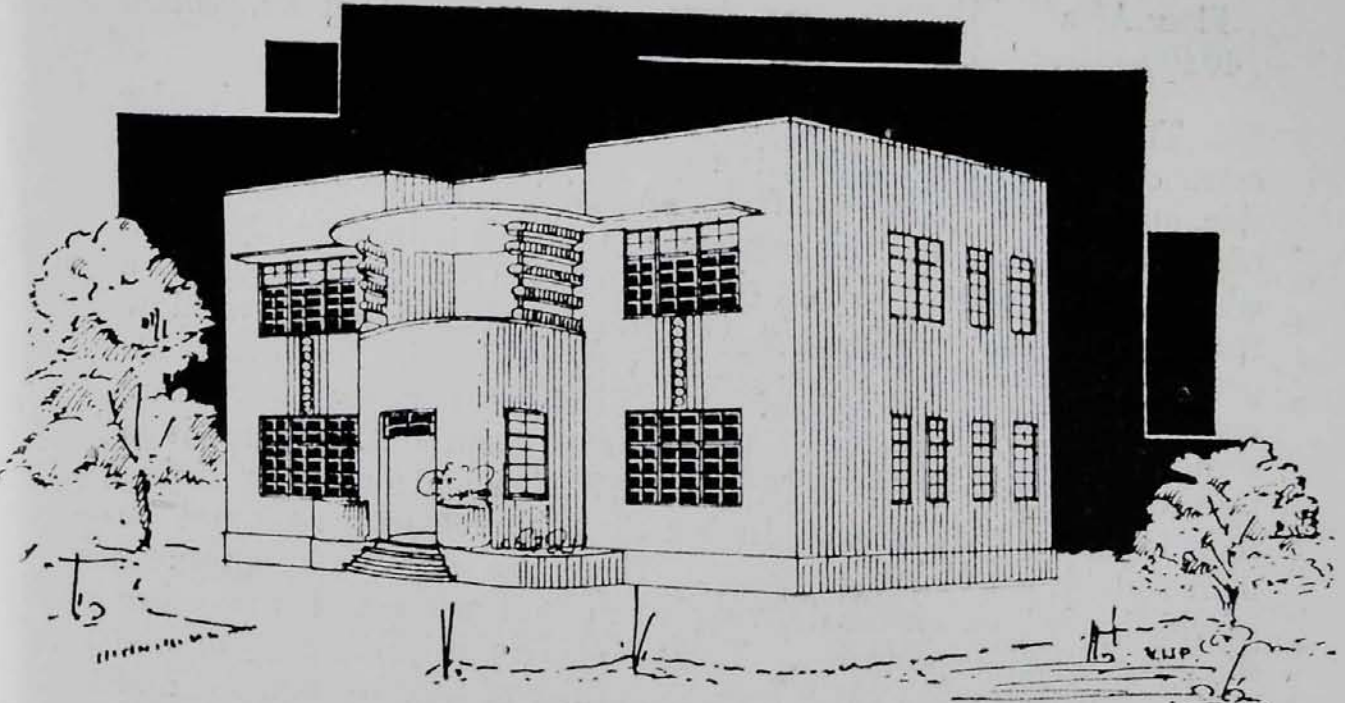


Fig. 149

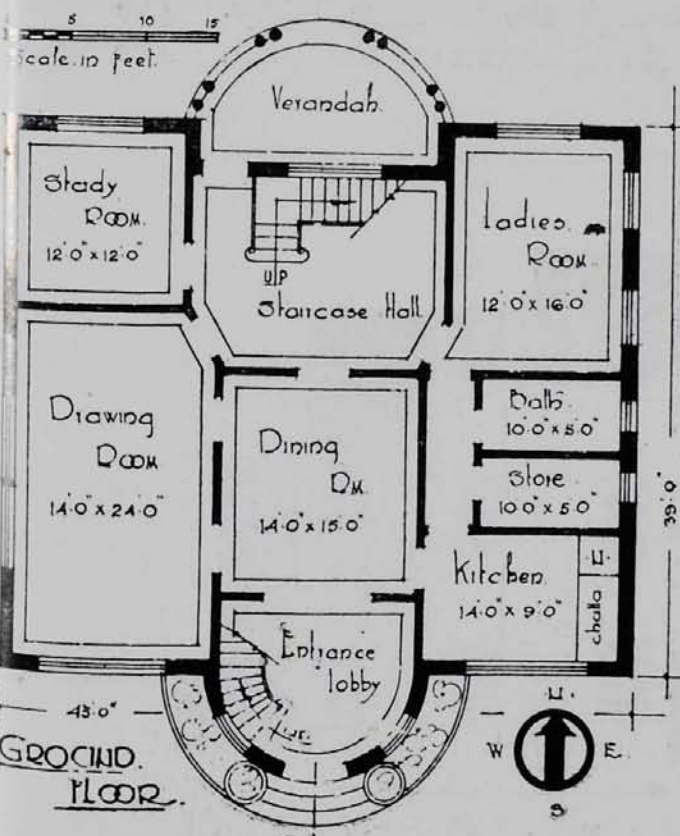


Fig. 150

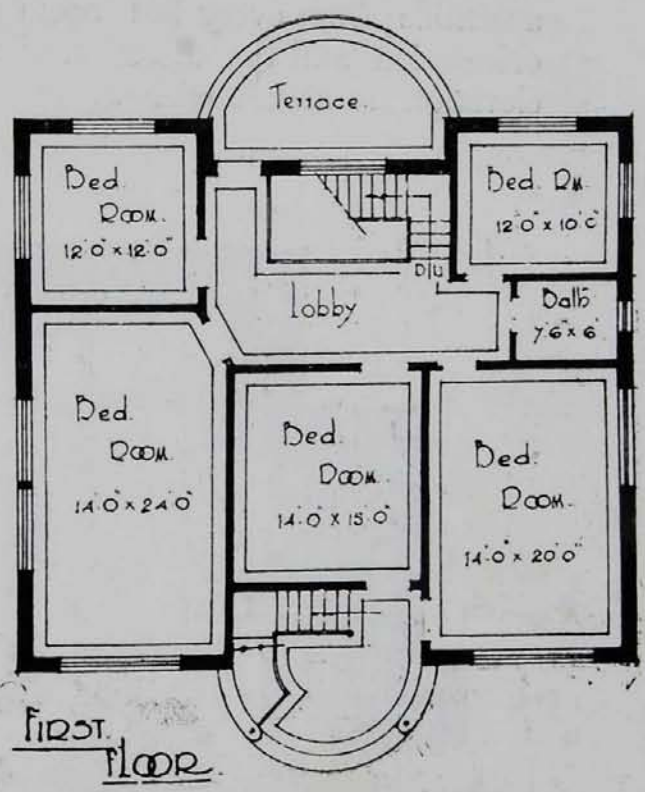


Fig. 151

Floor Area
4040 sq. ft.

Plan No. 52

Cost Rs. 16500

The home represented by the plan here has a small semi-circular entrance porch, behind which, is a spacious verandah on the left hand side, and a 7' - 6" passage in front. A staircase, in one straight flight of stairs, is arranged in this passage, so that it is independently accessible from any room. On the right hand side of the passage is a spacious drawing room with a charming semi-circular bay-window projection. The size of the kitchen is very good and a small store attached to it increases its utility. As it is situated in the North-east corner, kitchen smokes and smells would be kept out. There is a bath room for general use in front of the kitchen and a spacious dining room is close to the kitchen. In fact the ladies' apartment would be more suitable for dining purposes. There are two back entrances provided, one between the drawing room and store and the other through the ladies apartment. There is also a third, direct from the kitchen, but it detracts much from the utility of that apartment and may be closed.

On the upper floor there are four excellent bed rooms, two bath rooms, one common to two bed rooms and a verandah, which is accessible from every bed room through the staircase lobby. The orientation and the direction of wind are shown on the plan. The elevation is ultra-modern.

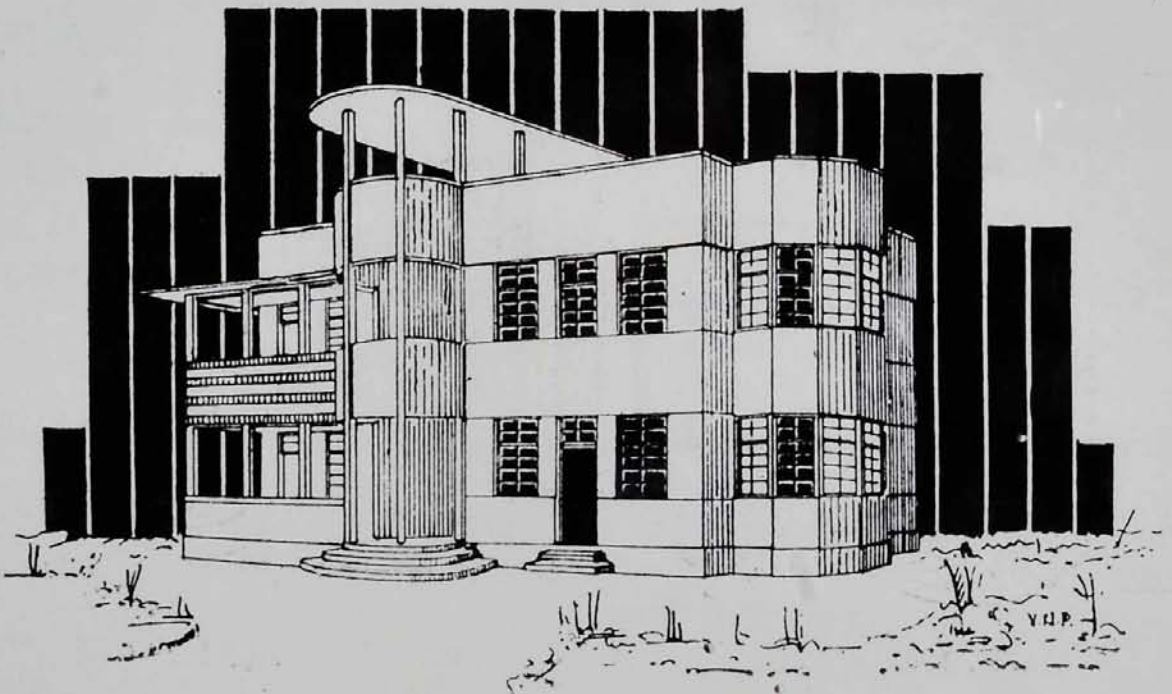


Fig. 152

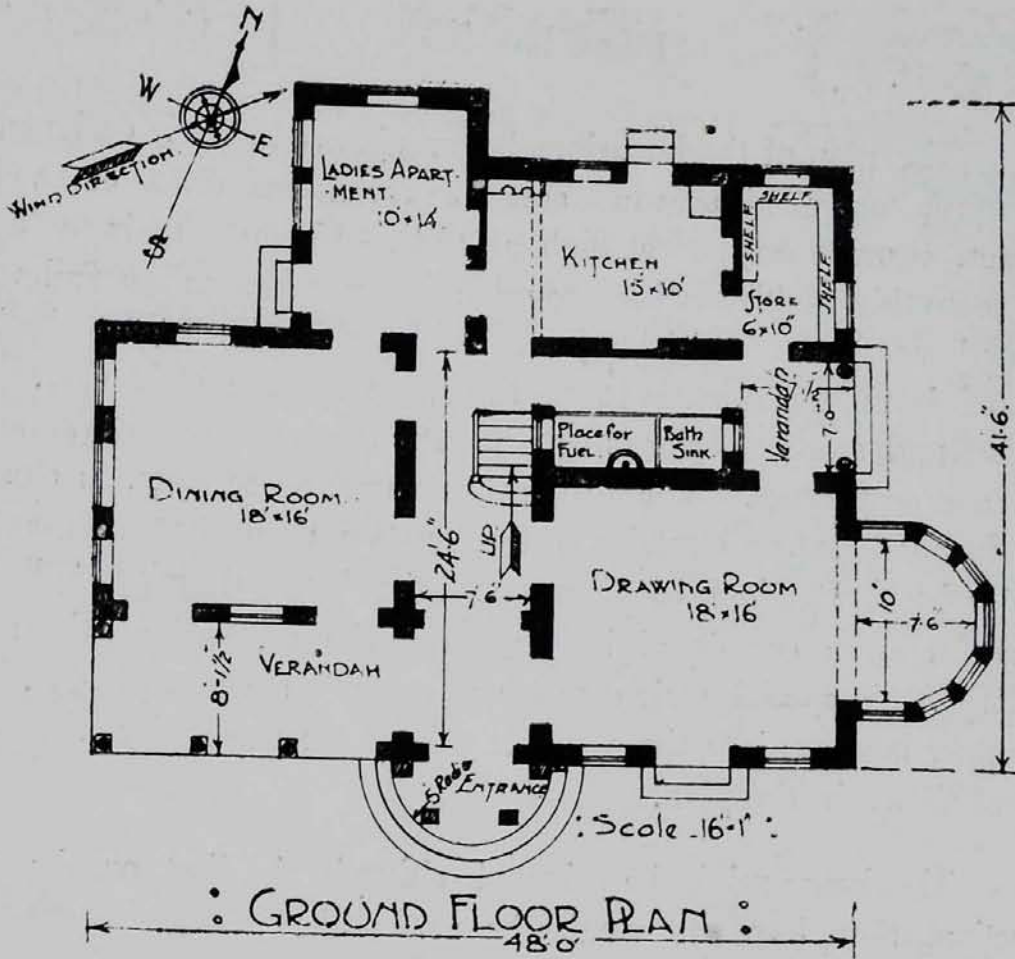


Fig. 153

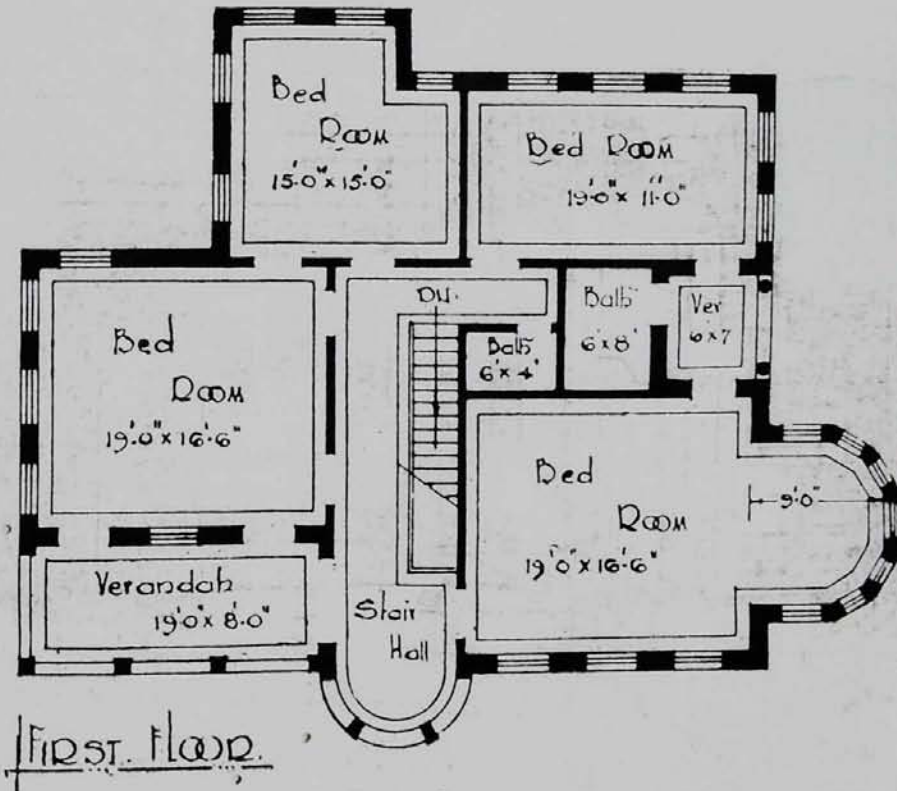


Fig. 154

Floor area
4100 sq. ft.

Plan No. 53

Cost Rs. 16500

The plan of the luxurious house pictured here is designed on the open, extended scheme, suitable for a sea coast or a hilly district, situated on not a high altitude. In fact, it is a home, one room thick. The wide verandah extends almost the full width of the house in front. The guest room, with its private bath, is isolated from the other part of the house by the stair case. The kitchen and store room are in a separate block attached by means of a covered passage. The dispensing room, or servery, is close to the dining room. Upstairs, there are two large bed rooms with private baths attached to them, and the large drawing hall may be useful as an occasional bed room. The sizes of all the rooms are large. A special stair case for servants, on the rear side, with its upper landing into the servants gallery, is a necessity though it is not shown in the plan.

The house might be oriented either in the East or the West direction, though, West would be preferable.



Fig. 155

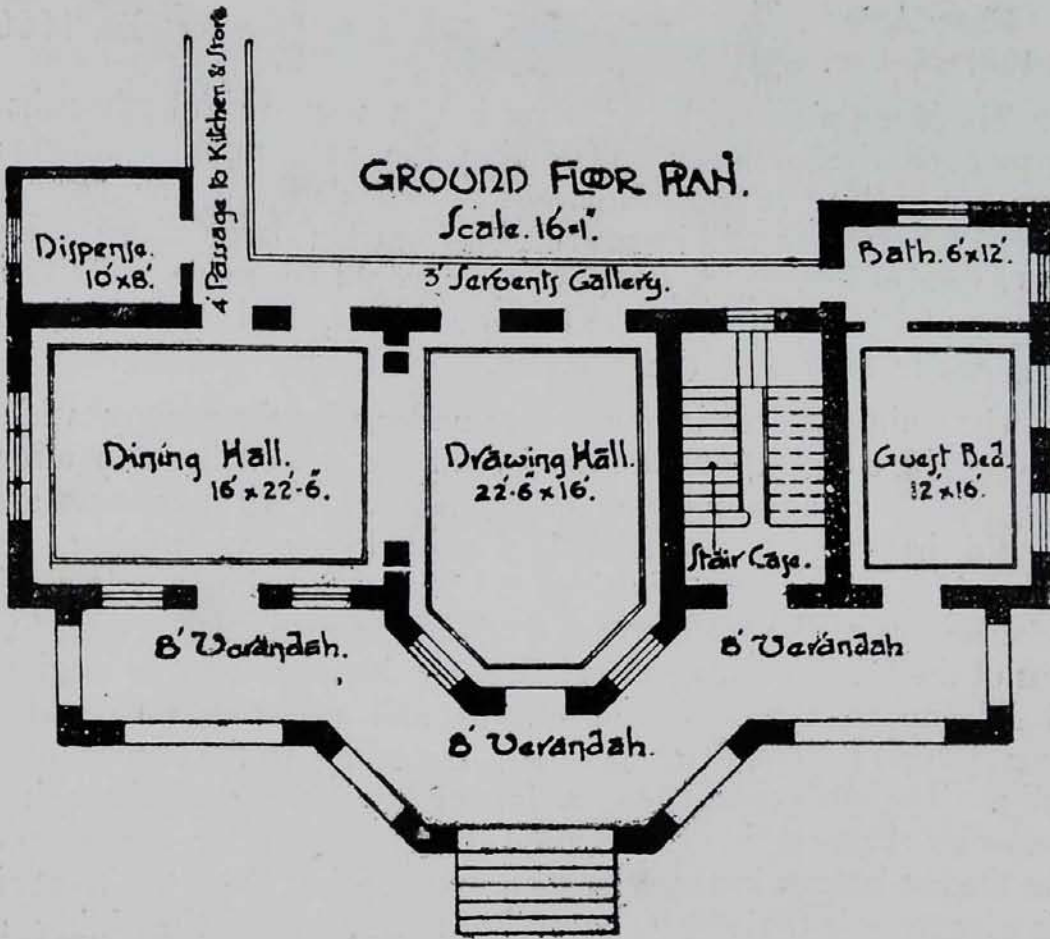


Fig. 156

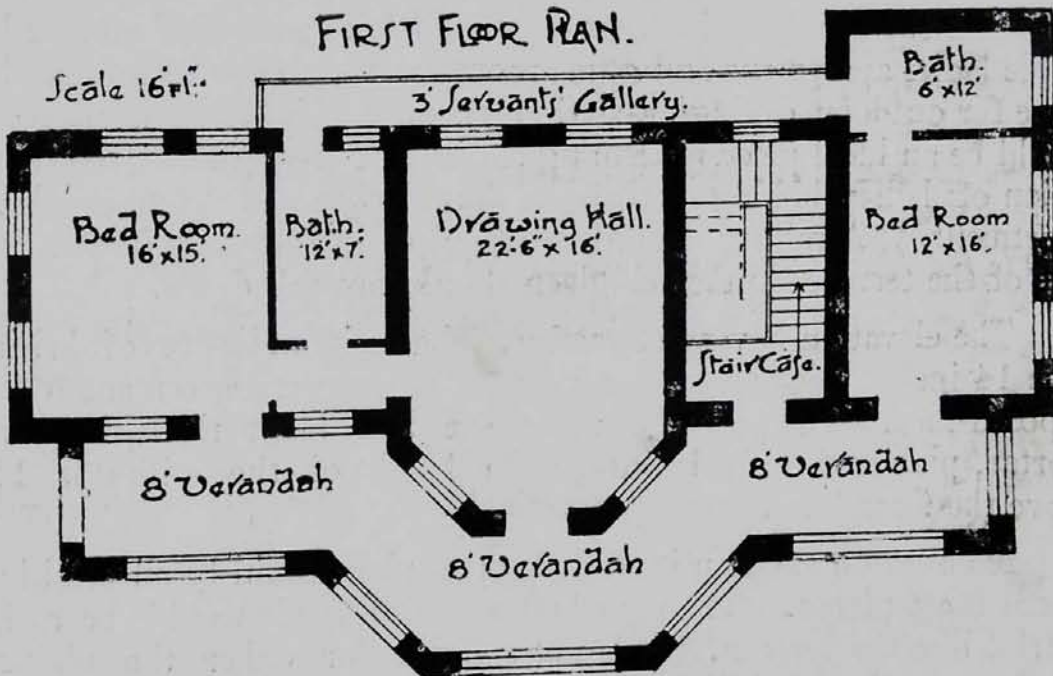


Fig. 157

Floor Area
4097 sq. feet.

Plan No. 54

Cost Rs. 16600

The home pictured here has received a very careful thought on the part of the designer to provide the maximum comfort and happiness to the dwellers inside. It is not designed for considerations of economy as will be easily seen from the large space allowed to be occupied in verandahs. The plan would be more suitable for a corner plot if oriented in the manner shown, and is calculated to contribute to the maximum comfort.

The main entrance is in a corner under a lovely canopy which is over-hanging so much outside the face of the verandah, as to afford a full shelter to an automobile standing in front. All the rooms are so arranged that every one of them is protected by a verandah at least on two sides. The house provides the best circulation possible. The special feature of the plan is that the house can grow according to the needs of the family. It would suffice, for instance in the beginning to build, up to the ladies apartment and afterwards to add bed rooms behind it, one after another, according to the needs of the family. The kitchen will have a lot of morning sun through the window on the East side and would be protected by the verandah from the hot breezes in the afternoon and evening from the West side. This advantage is derived by every bed room. Both the dining and drawing rooms are of ample size. The kitchen is in a separate block attached to the main house by a covered passage. The bed rooms are sufficiently large and each is provided with its own private bath room. An open terrace, if constructed behind the servery and store room, so as to join the verandah in front of the kitchen, with that on the back of the ladies apartment and office room, would serve as an excellent place for outdoor dining or sitting room. This terrace, moreover, would be an ideal place for young children to play under the supervision of ladies looking both from the kitchen and from the ladies' apartment. A railing would be required in that case, on the South side of the terrace, so that children should not fall down.

The elevation is very attractive. The main walls are of brick in lime 14 inches thick and are rendered in snowcrete cement on the exposed face. The partition walls are half brick thick in cement mortar, plastered on both sides. The height of the ceiling is 12 ft. above the floor level.

A house on such an extended, open plan would be an ideal home on sea coast places. The next best situation for it would be a hilly district like the Deccan. It is not suitable for either the plains of Northern India, nor hill stations, where a close and compact plan is required.

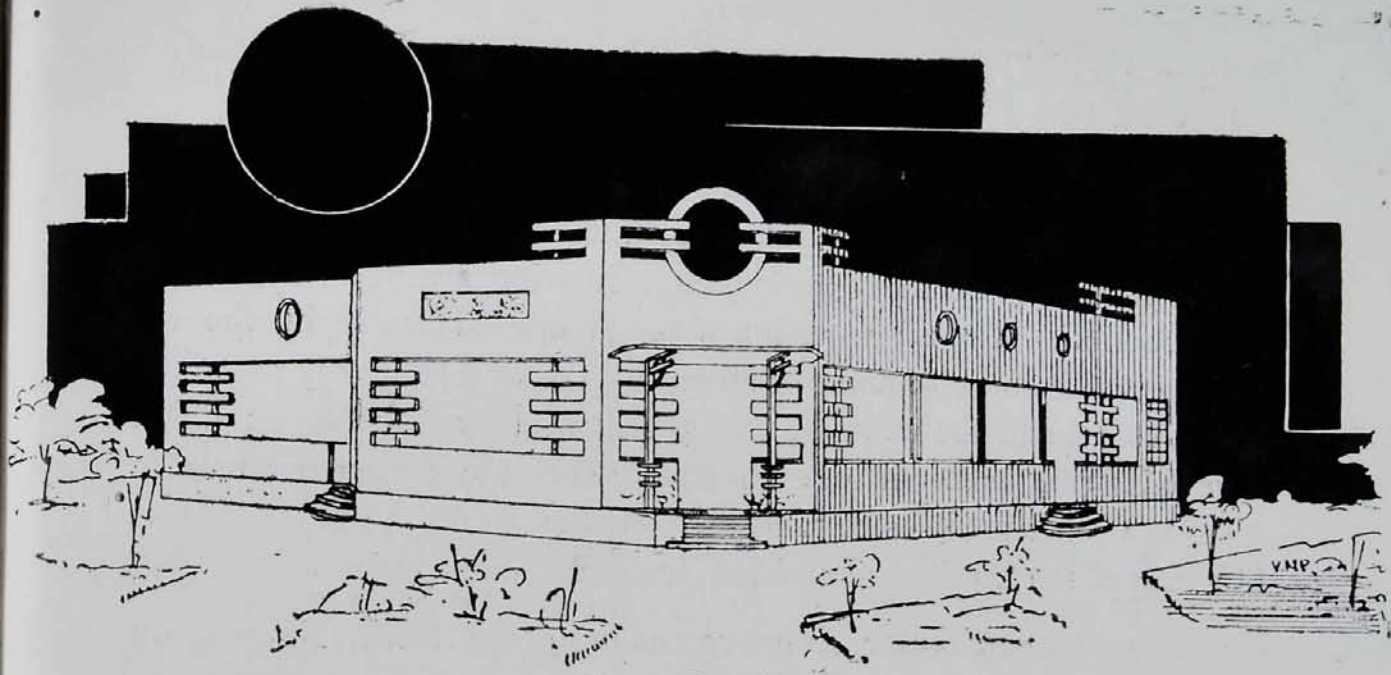


Fig 158

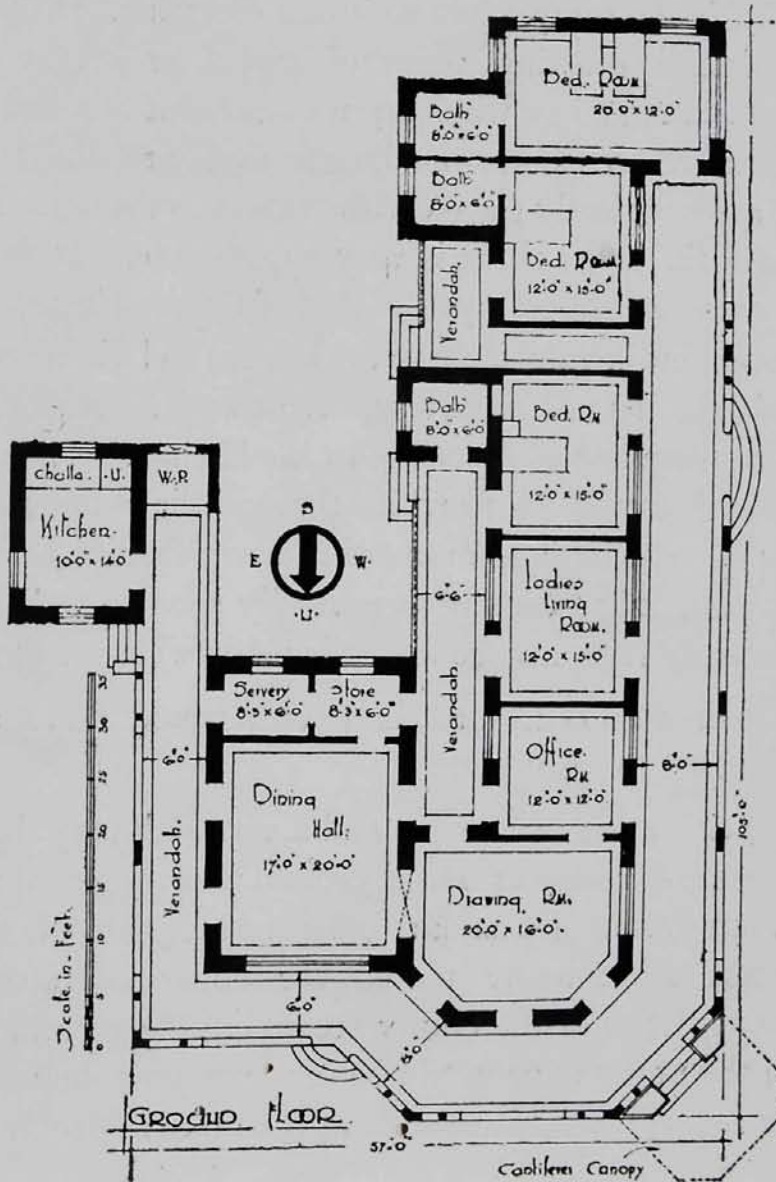


Fig. 159

Floor Area
4280 sq. ft.]

Plan No. 55

[Cost Rs. 16750

Here is a home which contains all the essential elements of a fine design—beauty without vain ornamentation, strength and stability firmly impressed on the exterior, and interior arrangement, sound and practical. The employment of rough dressed stone in the exterior gives it an appearance of strength, the stream lined, sweeping, round chajja and the wrought iron grilled windows in the verandah, give it the simple charm of modernity and the symmetrical front gives it a grace of balance and proportion. Thus, there is a nice blending of the traditional and modern architecture in it.

The quarter-circular deep verandah in the front, though, on account of the central passage not so useful on the ground floor as on the upper one, is the central feature in the elevation. On its left hand side is a beautiful drawing room of ample proportions, with an attractive semi-circular bay window, and beyond it is a bed room open to the Western breeze. Corresponding to these are the ladies room and kitchen symmetrically placed with respect to the central verandah. The position of the ladies room is very appropriate. It has got the necessary prominence almost equal to that of the drawing room for men and at the same time is quite close to the kitchen and dining room — the centre of the woman's home activity, even though a cook and a maid might be in employment. Attached to the kitchen, is a small store room, and a back entrance is provided through the dining room. There is a paved open yard behind, on one side of which, are arranged two w. c.s and a bath. The stair case is centrally situated and is approachable independently from any room. It is made wider at the entrance.

The back open courtyard, if paved, would serve as an ideal room for children to play about.

Upstairs either five bed rooms and a verandah may be arranged, or, the same suite of rooms as on the ground floor, repeated with a view to letting it out to a family as an independent flat. However, the stair case is not conveniently placed for doing the latter, without disturbing the privacy of the family occupying the ground floor. The verandah on the upper floor would be an excellent lounge as there will not be a through central passage in it as on the ground floor.

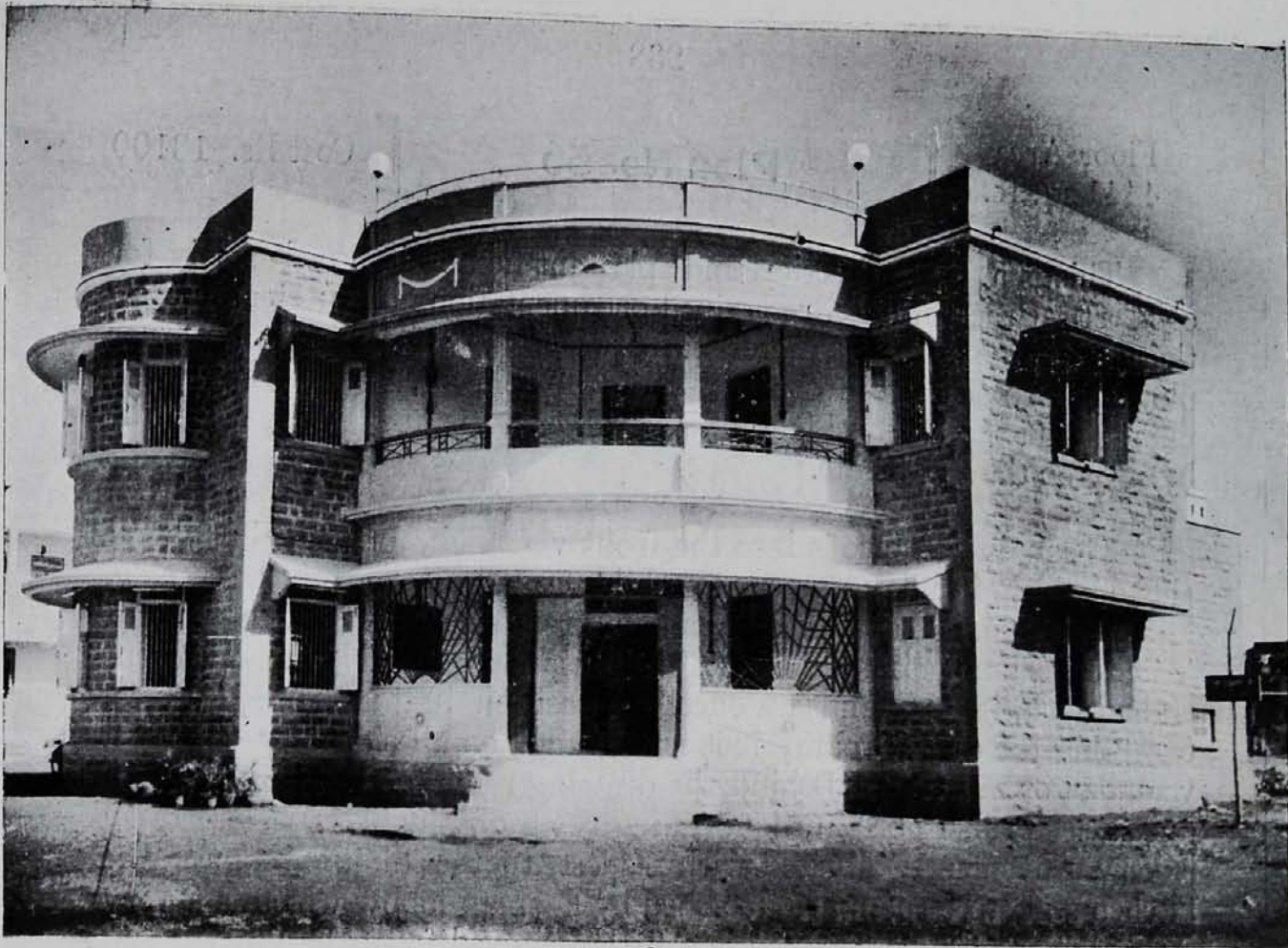


Fig. 160

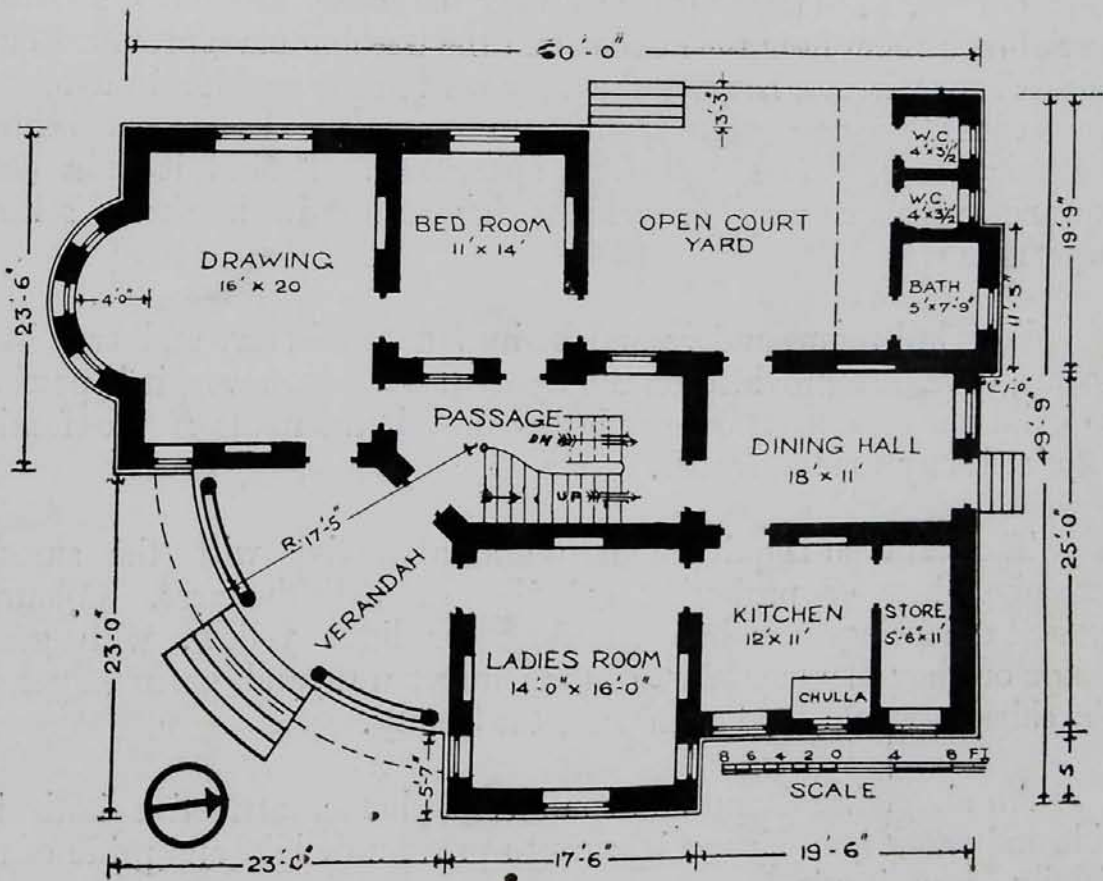


Fig. 161

Floor Area]
4441 sq. ft.

Plan No. 56

[Cost Rs. 18100

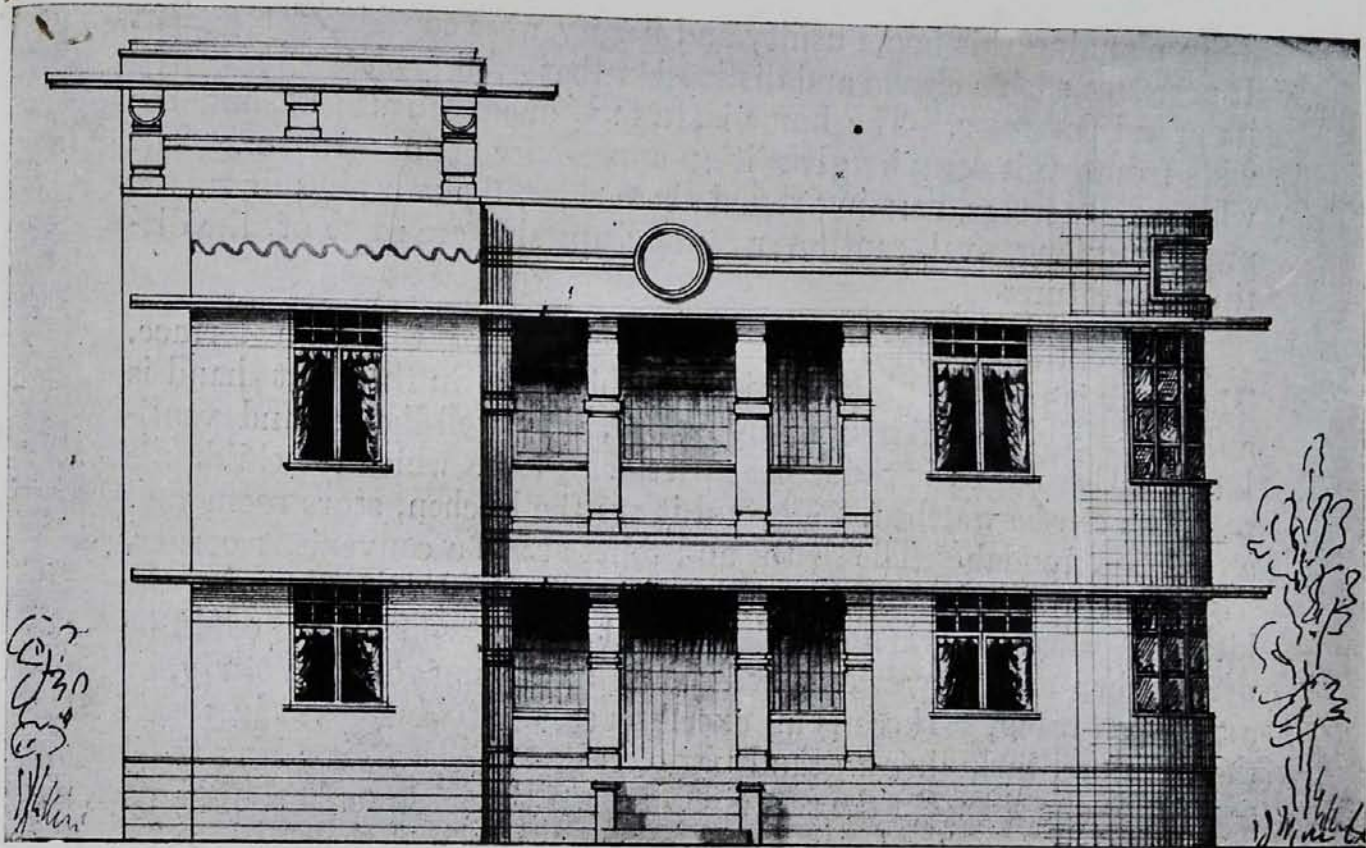
This is a very practical and pleasant home designed solely for comfort. Graceful lines, restrained ornamentation, and perfect domesticity are some of the characteristics of it. It is suitable for a corner plot, the main face, with the 8 ft. verandah in front, abutting against the highway on the West side, and the other face, abutting against the by-way on the South side.

The main entrance is into the front verandah, on the left hand side of which, is a day nursery for children and on the right hand side, an office room. Behind the verandah is a spacious drawing room. This room, amongst middle class families, is the family's show room and as such, it commands an excellent position in this home, because, excepting the dining room, it is surrounded on all sides by either a verandah or a lobby. Behind the drawing room, and joined to it by only a removable curtain, is a dining room of equal size. The pantry is very conveniently situated with respect to the dining room. The kitchen and store room are detached by a small lobby which is a very good thing. The bath room is a little removed from the kitchen and dining apartments, which some families may not like. In that case the room 'W. P.' (washing place) may be converted into a small special bath room near the kitchen and the washing place provided outside. The stair case has found a very convenient location in a lobby, so that it is easily accessible from any room. The bed room behind the stair case is, in fact, a ladies' apartment. Behind it is a back entrance, which is very convenient for calling in hawkers, selling vegetables etc.

Four bed rooms and verandahs in front and rear, and two bath rooms, have been provided on the upper floor. However, it is possible to build one or even two more bed rooms, if the needs of the family require it any time in future.

The elevation is quite modern and attractive with the smooth sweeping lines of projecting chhajjah on both the faces. Coloured cement rendering either in a snowcrete or light yellow, with green bands on the pillars and face of the parapet wall, and green edges of the chhajja, would further enhance the beauty.

An altogether decent and comfortable home, attractive both inside and outside, and hence is sure to prove a delight and pride of the family occupying it.



FRONT ELEVATION

Fig. 162

FIRST FLOOR PLAN

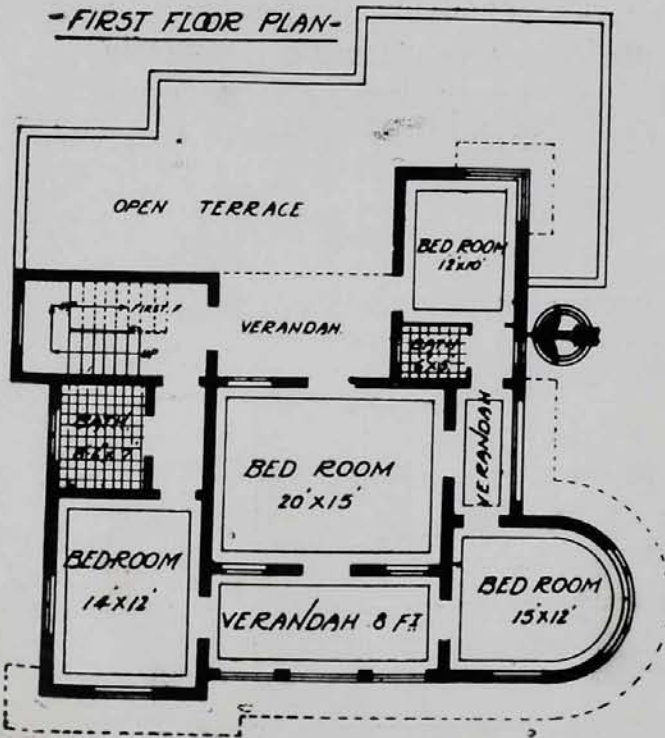


Fig. 163

GROUND FLOOR PLAN

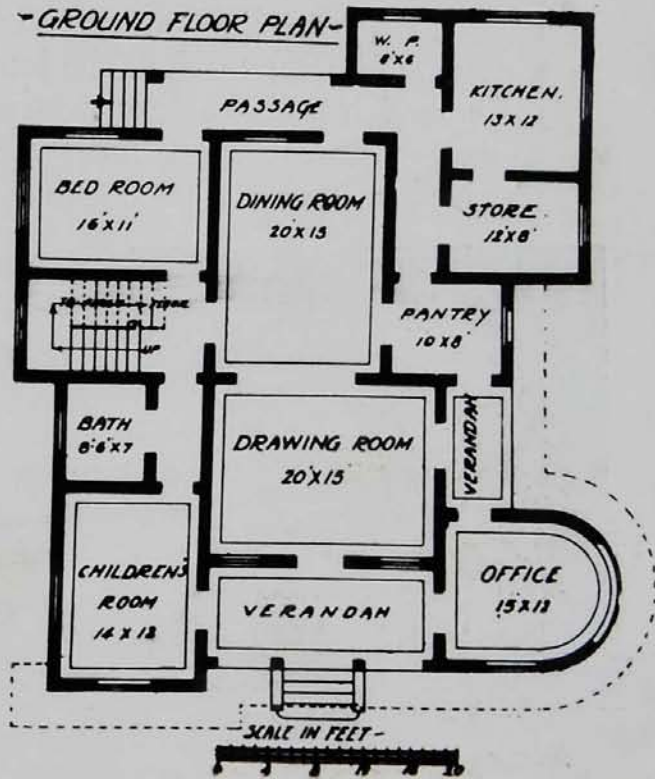


Fig. 164

Floor Area
4311 sq. ft.



Plan No. 57



Cost Rs. 19450

In planning this home utility and beauty were considered together. It possesses such a charm and distinction that even princes might envy its proud possessor. The home is, in fact, one room thick, but the wide frontage it occupies gives it an appearance of a mansion. The wide, open terrace, running round three sides, the sweeping lines, the projecting long, oval, cantilever canopy upstairs, are some of the distinctive features.

The entrance is in the right hand corner of the open terrace. The latter is protected by a projecting chhajja. On the right hand is a day nursery for children, a large room, very well lighted and ventilated. Close to it, is the ladies apartment, from which the children's activities can be watched. Beyond it are the kitchen, store room and a small verandah. The bath and toilet are in a convenient corner. The dining room is an unusually large room and is close to the kitchen. Close to it, is a gents' informal sitting room, which could be used, either as an occasional bed room, a smoking room, a study, or a seclusion room. There is an excellent sized drawing room in which the furniture, including a grand piano, is shown. There is a long fixed seat along one side. On the rear side of these three rooms is a spacious verandah ten ft. wide, in which, at one end, is placed the staircase.

Four bed rooms are arranged on the upper floor. The one for the master is very large and luxurious. There are two bath rooms one at each end and also two terraces. The large terrace on the left, can be reached either by the rear verandah or the front lobby, in the form of a passage on the terrace. The long, projecting, cantilever canopy over the verandah lends boldness to the design. Every bed room is open to the South-west breeze and there is a lot of closet or cupboard space provided in each.

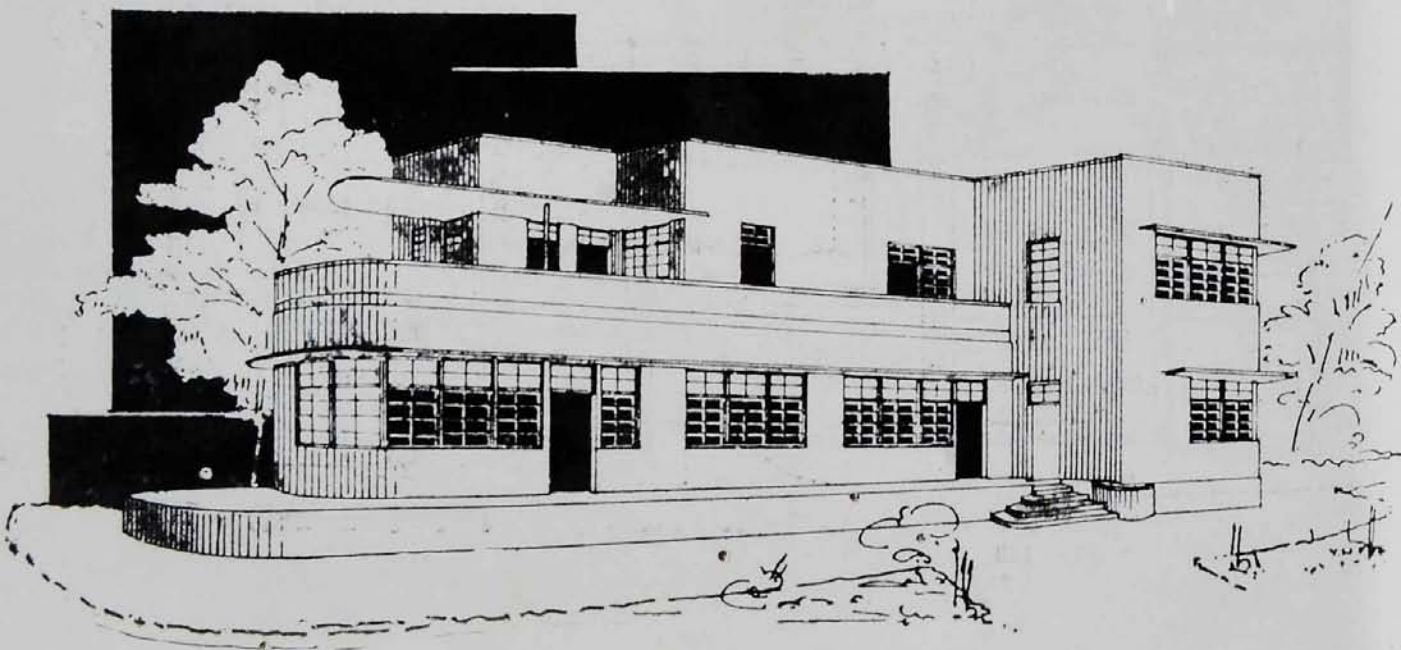


Fig. 165

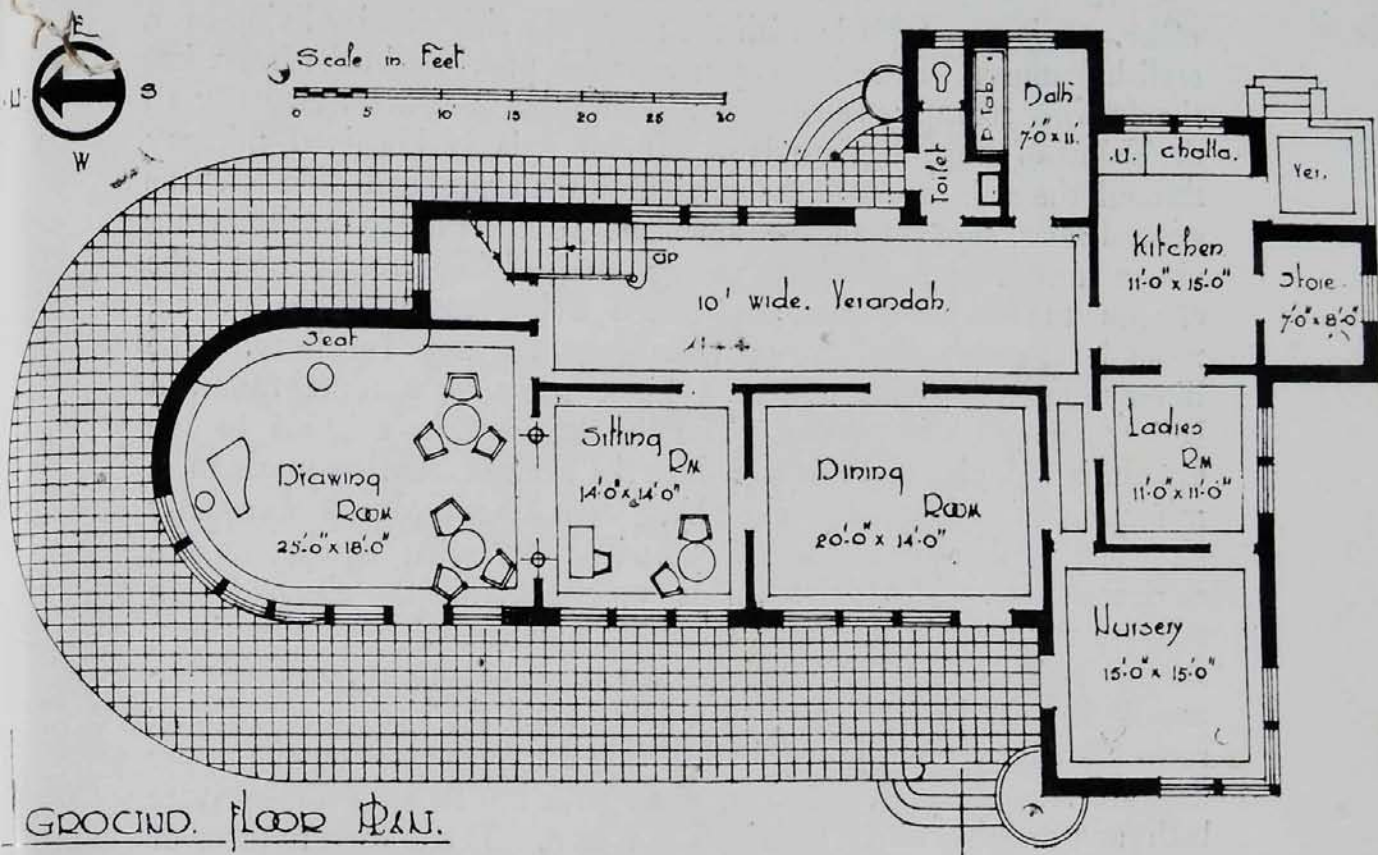


Fig. 166

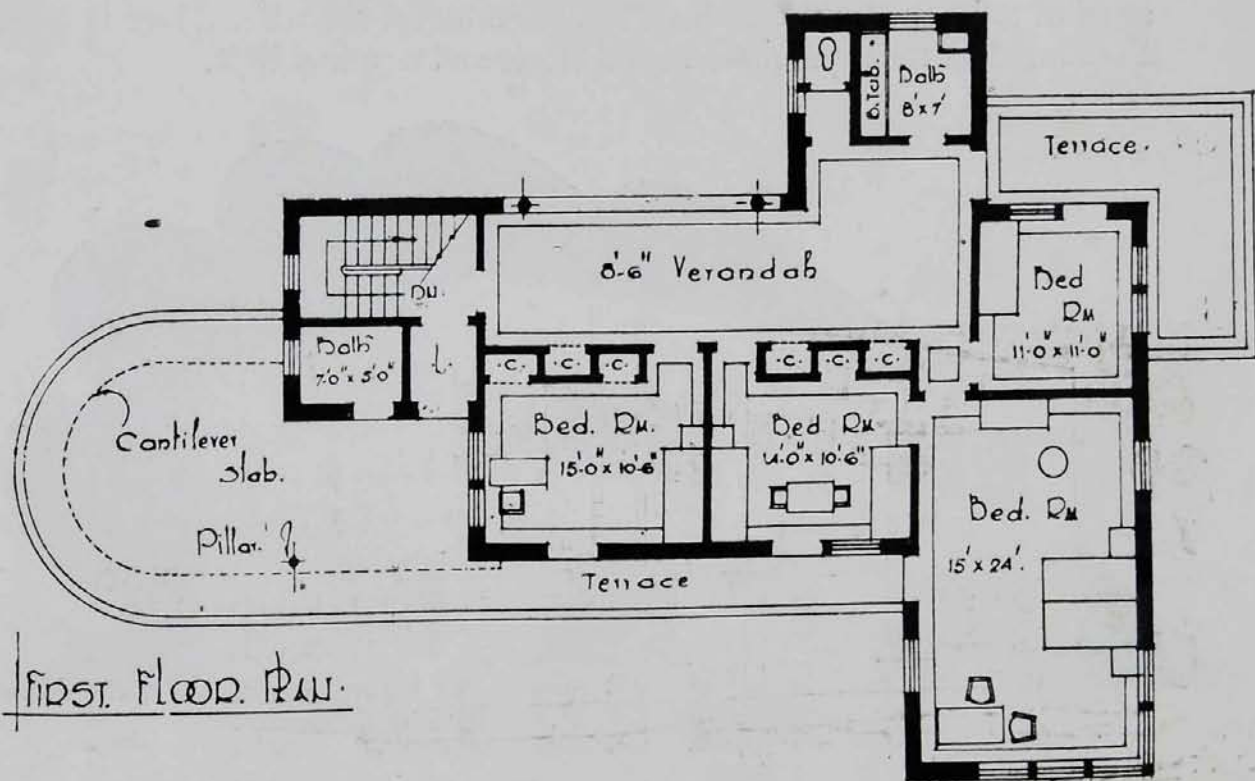


Fig. 167

Floor Area
4558 sq. ft.

Plan No. 58

Cost Rs. 19500

The outstanding characteristic of this home is the flexibility it offers. It is sure to fit in with the needs of a rich family living in a stylish manner. There is no open verandah provided in the front, but the drawing room has such large windows that it answers virtually all the claims of an open verandah. If an axis be imagined midway through the stair case hall, the portion on the right hand side on the ground floor, supplies all the amenities required in the service wing viz. a store room, kitchen, pantry and dining room, and the one on the left hand, facilities of the living rooms. The drawing room is of ample size, to provide space for any furniture. The library can serve just as well as a guest room, a comfort room, a ladies room or a hobby room. The dining room in relation to the kitchen is well placed, so as to reduce the work of serving meals to a minimum, with the pantry close by. The kitchen also is unusually large and would accommodate very easily the modern equipment of a refrigerator etc. The bath room is very conveniently situated. In addition to the main stair case, which is wide enough and luxurious, another stair case for servants is provided. The store room is unusually large and might serve as a kitchen and the kitchen as a dining room if an extra room is required. The arrangements on the upper floor are very compact. There are four large bed rooms with a private bath and dressing room provided for each. There are a number of clothes closets provided. The master's room, viz. the one in the front left hand corner, is 18 ft. square, and has two bath and dressing rooms attached to it, one for the husband and the other for the wife. There is a central cloak room provided with a closet and a urinal in it.

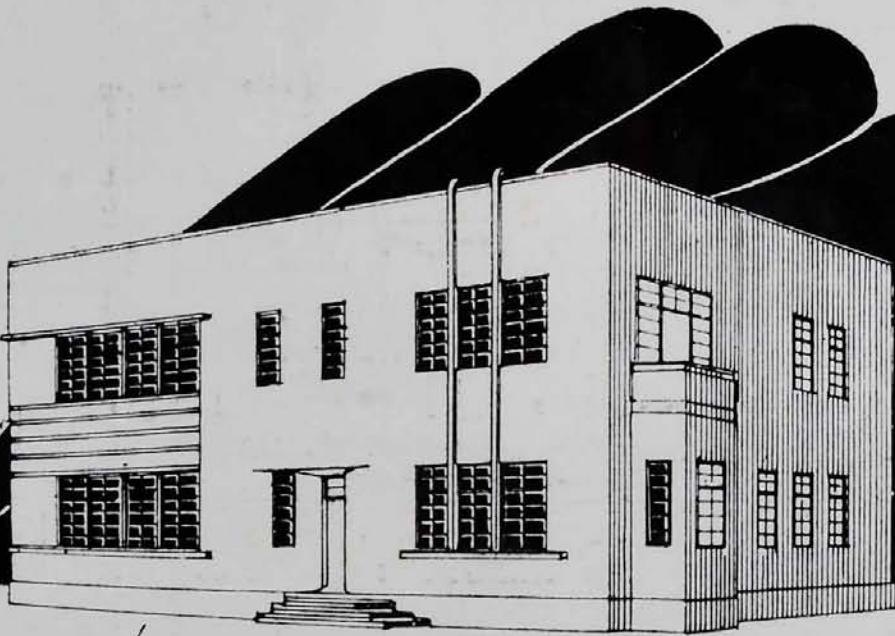


Fig. 168

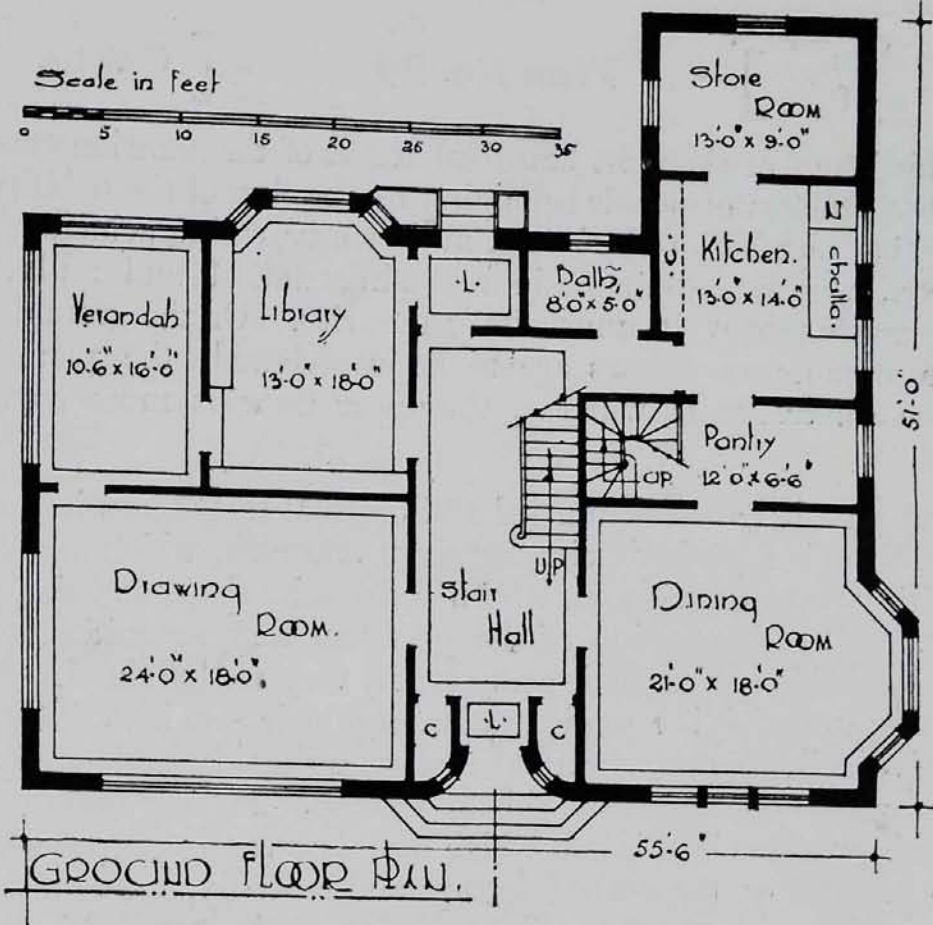


Fig. 169

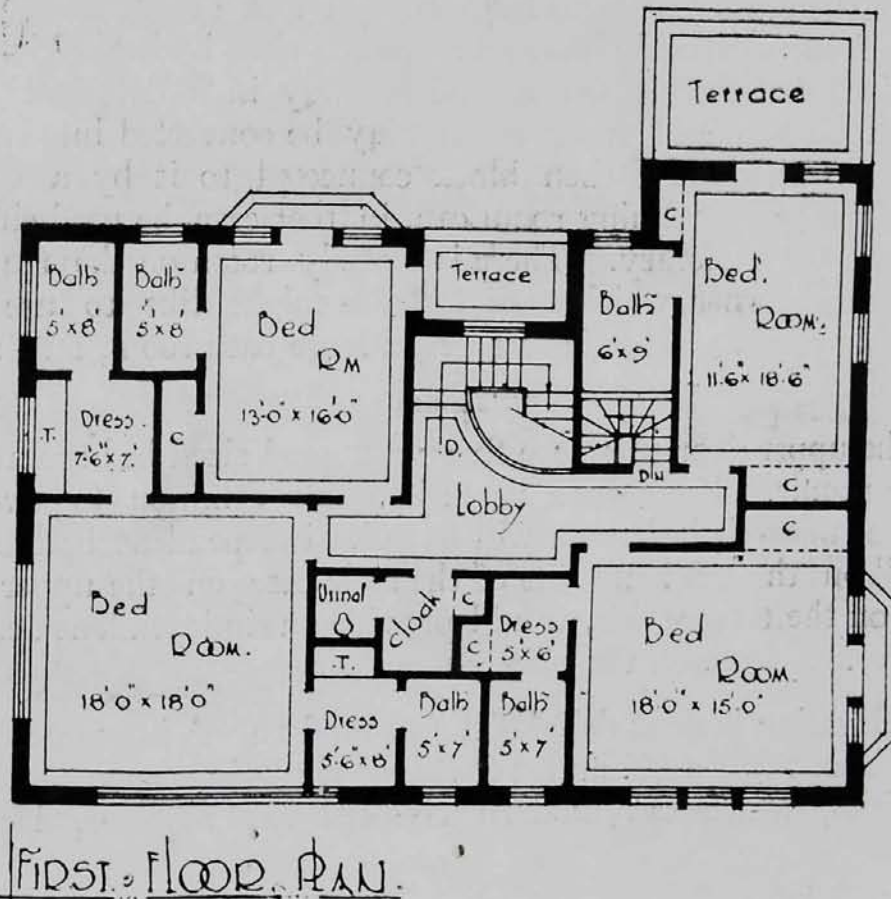


Fig. 170

Floor Area
4550 sq. ft.]

Plan No. 59

[Cost Rs. 19580

This is one of the most beautiful homes of the mansion type, and solves the problem of people belonging to the class of the nobility such as *Rais*, big *Zamindars*, *Jagirdars*, mill-owners, ruling princes of small states etc., who want to maintain a certain standard and still do not want to waste money in unnecessary luxuries. On the ground floor, where a number of visitors are to be interviewed, the planning is rather on a liberal scale, whereas, the upper floor is most compactly planned.

This plan has several unusual and original features in it. At the entrance there is a perfectly circular large verandah, which might serve as a waiting room for visitors, who will, from its shape and size, gather the first excellent impression of the grandeur and magnificence. On the left hand side is a large drawing room, very well lighted. Behind the circular verandah is a semi-circular large stair case hall. This room will receive its light partly from the rooms on the sides and mainly from the large window on the front side at the top. An easy and luxurious stair case is provided in this hall which would serve two purposes—firstly, as an ornament or the central feature and secondly, as the means of, communication with the upper floor. A lift can be installed in the well of this stair case. There is another stair case provided for the use of servants. The dining room is large enough and symmetrically situated in the front. The kitchen and store are close by behind it. But, if it is desired that the kitchen should be away in a detached block, the present kitchen and store room may be converted into a large dining room, with the kitchen block connected to it by a covered passage. The present dining room can, in that case, be used either as a guest room or a library. There is a study room on the rear side in the left hand corner, which some families might like to use as a ladies' sitting room. There is, besides, a large bath room, and a back entrance through a deep verandah.

On the upper floor there are five very good sized bed rooms with three bath rooms. If one bath room is made common to two bed rooms, the master's bed room will have its independent bath room. The "box" on the left hand side of the stair case on the upper floor, if opened on the terrace side, would provide an independent access to the front terrace from all the rear rooms.

The elevation is most delightful and modern. A house occupying a space of about 58' x 40' and providing six living rooms with all the amenities, which the modern civilised life requires, is really a marvel.

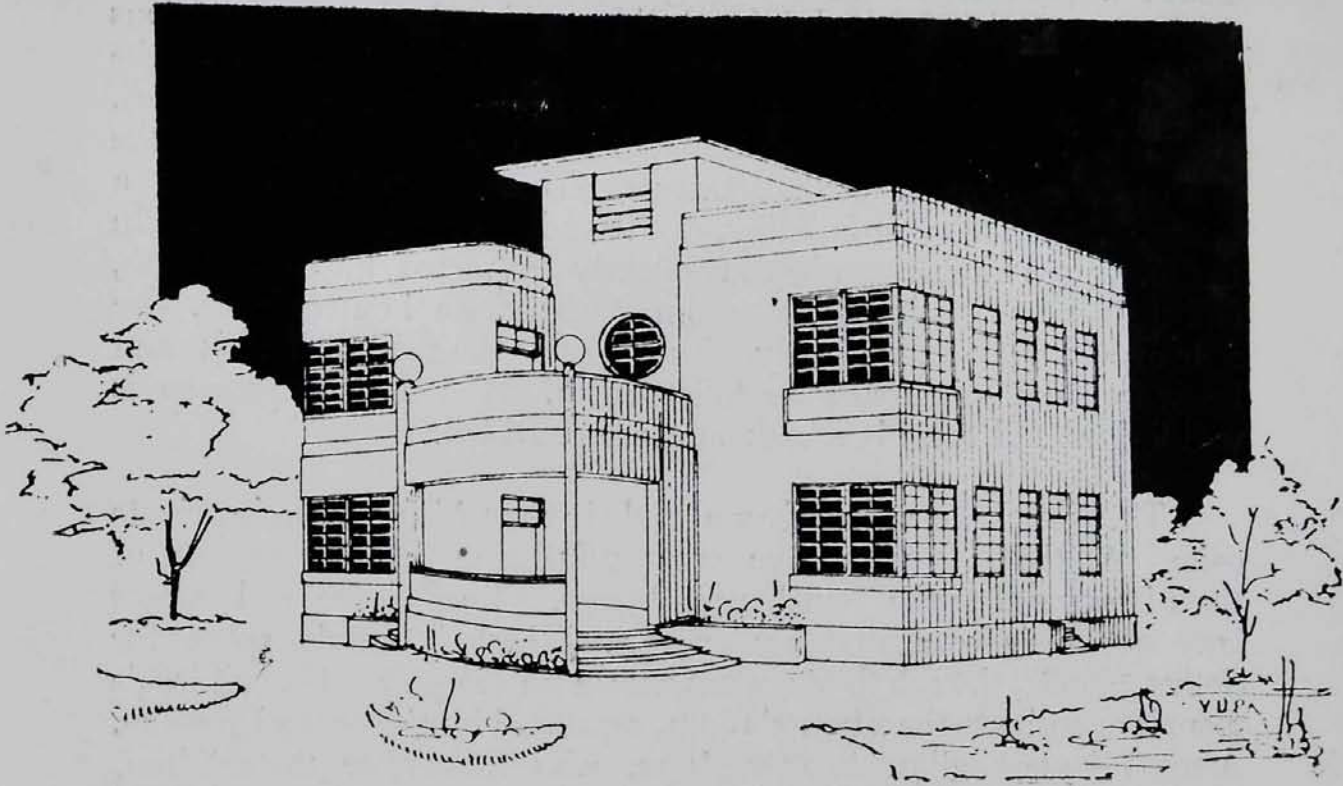


Fig. 171

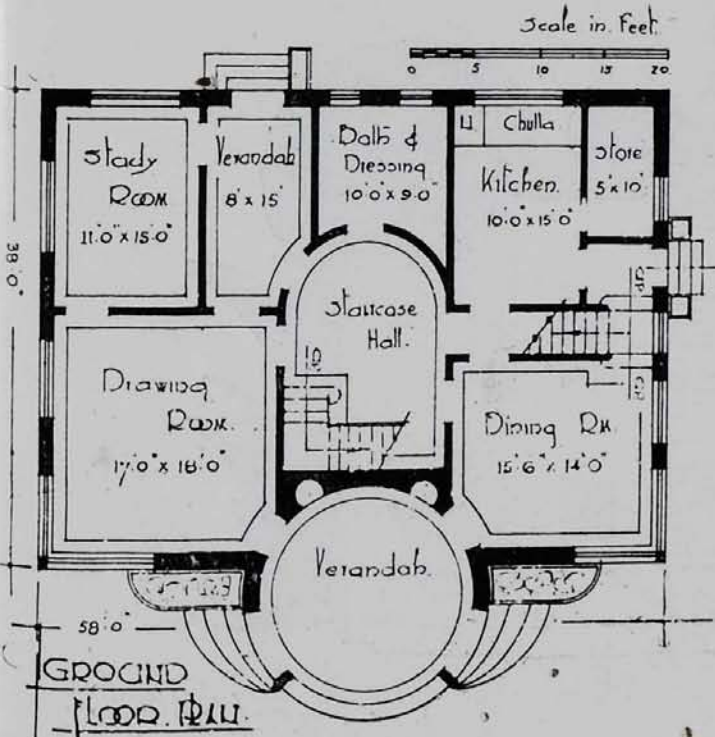


Fig. 172

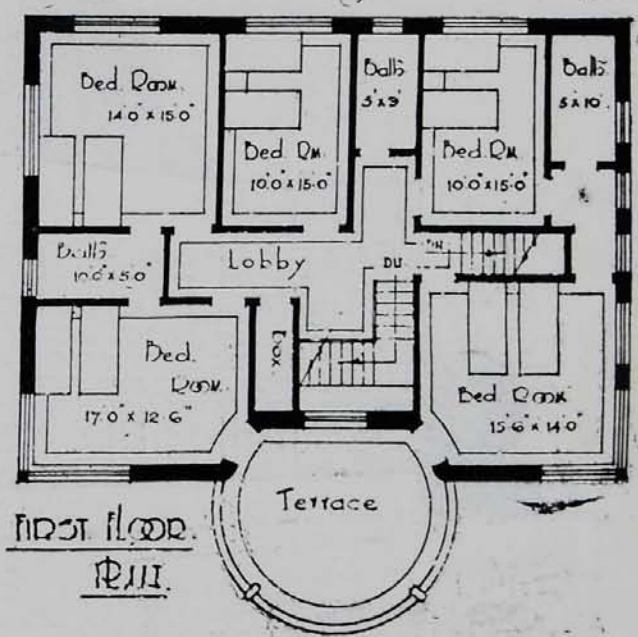


Fig. 173

Floor Area
4562 sq. feet.]

Plan No. 60

[Cost Rs. 20000

This luxury residence has three artistic verandahs on three sides on the front, and two square bay projections in corners, which have added a peculiar charm to the general composition. There is an entrance verandah on the left hand side, which leads to a spacious lounge. If a portable curtain be erected across it, just in front of the stair case entrance, it will correct the too elongated shape of this hall, and make a separate small stair case hall. Both the library and the dining room are spacious apartments. Those, who do not want a kitchen inside the main building, can have it in a separate block. In that event the kitchen can be conveniently converted into a verandah, and the store room, into a rest room for servants in attendance. The stair case is very conveniently situated and the space behind it and below its landing is used for a toilet room. The central passage is well lighted and there is a back entrance provided.

The second floor plan gives a real luxury of an owner's private suite. All the bed rooms have cross ventilation and every one of them is exposed to the South-west breeze. Two large end rooms have got their own dressing rooms. There is ample space for clothes closets, though they are not shown in the plan. The children's room is opposite to the parents' room, separated by the central passage. A room has been allotted to the *Ayya*, who looks after the children, and is placed just adjoining the children's room for the facility of service at any time. There is a general bath-room for common use, easily accessible from any room. A store room is also provided for storing the family linen.

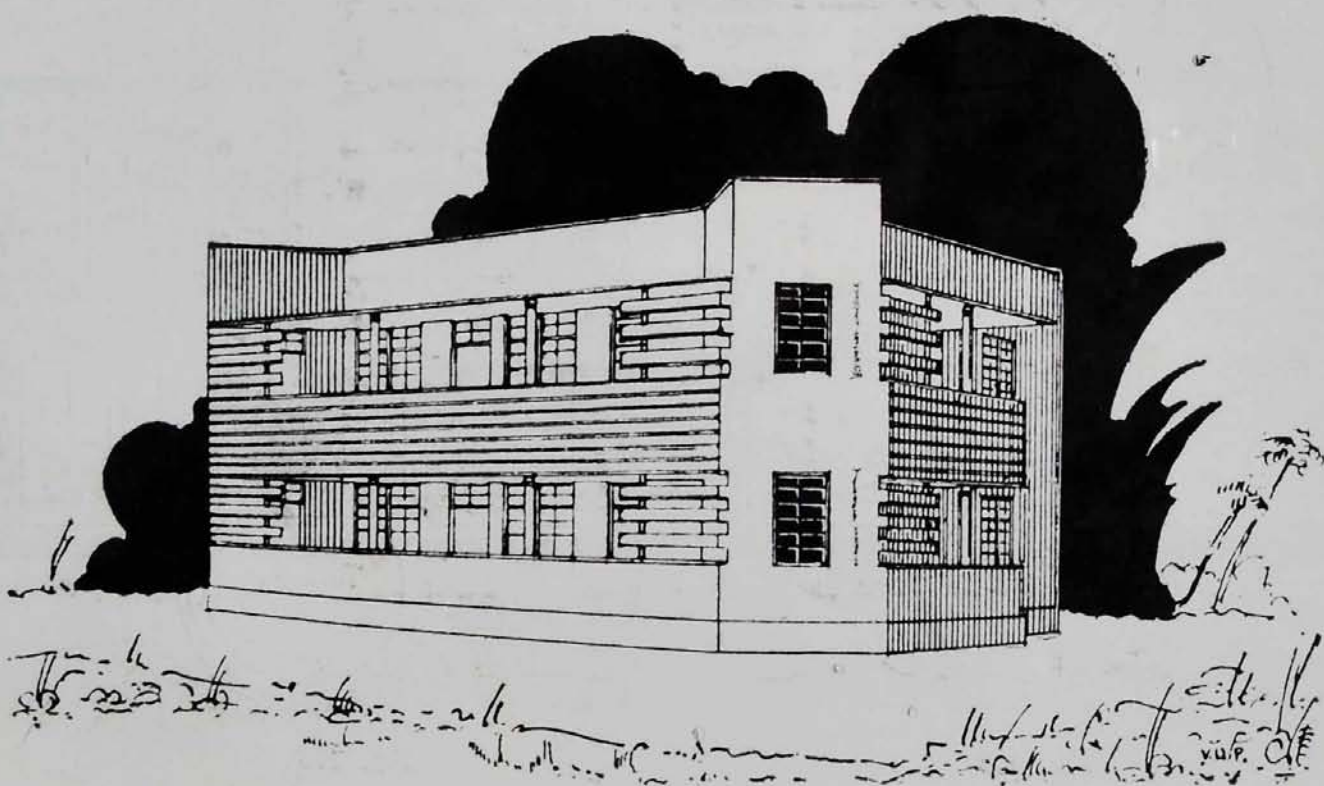


Fig. 174

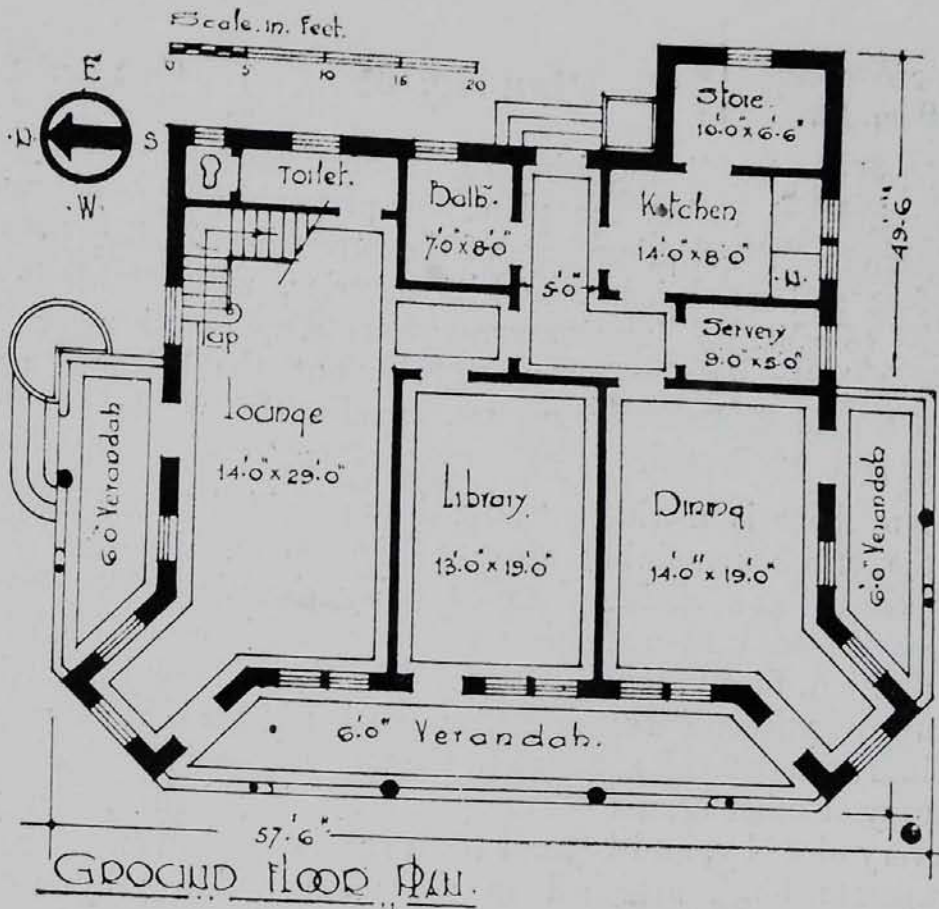


Fig. 175

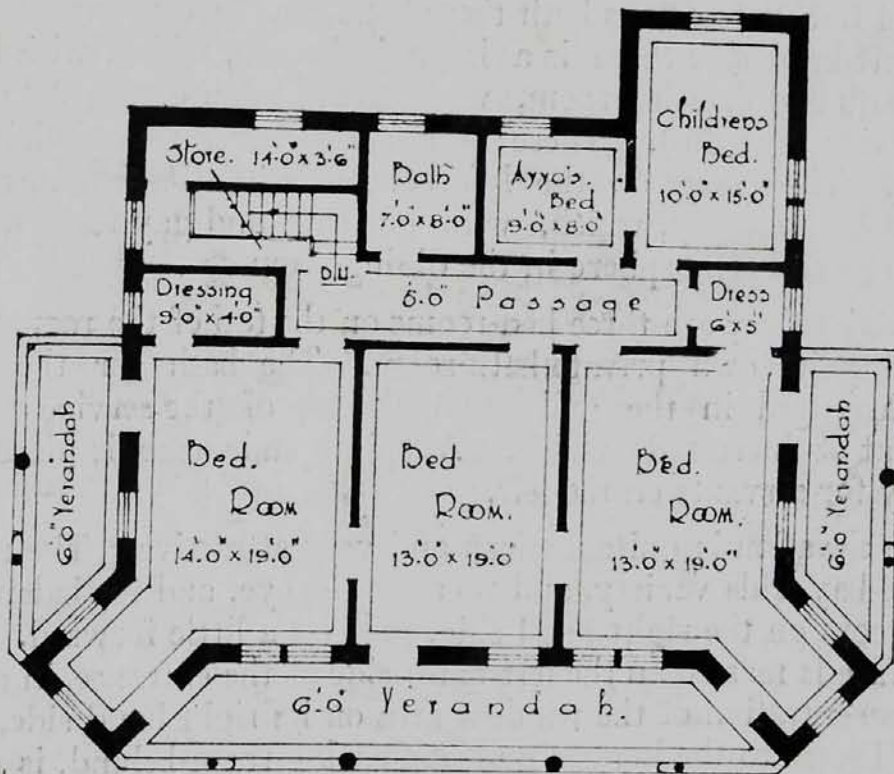


Fig. 176

Floor Area
4620 sq. ft.]

Plan No. 61

[Cost Rs. 23000

Here is a plan distinguished for its unaffected simplicity. There is every indication that the plan was prepared first to suit the site, orientation and the requirements of the particular family, in relation to comfort and convenience, and its exterior, which came in logical sequence to suit the interior arrangements, was further given a few touches at the hands of an expert to bring out the balanced arrangement of simple and effective masses, making the whole composition vigorous and unaffected.

Thus, there is a wide entrance door provided at one end, just to leave the entire remaining space of the 10 ft. verandah for uninterrupted use as a sitting place to enjoy the Western breeze. The stair case is placed at a further extreme end in a projected bay, in which position, firstly, it is best lighted by the wide and low windows extending over the entire semicircular portion of the bay, and secondly, it provides an independent access to the upper floor without disturbing the privacy of other rooms. The spacious dining hall has a pantry and servery close by, and beyond them are the kitchen and store-room, in a separate block attached to the main building by a covered passage. The drawing-room, which is of the same size, opens into the dining-room by means of a flat arch of the full width, so that, on special festive occasions both these halls can be combined together. On the left hand side there is a large bed-room, which, with its own private bath and dressing-room, would serve as an excellent 'comfort room' (vide page 68). There is a small service verandah on the rear side. The terrace on the left hand side of the dining-room is used as a conservatory, which, with its fresh and gay foliage, would create a cheerful atmosphere in the dining-room.

Upstairs there are three bed-rooms on the top of the rooms below, each having its own private bath-room. The bath for the central room is arranged in the gallery on the top of the service verandah below, but of increased width. A spiral stair case is placed conveniently for servants on the left.

The elevation is quite modern and very attractive. The rounded stair case bay adds variety, and focusses the eye, and for balancing it, the bed-room on the right hand side, projects a little forward. Again, wall surface is massed on the left hand side of the entrance, in contrast to the concentration of the window area on its right hand side, where, Western breeze to the lounge and the sitting-room behind, is most in demand. The rounded portion of the stair case is raised not simply for beauty, but it serves a definite function viz. of housing a hot water tank.

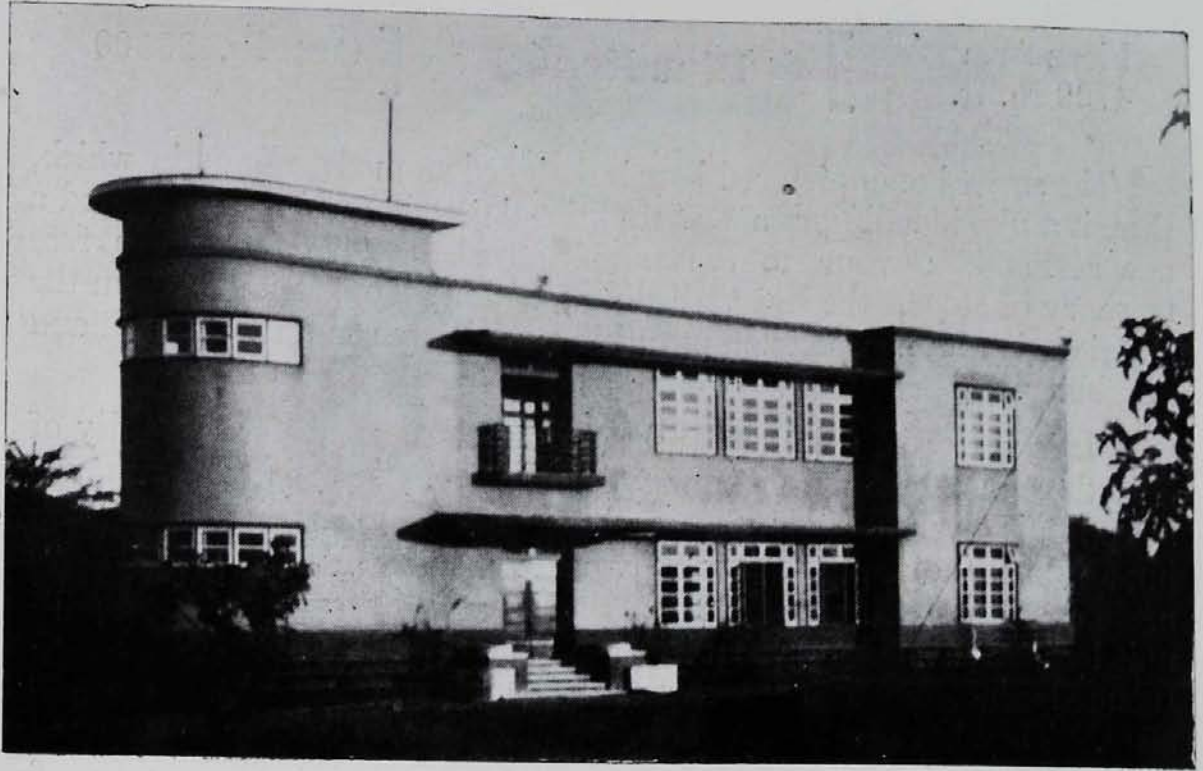


Fig. 177

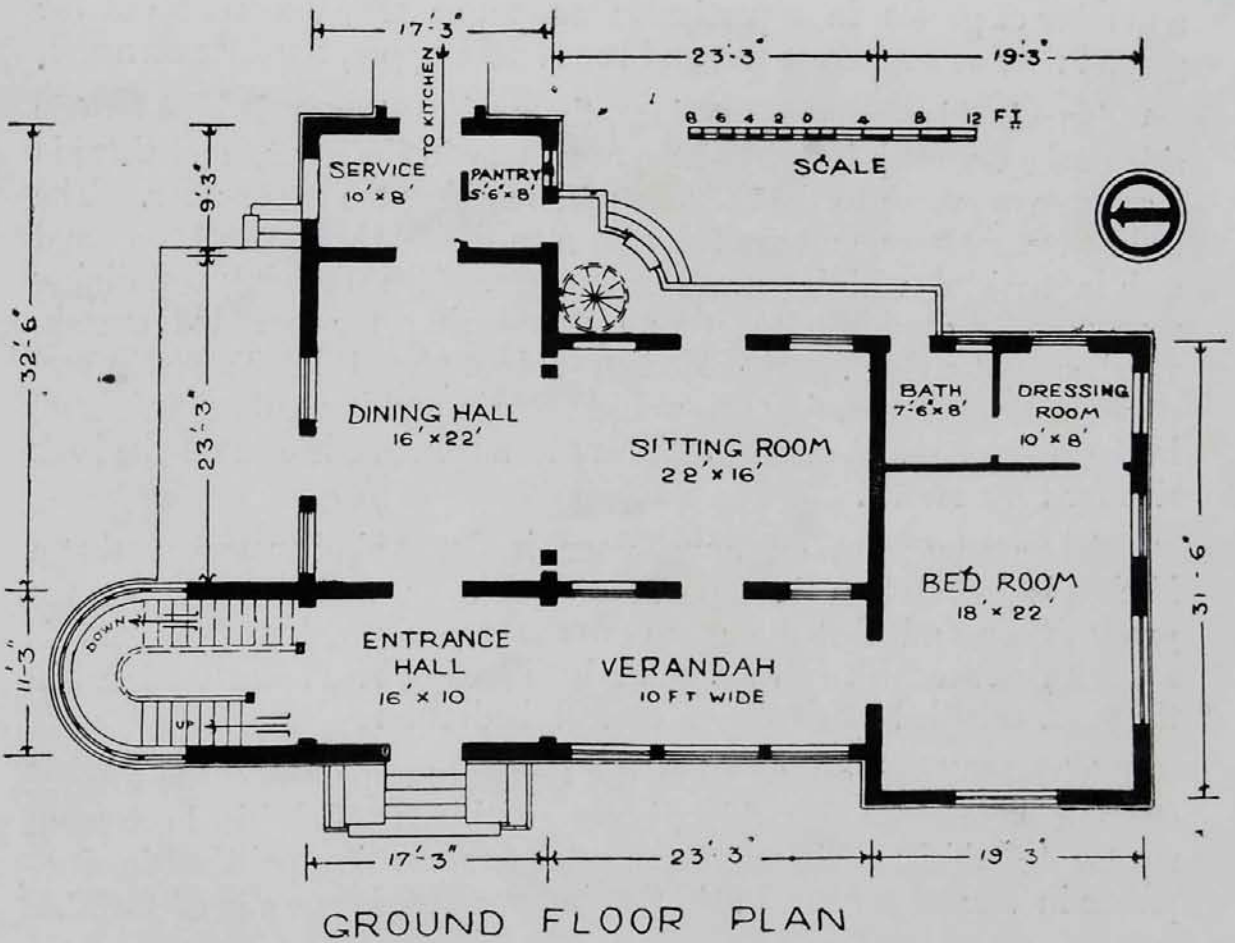


Fig. 178

Architects: GREGSON, BATLEY AND KING, BOMBAY.

Floor Area
4700 sq. ft.



Plan No. 62

[Cost Rs. 23500

The smart home pictured here is designed on modern lines, in which, there is a nice blending of a few traditional details, which have added a new zest and flavour to the architectural composition. The face masonry of stone, the snug, tiled roof and the bold, trim lines in the exterior give it an expression promising efficiency, comfort, strength and durability.

It is planned for luxury rather than for economy for a family of only three members living in a stylish manner. That is why so much attention is given to circulation rather than to compactness by providing a number of verandahs and a wide, central passage which have made every room including even the kitchen, such an independent unit by itself, that it can be entered independently from two directions. Intense business requires the family normally to live away from the place. They have, therefore, built the home mostly for an occasional week-end occupation. It is, therefore, so cleverly planned that the family can occupy either both the floors, if they have in view to invite a number of guests in a particular season, or they can rent out the ground floor as a separate flat and reserve the upper, for their own use.

To suit this arrangement best, the main entrance is kept on one side of the verandah instead of the usual one in the front, and there is a separate approach to the stair case for reaching the upper floor. The bed rooms are large, and are fully open to the South-western breeze and each is provided with its own bath room. The drawing and dining rooms can be combined together by removing the portable curtain which separates them. The kitchen is best placed in the North-east corner, where the morning sun would enter it, and it would remain cool in the afternoon and evening. There is a spiral stair case on the back side for the servants.

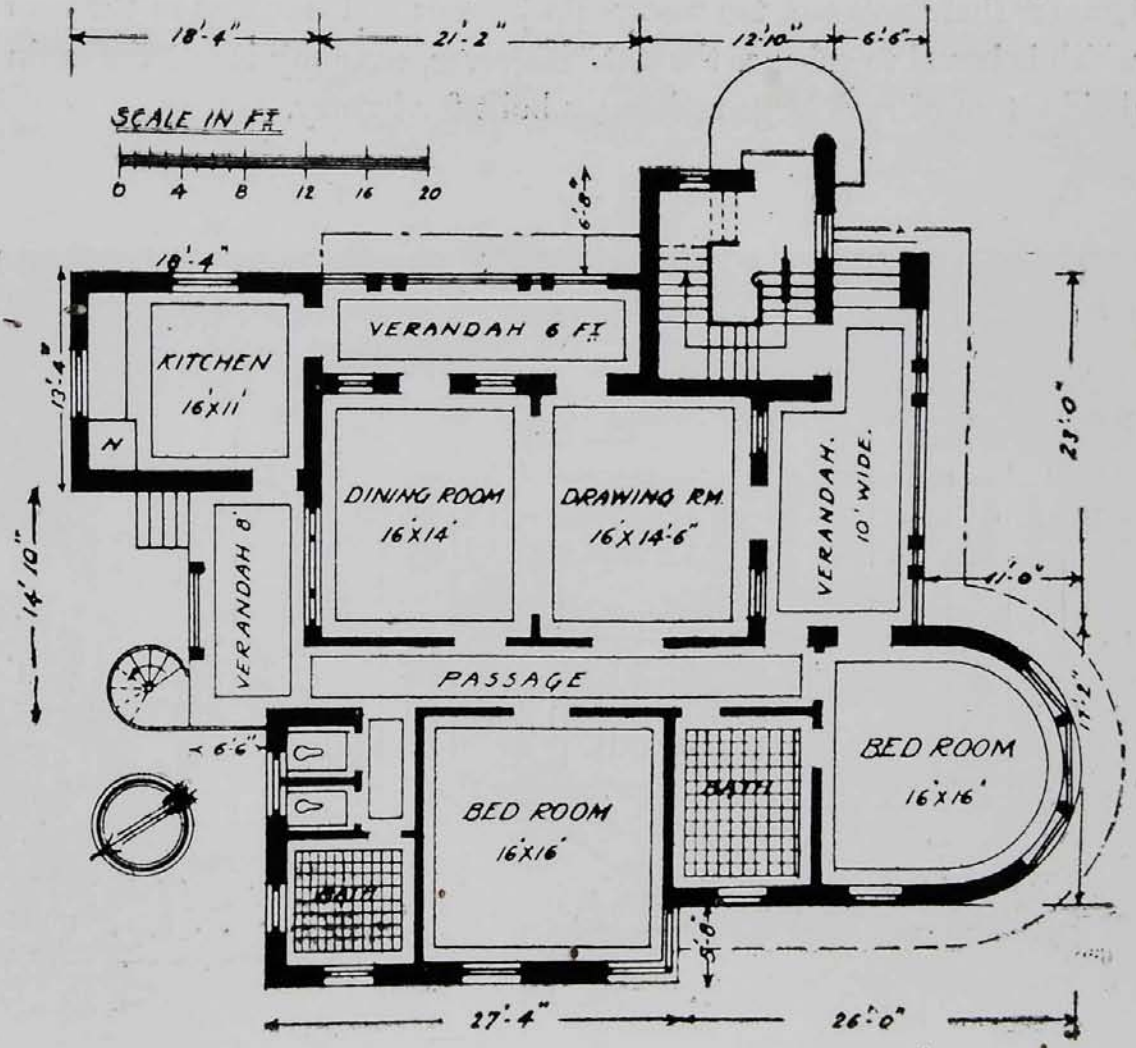
The arrangement on upper floor is almost similar except that a kitchen is provided on the top of the bath room and two w.c.s. on the ground floor, and that the room on the top of the lower kitchen is made a guest room, two w.c.s. and a bath having been accommodated in the space occupied by the large central bath room.

The details of construction are :—Outer walls of chisel dressed stone in lime 18 inches thick, inner partitions of brick in cement mortar $4\frac{1}{2}$ " thick; paving of ornamental terrazzo tiles polished in situ ; pillars in verandah of R. C. C., flooring supported on walls of R.C.C. ;

Perhaps, the only draw-back of the plan is, that it has too many projections and corners which must certainly increase the cost.



Fig. 179



GROUND FLOOR PLAN

Architects: PATEL, JADHAV AND DADARKAR, BOMBAY.

Fig. 180

Floor Area
4790 sq. ft.

Plan No. 63

[Cost Rs. 24,000

The house represented by the plan here is of a mansion type with the main front in the West direction. The grouping of rooms on the front is made symmetrically with respect to the quarter circular verandah in the centre. The woman's rights are fully acknowledged by giving as much prominence to the ladies apartment as to the drawing room. The kitchen, store, pantry, bath and dining room are all very well grouped close to the ladies apartment. The stair case hall with verandahs on both sides, would be a very good, informal, cool room for sitting. In the 'well' of the stair case an electric lift can be very conveniently installed.

Upstairs four excellent bed rooms, (one of them viz. the master's room provided with a dressing room) a common bath room, a verandah and a stair case hall are provided. A site on a top of a hill, or facing a large river or sea, would be ideal for the home. The one defect of the house is that there are too many projections and recesses in the plan which is bound to enhance the cost. However, economy is not the main desideratum of such large residences built for luxury.

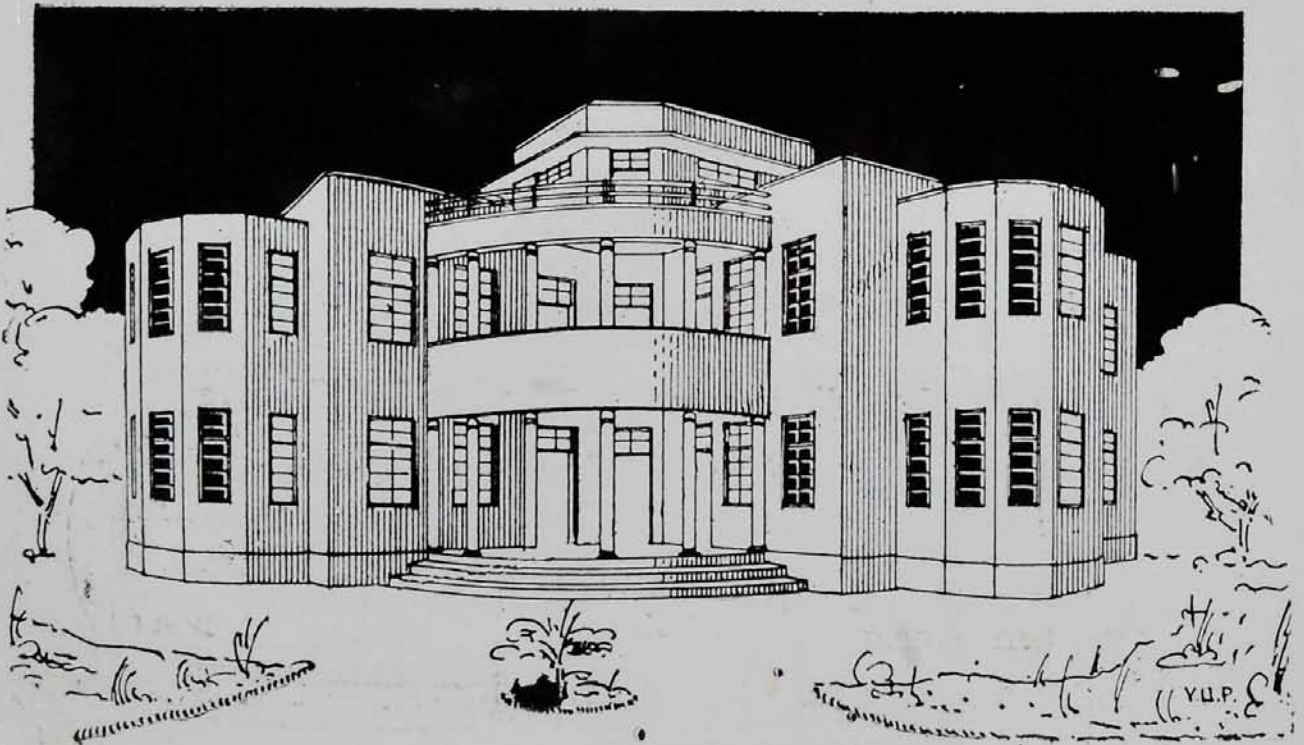


Fig. 181

Floor Area
6540 sq. ft.

]

Plan No. 64

[

Cost Rs. 25400

The solid stone facing, bold, prominent projections, sweeping curves etc. of the house and garage ensemble, represented by the plan here, carries an air of strength and stability about it, indicating that it is built for permanence. It faces the East and is of a U-shape, so as to expose the maximum surface to the south-western breeze. It is a house practically one room thick and that room also is protected by a verandah on the South and West. A very well considered design indeed.

There is a paved terrace in the front, from which, one enters into a semicircular vestibule. The latter opens either into the drawing room or the lobby of the staircase, leading to the upper floor. This arrangement would permit either of the two floors being treated as an independent flat.

A ladies apartment and a bed room are arranged in the Southern wing, with a bath room between them for common use. A spacious verandah is provided behind the drawing hall on the West side. An unusual feature is, that the kitchen and dining room are joined together by a portable screen. The bath and w. c. are beyond the kitchen at a very convenient place. The store is located in the extreme corner. A door in the rear wall of the garage opposite the store room would allow entering the garage from inside the house in the wet season.

The paved back yard would prove an excellent place for the family gathering in the midst of the breeze from the South-west. On the upper floor either the same arrangement as below could be made or, six bed rooms, a large drawing room, two verandahs, two bath rooms and a w.c. provided, as shown on the plan. A 6 ft. wide balcony is projecting in the front which has further increased the utility of the house.

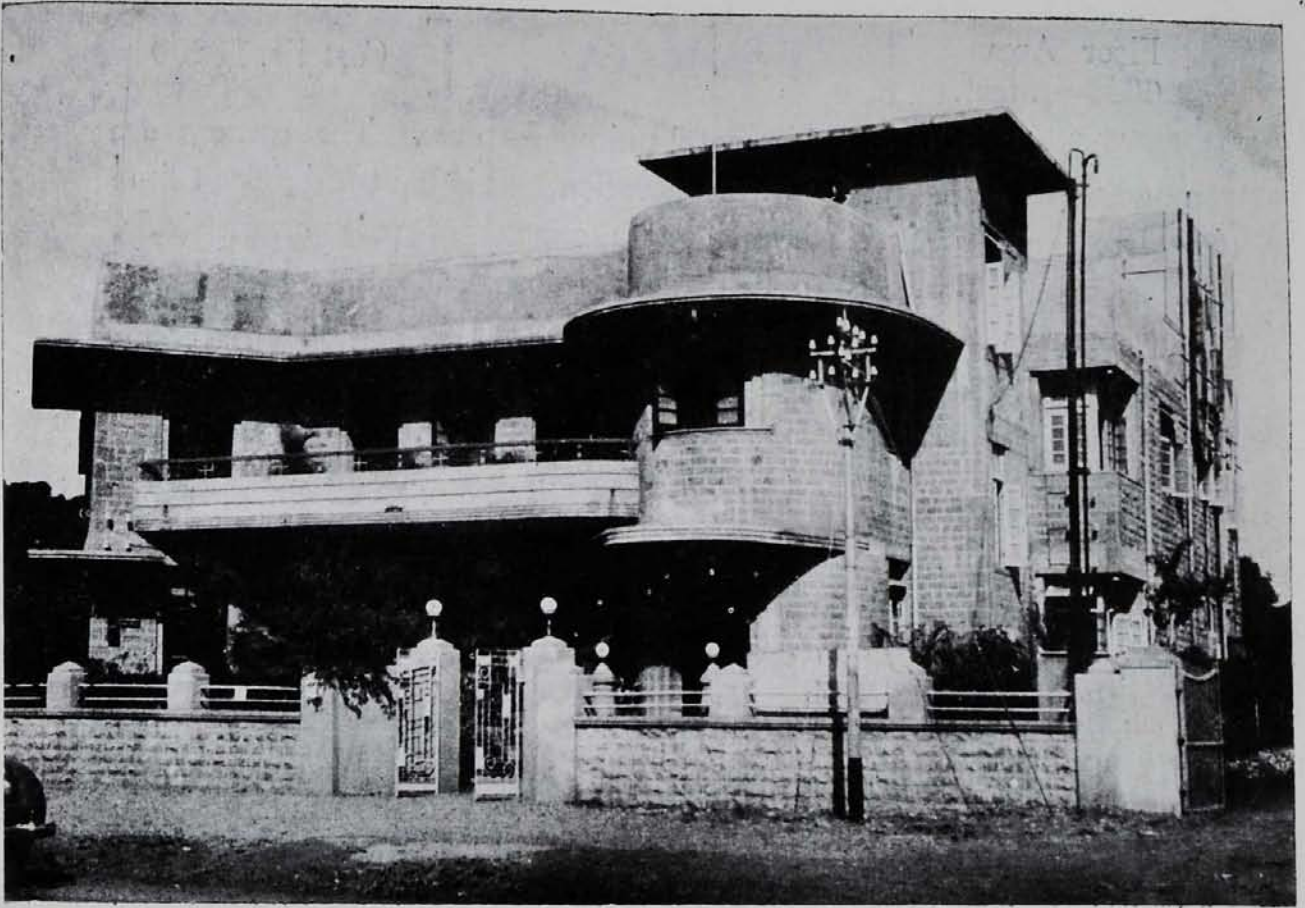


Fig. 184

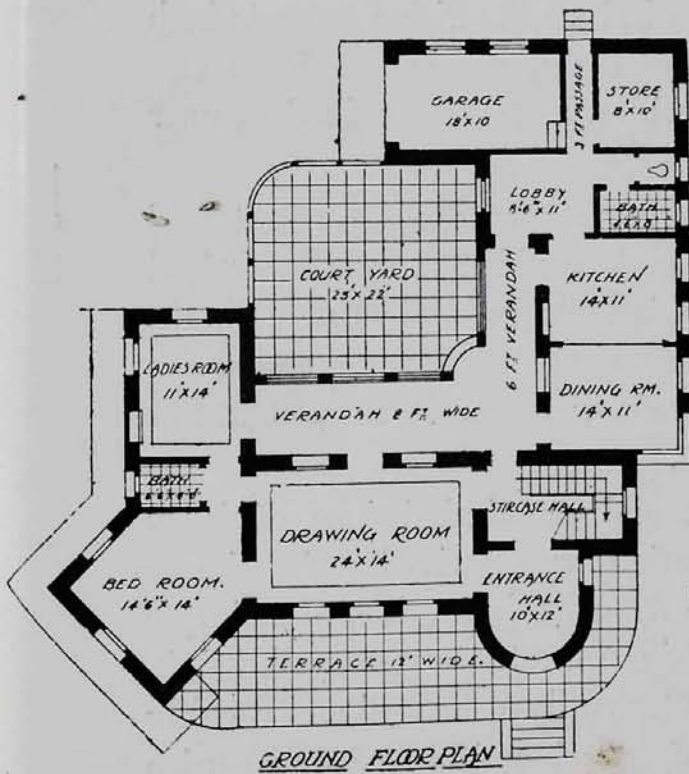


Fig. 185

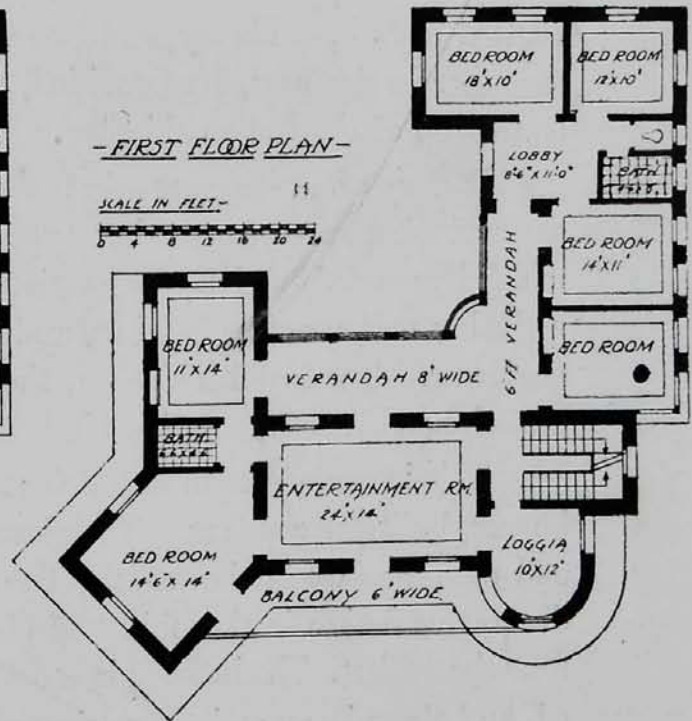


Fig. 186

Architects : SATHE, MASTER AND BHUTA, BOMBAY.

Floor Area
6042 sq. feet.

Plan No. 65

Cost Rs. 28200

This charming villa has many unique features. The corners are rounded, which lend grace to the elevation. It is built of brick in lime rendered on the outside with colorcrete cement of pale cream shade. It has a flat roof which can be used as a promenade to take advantage of fine views. The front entrance faces the West, so that the dining and drawing room on the ground floor, and the two bed rooms above them on the upper floor, are very well protected from the hot breezes. The entrance opens into a verandah 10 ft. wide, on the right hand end of which, there is an office room. The dining and the drawing rooms, which are quite spacious, are treated as formal apartments and are separated by a corridor from the wing on the right hand side. There is a spacious bed room provided in the wing, behind the office room, with its own dressing and bath room and a w. c., and behind it, are placed a store room, an Indian kitchen, bath, and a washing place etc. suitable for the Indian manner of living. On the left hand side, behind the dining room, is provided an English pattern kitchen, with a pantry attached to it. There is a very wide verandah on the rear side, in which, at one corner, is located an easy and wide stair case.

On the upper floor three large bed rooms with a separate bath allotted to each, a library, and two verandahs, one in the front and the other in the rear, are provided, with a large terrace in the corner on the top of the Indian kitchen.

It very often happens that there are guests to be entertained some of whom are of orthodox type and would not even touch food which is, not only strictly vegetarian, but also cooked by persons in the orthodox manner after bathing, and dressing themselves in sacred silk garments. The English kitchen, therefore, is placed at the extreme opposite end from the Indian kitchen.

This is one of the most efficient and practical designs of large houses, built for comfort. The elevation is effective by the simple and plain surface of the walls. The wrought iron grille, of a simple decorative design in the midst of plain concrete parapet wall, heightens the effect. The interior is most tastefully decorated and furnished, and there is an artistic setting of most beautiful landscape garden provided, which forms an integral part of the design.

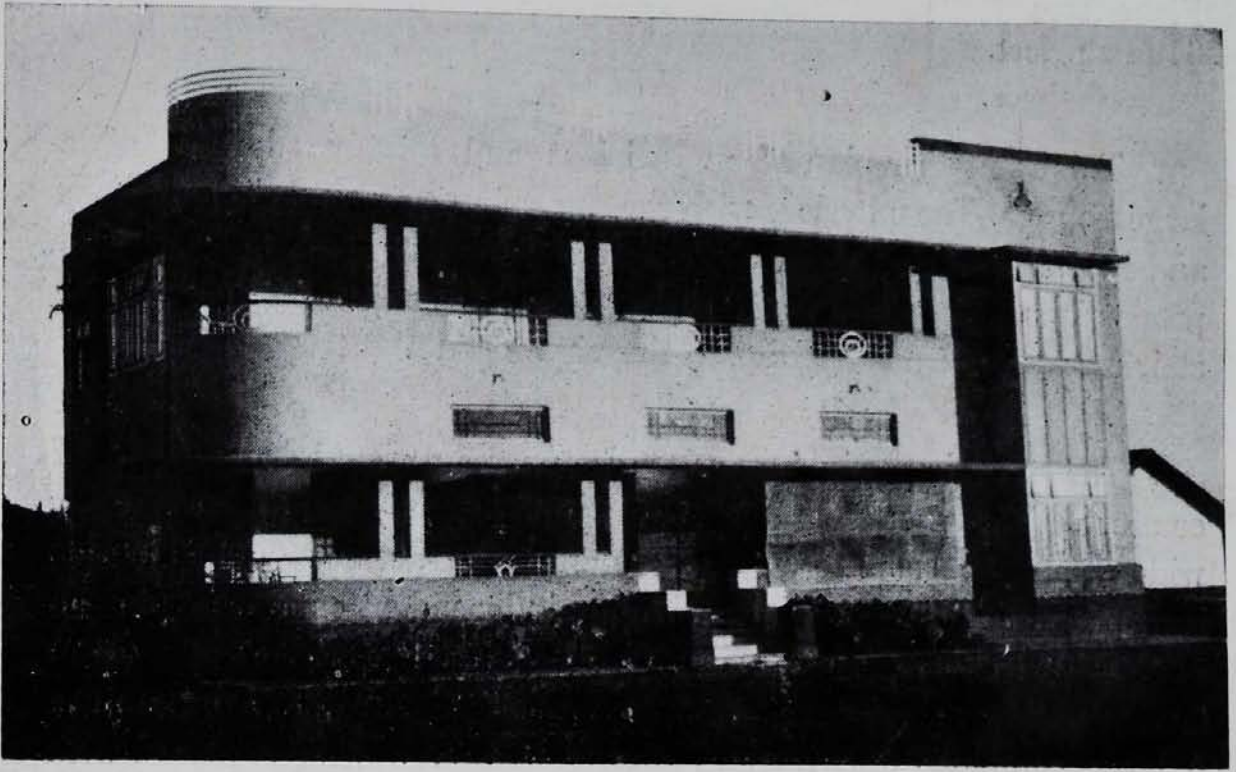


Fig. 187

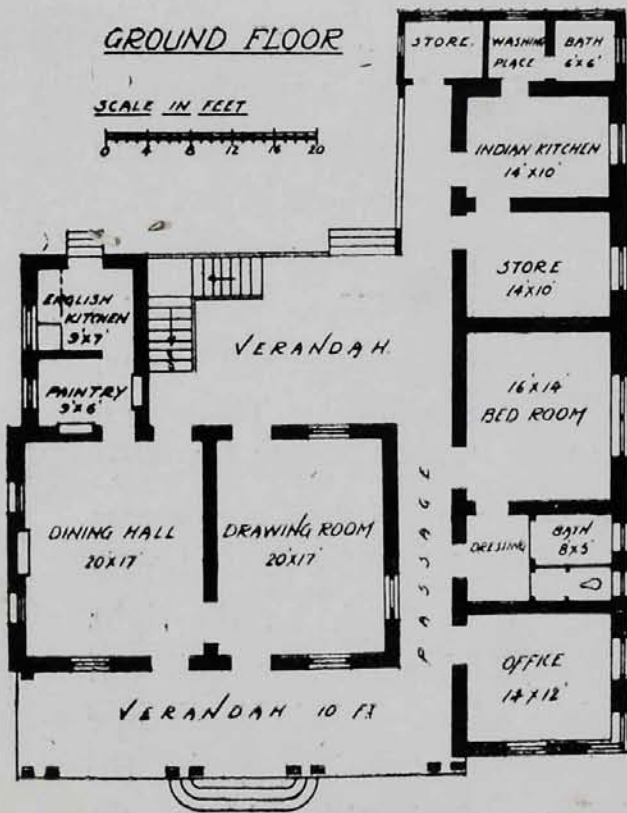


Fig. 188

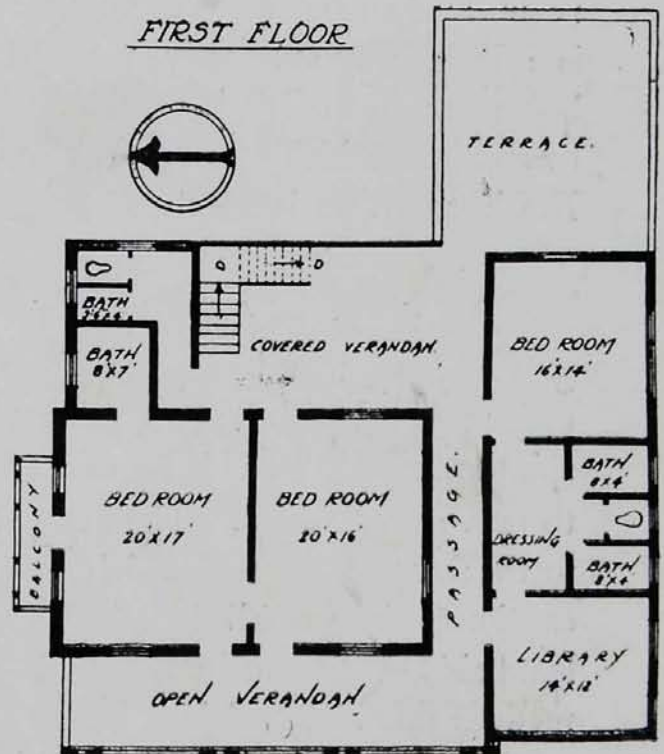


Fig. 189

Floor Area
6104 sq. feet.]

Plan No. 66

[Cost Rs. 28,200

This is another plan of an efficient and effective design of a large house. The exterior, with the sweeping curves of the chhajjahs and rounded corners, the well-thought out fenestration, and balanced proportions, gives it a special distinction. The added height of the stair case room lends dignity to the vigorous design.

The planning of the interior also provides the highest degree of comfort. The house has the main front on the South side. The wide entrance opens into a curved verandah, 7ft. wide. The stair case is so placed and provided also with an independent entrance from the outside, that either both the floors could be used together by the same family or they may be separately occupied by two different families. A large, combined drawing and dining hall is centrally placed with a pantry room opposite to it, and two spacious bedrooms are arranged on two sides, provided with their own private bath rooms. The store room, kitchen and servery are placed in an attached wing. The servery is a little away and may perhaps cause some inconvenience. The bed room on the left hand side, which is open to the full Southwest breeze, and which commands a wide outlook, swinging round from North to West is the most delightful room in the whole house.

On the upper floor either the same suite of rooms as on the ground floor, may be repeated, or as many as six excellent bed rooms, each provided with its own private bath room, arranged. There is a spiral stair case provided on the rear side for servants, which is sure to prove very useful. The main stair case is continued to give access to the flat terraced roof which is water-proofed by taking special precautions. The small building, seen in the photograph on the right hand side of the main house, is a garage, which also, is built on modern lines. There is a beautiful setting of an artistic landscape garden provided. All these things, combined together, make the house a most comfortable home, which is sure to be the pride of the dwellers inside.

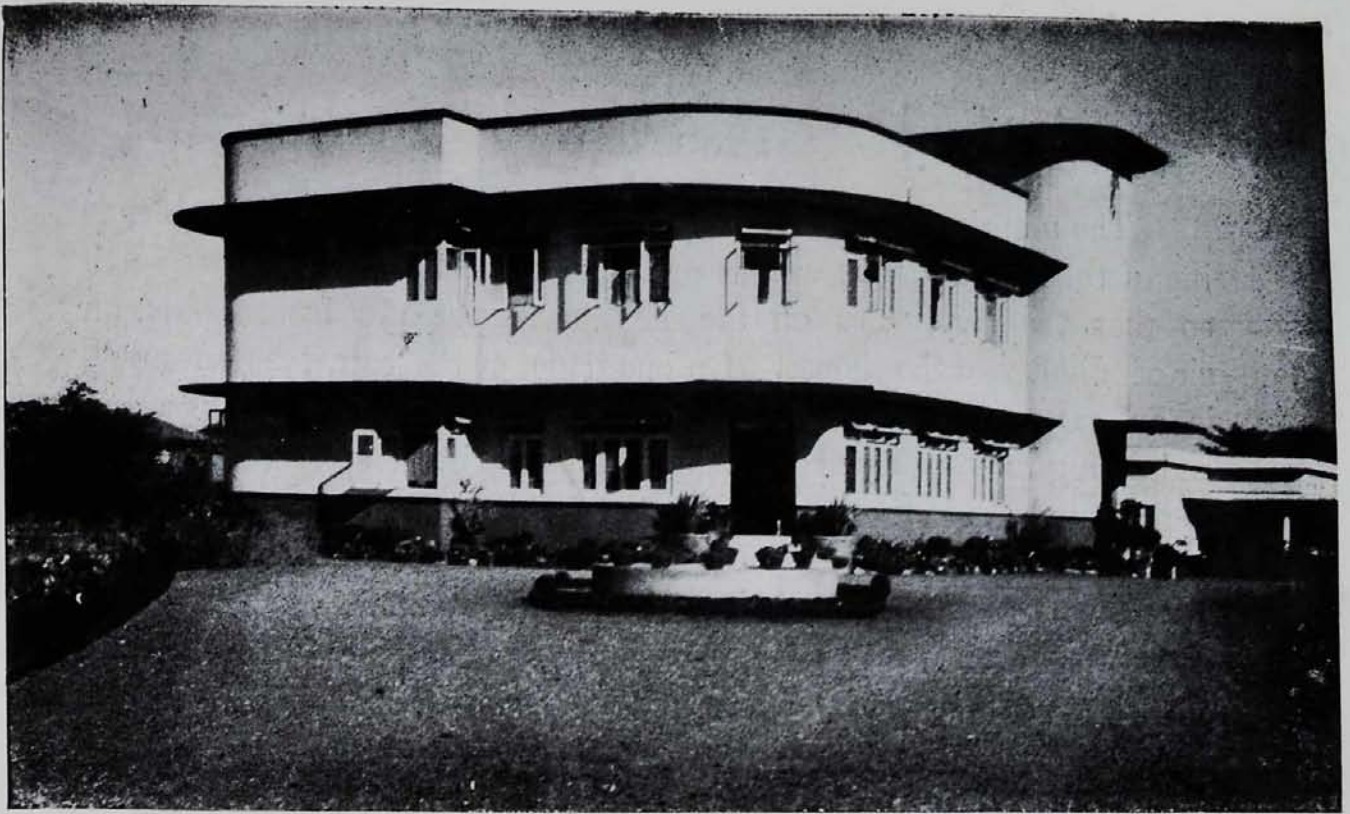


Fig. 190

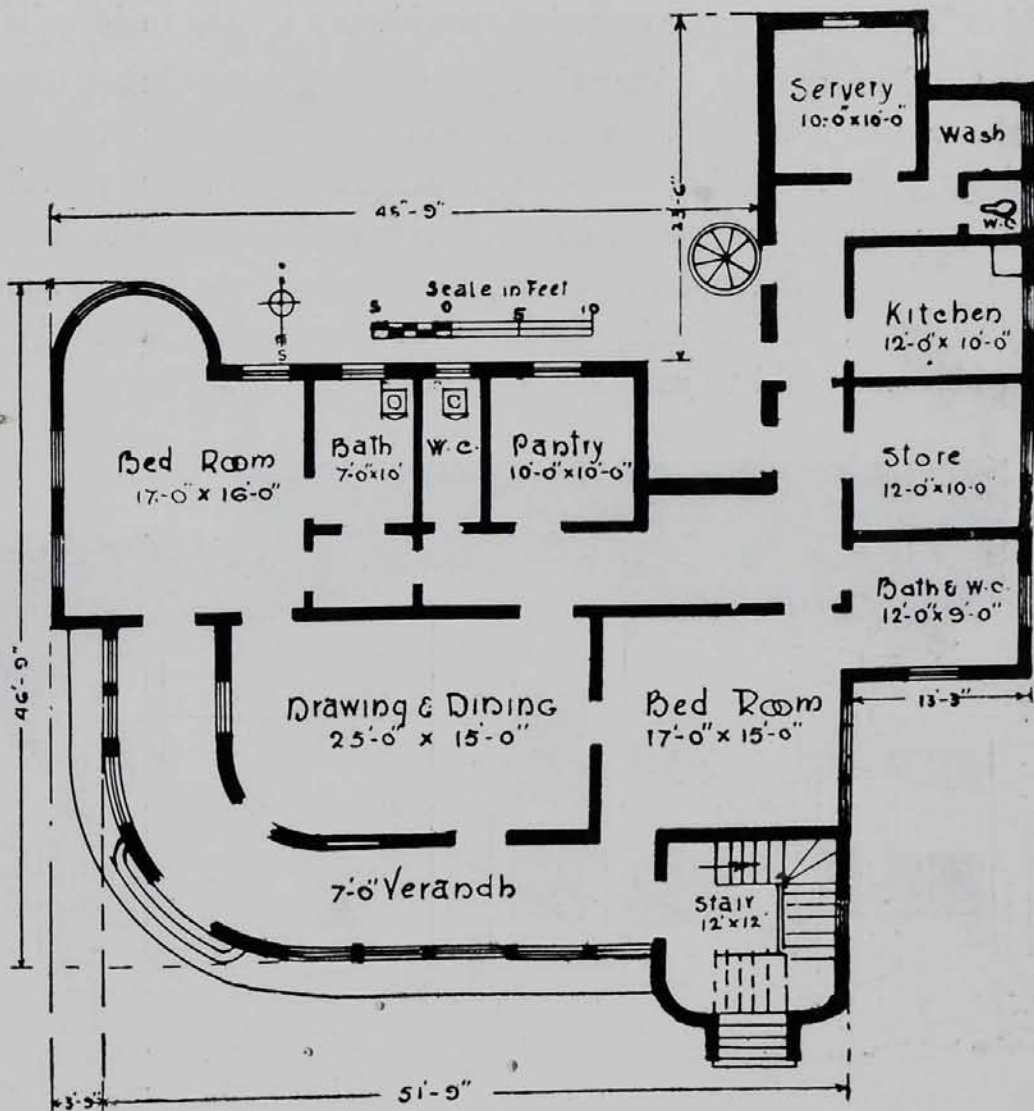


Fig. 191

Architects : SHAPOORJEE N. CHANDABHOY & Co., BOMBAY.

Floor Area
7380 sq. feet]

Plan No. 67

[Cost Rs. 37,450

The mansion featured here possesses in its exterior a nice blending of the traditional as well as modern architecture. It faces North so that the porch lies on the East. A porch in front lends an air of dignity to the house. On one side of the entrance verandah, is an easy, wide staircase, and in front, is a large drawing room and dining room of equal size. There is a six ft. corridor arranged to separate bed rooms on the right hand side from the central rooms, which are meant for common use. A spacious verandah, full of glazed windows with a wide, semi-circular projection in the centre, should make an excellent lounge on the north side. All the bed rooms are of ample size and every one of them is provided with its own bath and toilet room. Each bath room has an entrance from the outside for a sweeper to serve. This makes the house 'suitable for the country side also. There is a back verandah with a small servery in a corner, and a covered passage connecting the kitchen to the main building.

On the first floor, either the same arrangement as below, may be made, or, two more bed rooms arranged on the top of the drawing and dining rooms, for which, a common bath room could be provided in place of the dispensing room. A cantilever gallery on the back side, is provided for the servants, to which, an access from a spiral staircase may be given. The terraced roof over the front porch would be very enjoyable and could be used in common.

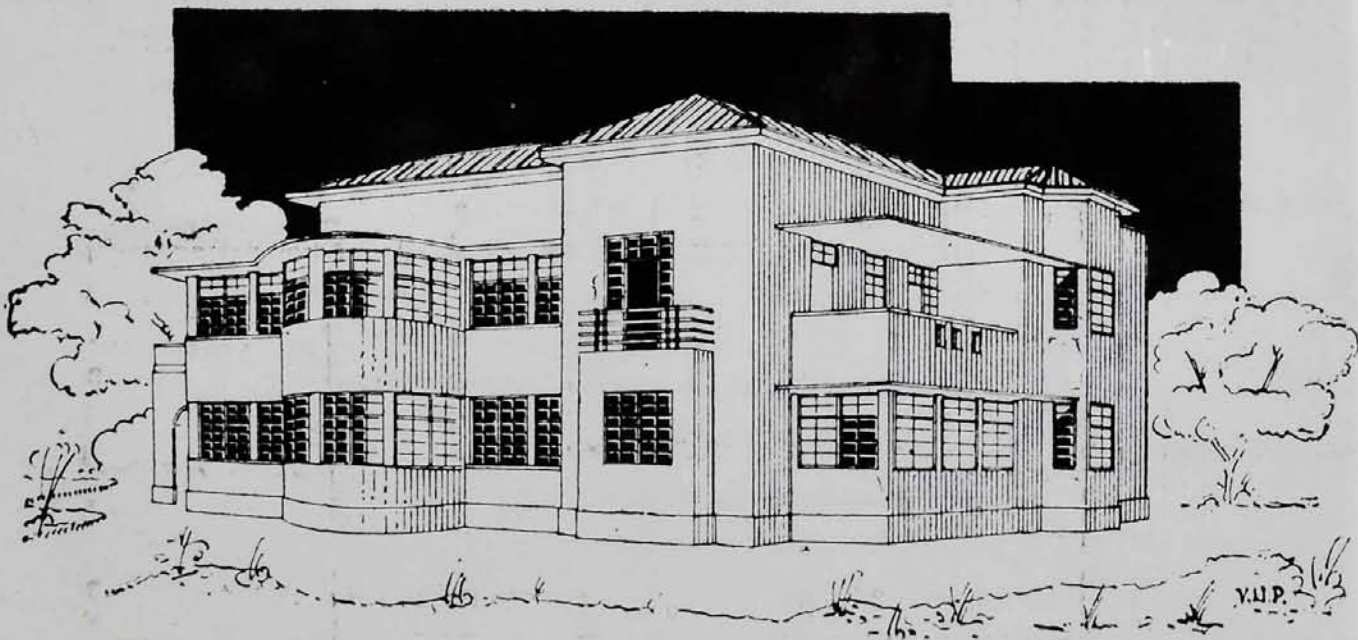


Fig. 192

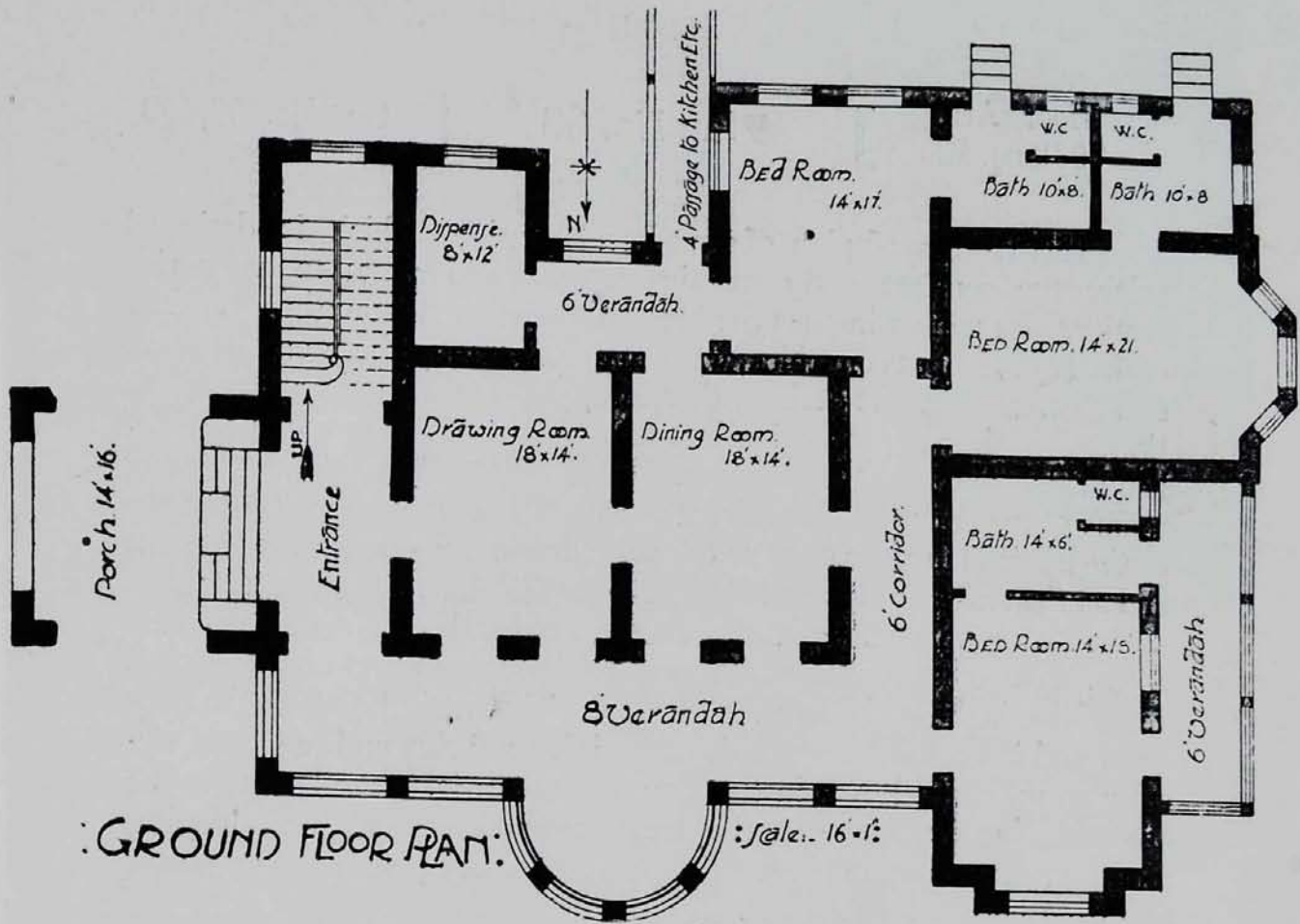


Fig. 193

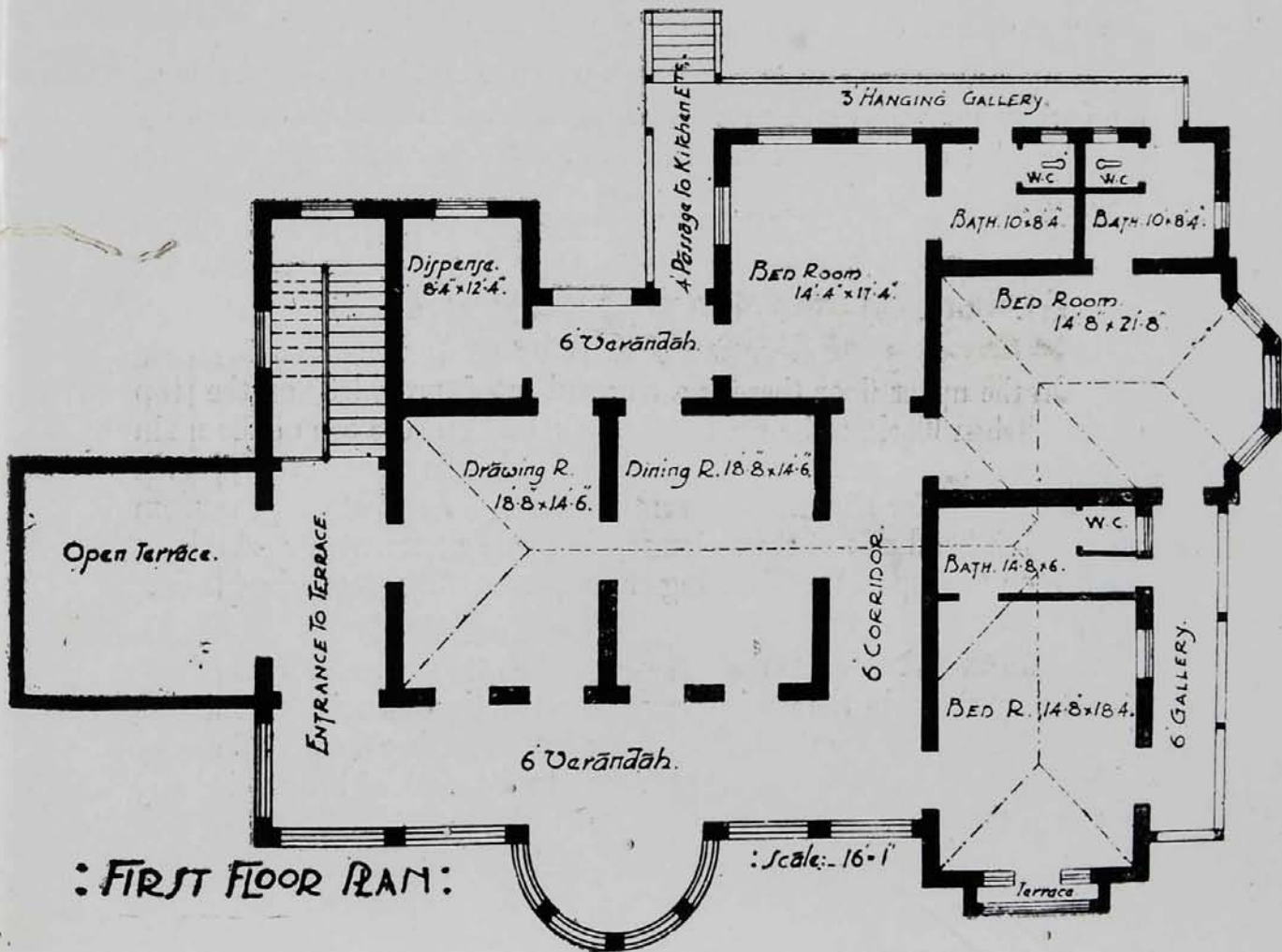


Fig. 194

Floor Area
7639 sq. ft.



Plan No. 68



Cost Rs. 38,400

This L-shaped plan of a modern mansion, which is designed solely for comfort and convenience, is sure to appeal to every rich family. Its main wing has the broad side facing the Southwest. The entire house is one room thick, with an open verandah both on the front and the rear side. It derives, therefore, the best of light and ventilation. The drawing room is a large apartment on the extreme right hand side, open on three sides. It is isolated from the remaining rooms of the house by the staircase room. The main front entrance to the house is in the corner of the verandah near the drawing room, and as the staircase is placed just opposite this, it gives a direct access to the upper floor also. On the left hand side of the staircase room, are two bed-rooms, with a common bath room between them, and verandahs, both on the front and rear. The main bed-room is very large and has a third verandah on its left hand side and a large circular room, called loggia in the plan, in a corner. The latter can be used either as an annexe to the large bed-room—say as a dressing room, or as a separate observation or bridge room, as it has entrances also from both the verandahs.

In the short leg of the L, kitchens and other service rooms are arranged. There are two kitchens, the one on the left hand side of the passage near the dining room, is the general kitchen of the family and the other on the right hand side is for the elderly members who want their food to be cooked in the orthodox manner. The room attached to the latter kitchen is meant for prayers and divine worship and also to be used for dining on the part of the orthodox members.

On the upper floor there is a terraced roof provided on the top of the kitchen block, to be used as a deck, and on the top of the main wing, almost the same arrangement as below is made though the rooms are used for slightly different purposes. For instance, the room on the left hand side of the staircase, is made a nursery for children, the one on the top of the drawing room, a sitting room for ladies, and so on.

Every room in the entire house possesses the best orientation, still, the circular rooms are the cream of the house, as they command a very wide view of the landscape and are sure to be full of breeze in any season of the year.



Fig. 195

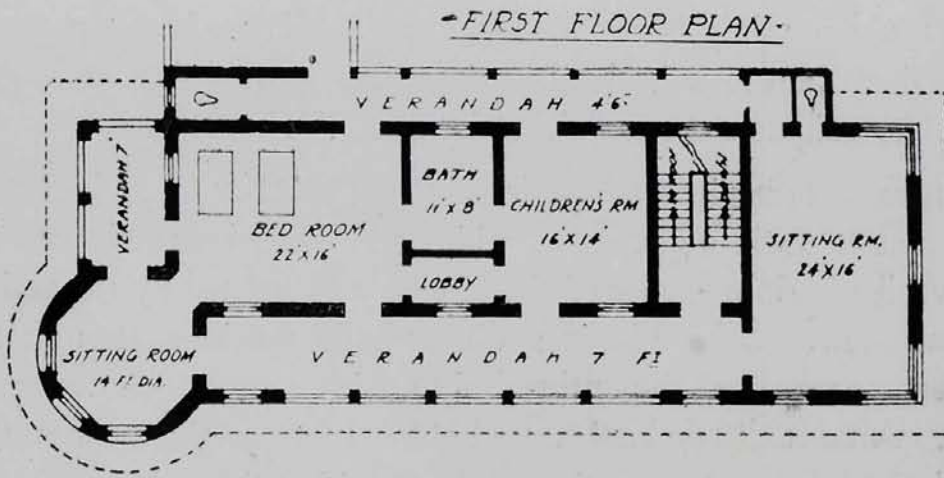


Fig. 196

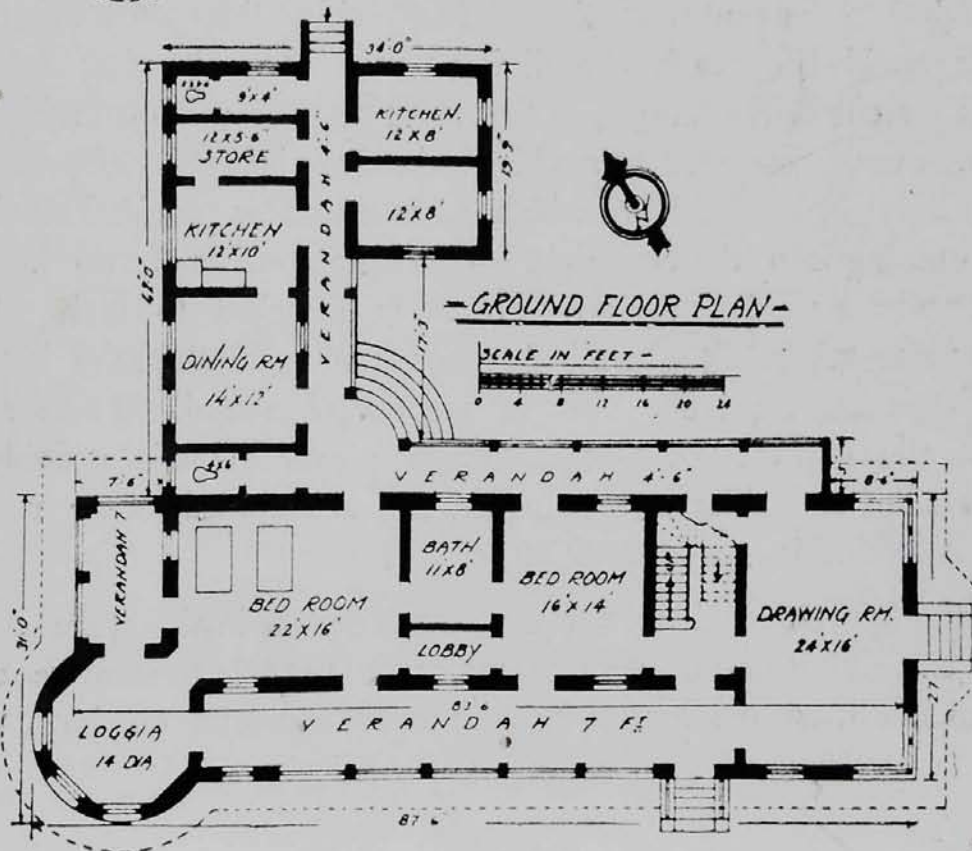


Fig. 197

Architects: SATHE, MASTER AND BHUTA, BOMBAY,

Floor Area
8958 sq. feet.]

Plan No. 69

[Cost Rs. 45,000

This is another plan of a mansion, designed on modern lines with sole attention to the comfort and happiness of the family for whom it was intended. Rectangular in out-line, unostentatious in concept, design and construction, it is one of the simplest plans imaginable and yet, it provides all the amenities of the modern, civilised life. The rounded corners, the bold horizontal lines of chhajjahs, the mass effect and just very simple lines on the surface to break the monotony of the concentration of plane surface, give it the characteristic air of dignity and grandeur, which, even the costliest and elaborate ornamentation would certainly have failed to impart. There is also a most beautiful setting of an artistic landscape garden provided round the building, which enhances the exquisite charm of the home.

The entrance opens into a spacious lounge of 41' x 18', adequately lighted so as to avoid a glare. A wide and luxurious stair case is placed conveniently in a corner of the lounge and lighted by the artistic corner window. Behind it, is a dining hall, spacious enough to fit in the generous scale of the entire design, with a pantry conveniently situated behind it. The kitchen and store room are in a separate block attached to the pantry on the left hand side, through which, a passage is provided to reach the dining room. The drawing room also is in the front of the lounge, so that these three rooms form a block for common use. Separated from this block, there is a suite of private rooms on the right hand side, to which, an entrance is provided in the lounge, opening into the verandah. This suite consists of two large bed rooms with a spacious private bath room attached to each. As the bath rooms separate the two bed rooms from each other, the latter obtain the strictest privacy also in respect of sound. There are verandahs all round the bed rooms, and a prayer room is provided with access on both sides on the rear side, in a secluded corner so as to make it conducive to concentration.

On the upper floor, if three bed rooms are made in the space provided by the dining and drawing rooms, it is possible to arrange six bed rooms in all, with a lounge in front and verandahs on both the sides.

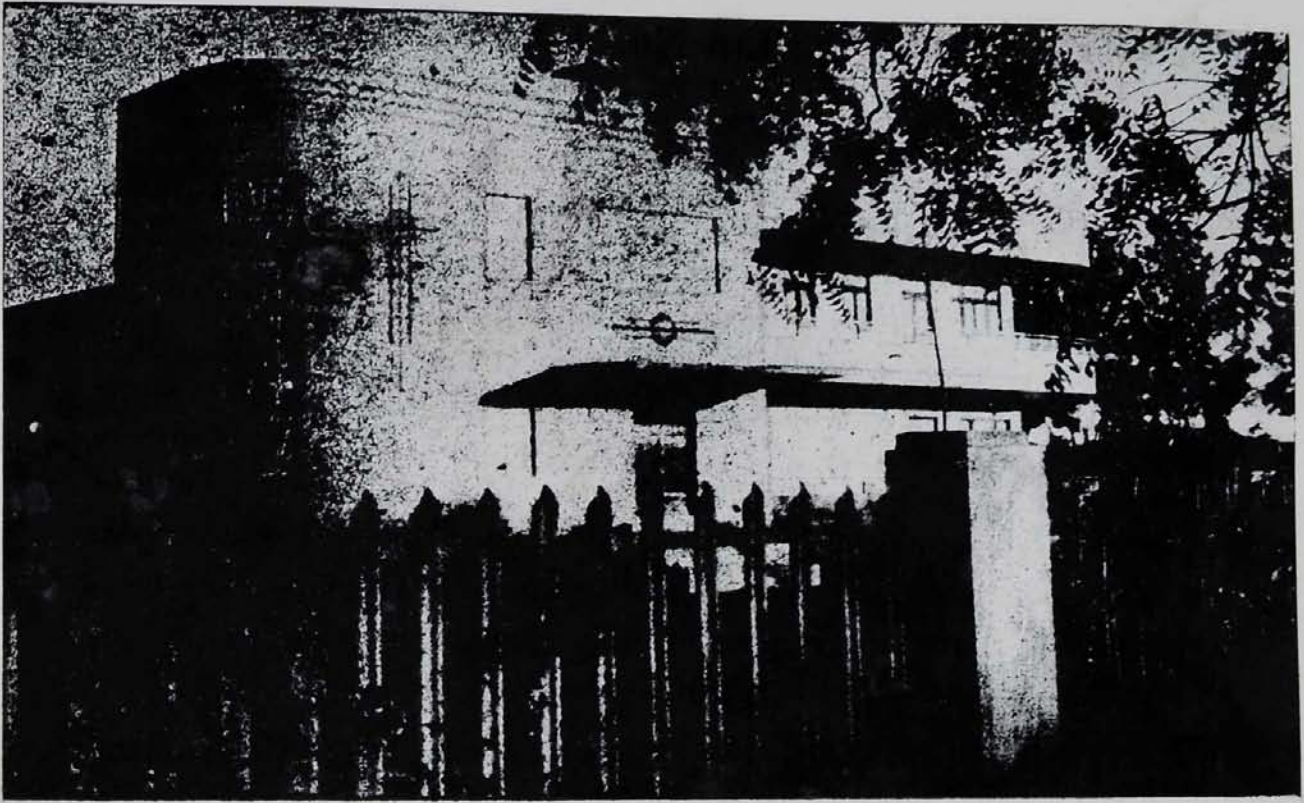


Fig. 198

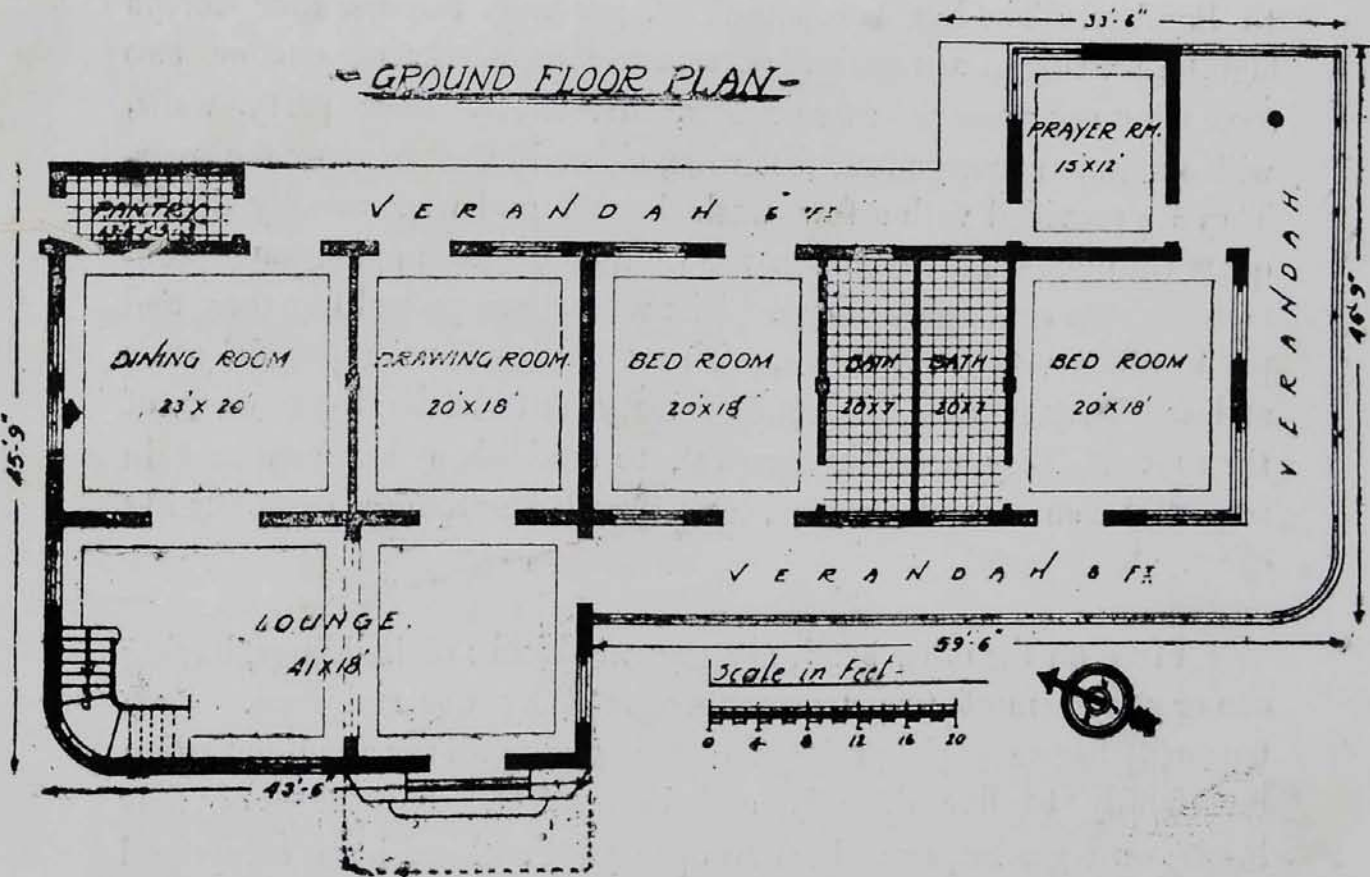


Fig. 199

Flats.

A flat is a self-contained, convenient, small dwelling, within a large building. It is called an apartment house in America. Flats are very popular in the civilised countries of the world, and may be counted by thousands. Notable instances of such modern flats are those at the Mosholu Parkway in New York and Carl Marx and other huge buildings in Vienna. One of the latter is 1500 metres, or more than $\frac{3}{4}$ of a mile long, four stories high, and houses nearly 8,000 families, in fact, a large town in *one* building! The special feature of these flats is, that the living rooms in each tenement are arranged on the side of a large open quadrangle, (which is used for a common garden), in such a way that every room is exposed to the direct rays of the sun in some part or the other of the day.

Flats are quite different from *chauls*, which are perhaps peculiar to Bombay. The latter are buildings, generally three or four storeys high, consisting of a number of separate tenements of one or two rooms, but not more than two rooms, divided by their party walls, with a common passage four feet wide, either in the front or the rear. They are provided with a few wash houses and w.c.s usually inadequate in number, for common use in a separate appurtenance connected by the common passage. The rooms are packed together and piled up in a very limited area, with no gardens, no separate yards and absolutely nothing by way of privacy outside the front door of the rooms. They tend, in general, to establish a low standard in respect of comfort and decency, and thus have often a demoralising effect.

Flats, on the other hand, are separate blocks of buildings, having one or at the most two tenements served by one stair case. Each tenement has a complete suite of rooms, giving all the accommodation for a family to live decently and in comfort. Each block of flats has its own garden, or at least an open yard enclosed by a compound wall or a hedge.

Until a few years ago, flats were rare even in cities like Bombay. But little by little people came to appreciate them, as they possess several advantages—both economical and social, over cottage homes, and to-day they may be found not only in the suburbs of large cities, but also in small towns.—At first they were built for families of the middle class only, but there are many flats *de luxe* now, which are occupied by the well-to-do people as well.

The flats owe a good deal of their popularity, to the desire on the part of people to leave the heavily rented, dingy houses built by speculative investors in congested areas as a business proposition and to go and build their own homes on the outskirts of towns. Though the economic gain was not much in the beginning, still, they could be independent of the unreasonable demands of their landlords, and after some time realised, that the general standard of the health of their family had definitely risen as a result of the open air and cheerful surroundings. Many of the people, who had laid by some spare money, either in service or in business, found it a very safe and convenient investment to build a flat, part of which they could themselves occupy, and rent out the rest to people of their own status and thus, while living happily, could also earn some profits, which in the boom period after the Great War were high.

Thus, a flat essentially possesses a business aspect to a more or less extent. In order, therefore, that it should prove a successful investment, its planning technique must be closely observed. The following are some important considerations.

(1) That it should be designed for one class of people, keeping in mind, their average income, social customs, and all other circumstances governing their mode of life.

(2) That middle class families have to keep up a certain status in society, very often beyond their means. Therefore, a flat designed for such a class of people should appear to be stylish and should show a high order in the workmanship and the materials employed in its construction, particularly so in the principal rooms, so that no casual observer should convey, an impression that the rents are low.

(3) That tenements on the ground floor, close to the public road, should possess means such as a high plinth, a trellis work or a close-meshed railing in the verandahs and windows,—means which are conducive to preserve the privacy of the family from the gaze of the passers-by.

(4) That there should be an entrance vestibule, no matter if small, to every tenement, so that the visitors can wait for some time before being ushered into the reception room.

(5) That the main entrance should form an attractive feature.

(6) That the fewer the corridors the better it is, in the interest of economy of the living space. At any rate they should be so planned that they do not form a vista from the entrance.

(7) That when there are two tenements on the same floor, side by side, the windows, at least in the important rooms of one should not overlook those of the other.

(8) That the supply of conveniences such as shelves, cupboards, storage space for fuel, lines for drying clothes etc., should be ample. The landlord should make the utmost of every available space for storage requirements. Thus, lofts can be provided over service rooms, such as, the bath room, the lavatory, the pantry etc., where even a seven ft. of head-way may be sufficient.

(9) That one main stair case for one flat is preferable to one serving two flats, side by side on the same floor. One flat served by an independent main stair case affords greater privacy and gives an idea of not being restricted by the presence of a neighbour, howsoever, there may be neighbours in the adjoining flats on the same floor, not served by the same stair case, but by different ones.

(10) That instead of keeping several small *chowks* or court yards open to the sky for the purpose of lighting and ventilating, all the space available should be combined to form one large *chowk*. Since, small court yards are difficult to clean, they tend to accumulate rubbish and the windows overlooking them, become merely inlets for foul gases when the rubbish rots,

(11) That if a drain has to pass under the floor of a certain part of the structure, all possible precautions such as an extra bedfall, means of inspection and repairs etc., should be provided to make the entire arrangement foolproof.

(12) That the arrangement of only one flat on each floor has the advantage, like cottage homes, that each room could be arranged according to its proper orientation.

(13) That since a stair case assumes a special importance in the case of flats, the following points should be noted.

(a) It should be broad and easy to climb.

(b) It should be fire-proof. In this connection it may be mentioned here, that an iron stair case or a staircase in which there is a preponderance of iron in an exposed position, is worse than useless in an emergency like fire, as it is liable to get hot—even red hot, and in that case it cannot be used.

(c) There should be preferably another staircase for servants on the rear, and this should be independent for each flat *de luxe*, since much annoyance is likely to be caused, if servants of two flats on the same floor, meet on the common staircase and converse with each other at the sacrifice of work. Such a service stair case is useful also as a means of emergency-escape.

(d) An internal stair case, with only top light and ventilation is very bad in high buildings. In the event of fire it behaves as a chimney shaft, at least gets full of smoke, making an escape impossible.

(e) When a staircase is at or near the entrance, it affords opportunities for the architect to make it a central architectural feature. Again, if it can be made a part of the entrance hall scheme, it produces an effect of spaciousness, which is valuable in creating a pleasant impression on the mind of the visitor.

These principles are illustrated in the following designs of flats.

Two Rooms Flats.

Floor Area of three storeys. 3150 sq. ft.] **Plan No. 70** [Cost Rs. 15,000

This is a plan of a building having two flats only on each floor. The staircase is at the entrance and the architect, taking advantage of it, has treated it as a central architectural feature. The entrance porch is projecting a little, over which a canopy is provided. Each flat consists of two rooms only, but unlike in a chawl, an independent bath room and a w. c. are provided for each. A loft is constructed on the top of the bath and w. c. at 7 ft. height above the floor. The entrance to the staircase on the ground floor, serves as the vestibule for the flats on that floor, and the upper landings, for the floors above. For the first and 2nd floors, balconies at corners are provided which are wide enough for a person to sleep in the open air. The flats face the West and therefore, there will be plenty of breeze in the front rooms.

As the flat contains only two rooms, it does not certainly provide the necessary amenities of life. Still, where the cost of site is very high as in Bombay, the rents also are high, which the middle class people cannot afford to pay. There are, however, hundreds of young people, recently married, starting to keep house, who very readily go in for such flats, which, except for the restricted accommodation, provide all the amenities of a decent living. These people shift to more liberal quarters upon the arrival of a baby or two, by which time, their income also proportionately increases.

The building is three storeys high, and there is a terraced roof at the top, to which, the same stair case gives access. All the outer walls are of brick in lime, 14 inches thick, and inner ones, thin partitions $4\frac{1}{2}$ inch thick of brick in cement mortar. For supporting the beams and floor, four R. C. C. pillars are provided in the central longitudinal wall shown by thick portions of the wall.



Fig. 200

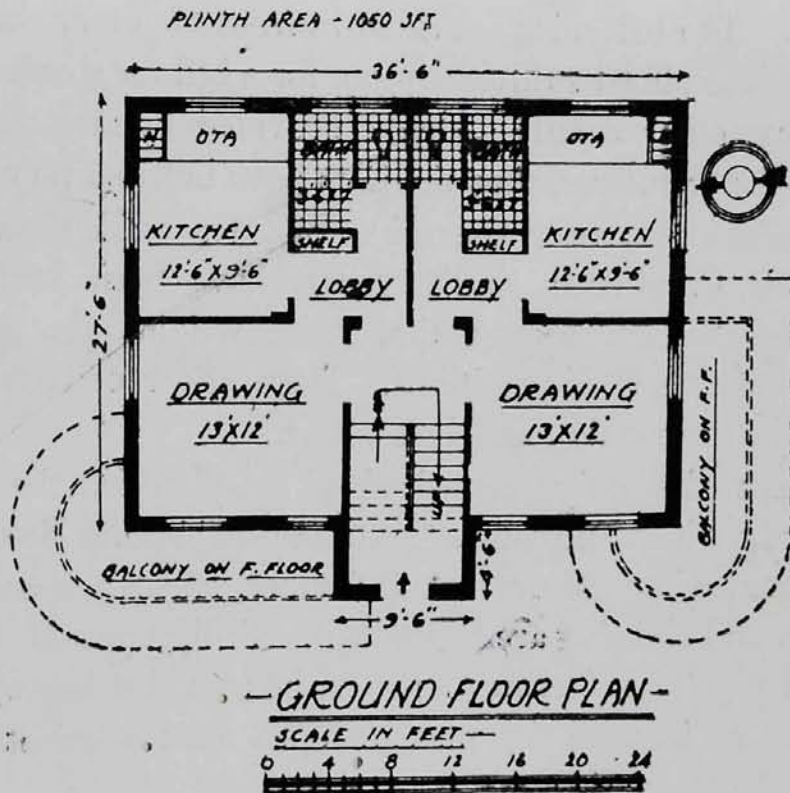


Fig. 201

Architects : MARATHE & CO., BOMBAY.

Floor Area of three storeys] **Plan No. 71** [Cost Rs. 24,600
5430 sq. ft.

From the very imposing appearance of the exterior, no body would believe that this is not a palatial building but, it is in reality, only one having four flats on each floor, each consisting of two rooms. This building is an example of the utmost skill employed by the architect to take the maximum advantage of space in providing conveniences.

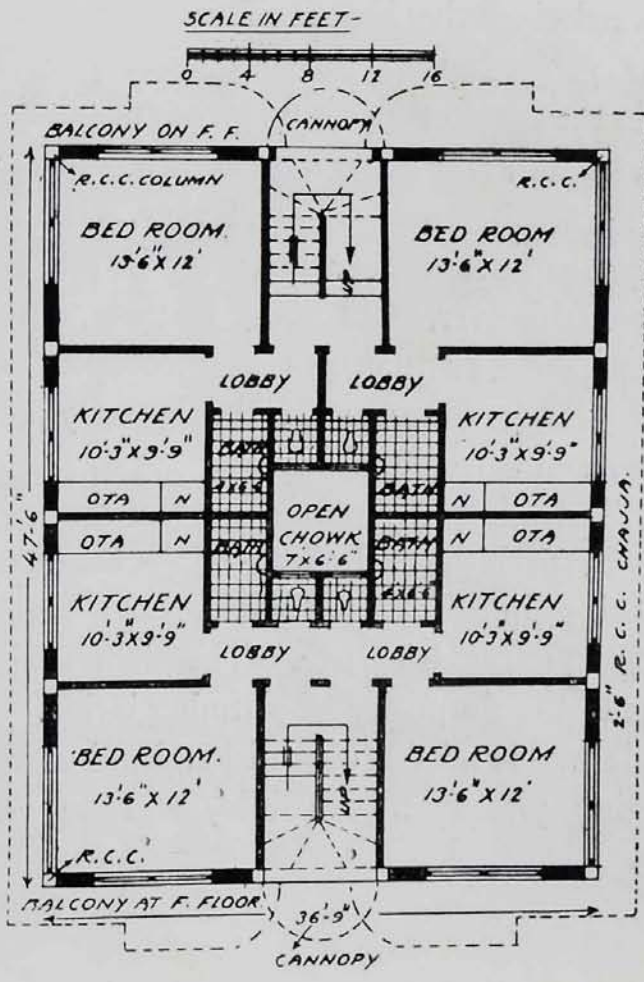
The accommodation is practically the same as that provided by the preceding plan, though the drawing hall is a bit larger. There are two entrances, one in the front, giving access to the front flats and the other on the rear, for entering the rear ones. The bath rooms and w. c. s are arranged round a small open *chowk* or court yard, open to the sky, so that all the drains are concentrated at one place, which is very economical. Access to the *chowk*, for cleaning, is kept through one of the w. c. s on the ground floor. Though the w. c. s and baths are just in front of the entrance, they are provided with self-closing spring doors. Their height, again, is kept only 6'-6" and lofts for storage are made above them. The *ota* in the kitchen is almost like a table 2' 6" high with asbestos cement lined top, below which, a cupboard is formed. The whole thing is removable, so that in the event, instead of a married couple, students occupy the flat, who do not want to cook their food, the same can be used as a table or may be removed altogether. The balconies provided in front of every bed room are wide enough to afford sufficient room for a bed for sleeping out. There are so many other small gadgets provided by attending to minor details by the architects, that the flats have become very popular.

The white squares in the midst of outer walls shown in the plan are the R. C. C. pillars; similar pillars have been built also in the middle, and all these support the entire weight, the walls between them serving merely as partitions. There is a roof terrace at the top, to which the main stair case gives access.

Perhaps the only draw-back of the plan is, the small central court yard, which might accumulate rubbish. However, no important rooms abut against it, and further, efficient means of frequent inspection and cleaning are kept in it. Still, it would be better if a horizontal pipe of sufficient diameter, be provided below the floor level for ventilating it, with its one end open on the street side, and the other, on the *chowk* side.



Fig. 202



Architects: ADALJA AND NOORANI, BOMBAY.

Fig. 203

- GROUND FLOOR PLAN -

Floor Area
2986 sq. ft.



Plan No. 72



Cost Rs. 10,200

This is a plan of a flats consisting of $2\frac{1}{2}$ rooms. In addition to the kitchen and bed room in the preceding two plans a small half room for storage is provided. The arrangement is such, that one or both the tenements on each floor could be occupied by the same family. It is a common experience that small tenements are always in demand, and there is a less risk involved in them, of remaining vacant for a pretty long time. The home represented by this plan essentially provides accommodation for two families, one on each floor, but to meet the above contingency arrangement of two small tenements also is made on the ground floor, and the upper is occupied by the landlord himself.

Homes built on the flat system, except when there is one flat on one floor, possess one disadvantage viz. the flats on both the sides cannot derive the benefit of the orientation of the building. In the present case the building faces South and the flats on the left hand are better situated with respect to the South west breeze than those on the other side.

The upper floor derives the benefit of the four balconies and the terraced roof. The projection of the balconies, particularly in the diagonal direction in the front corner is disproportionately large, which, though structurally sound, and gives a certain boldness to the design, is a blemish from the architectural point of view. The semi-octagonal sides of the staircase also over-hang a long way in the front, which is another bold feature. However, these bold features, are relieved to a certain extent by the effect of quietness and composure given by the simplicity and the delicate concrete *jali* in the body of the parapet walls of the cantilevered balconies.

It is not for illustrating any particular feature of the internal planning, but for the architectural effect of the calm composure, impressed on the building, in spite of the several bold features, that the plan and its photograph are cited here. The plain achitecture on the outside is an index to the simplicity of planning inside.

All the outside walls and the central longitudinal wall are fifteen inches thick including plaster on both sides, and the remaining ones thin partitions.

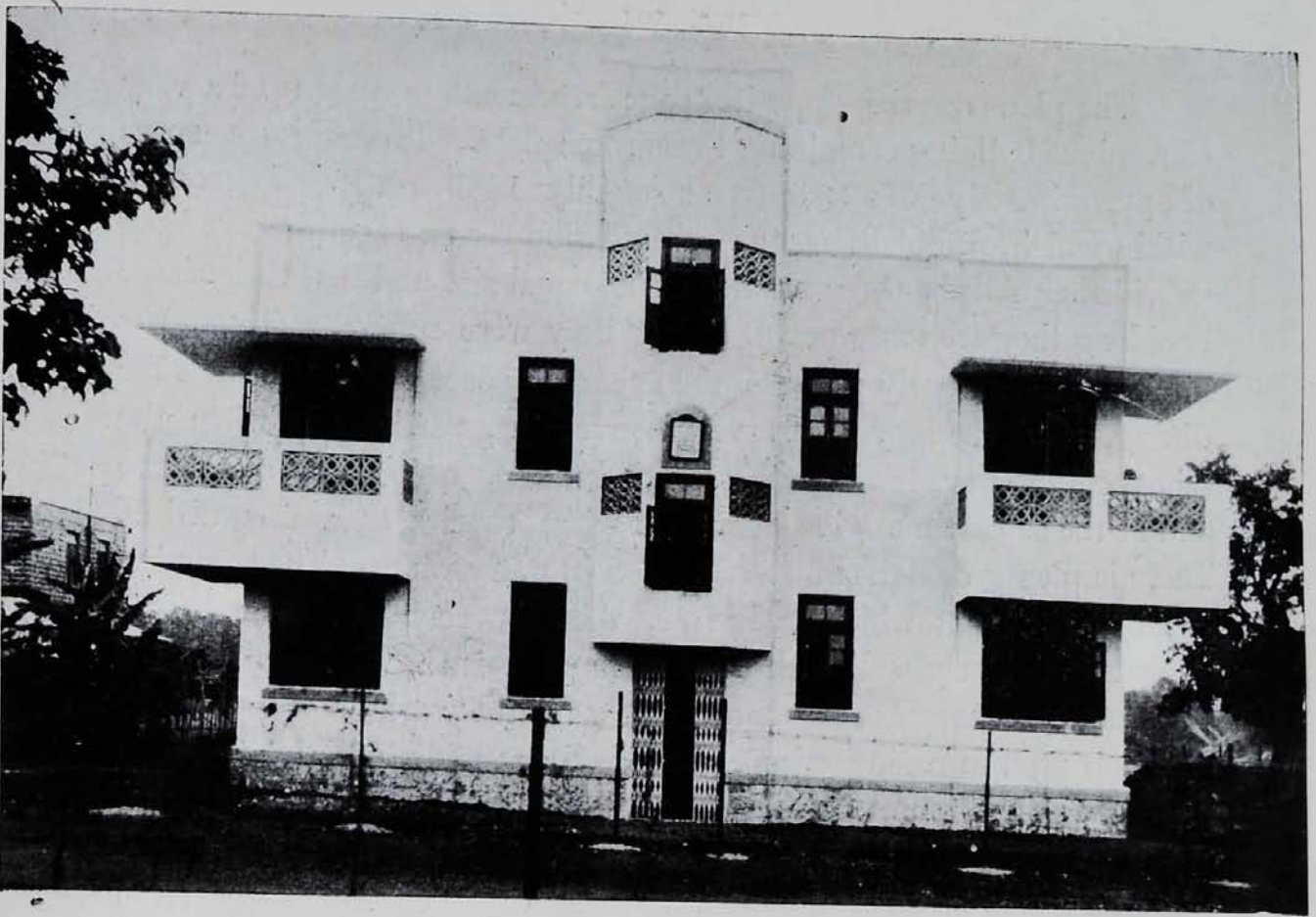


Fig. 204

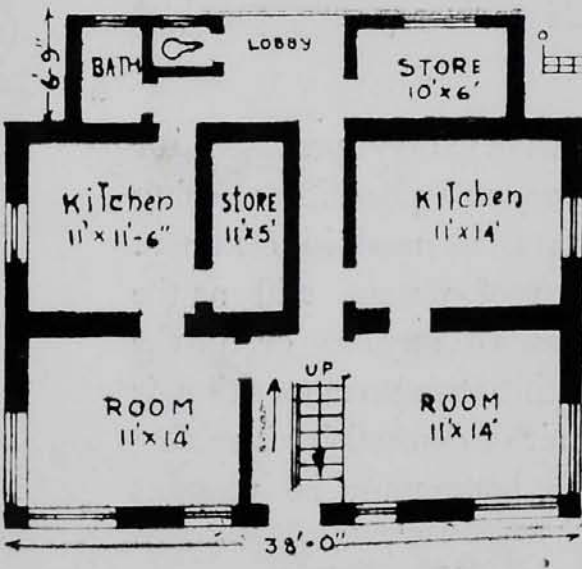


Fig. 205

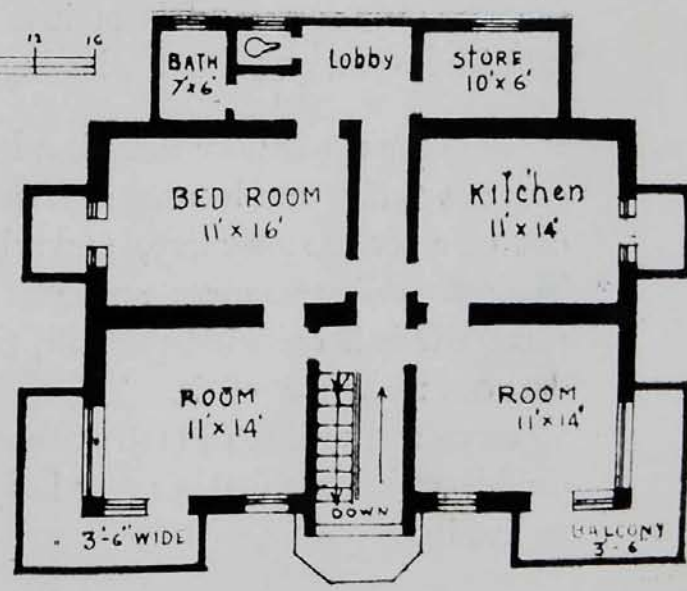


Fig. 206

Floor Area
2986 sq. ft.

Plan No. 73

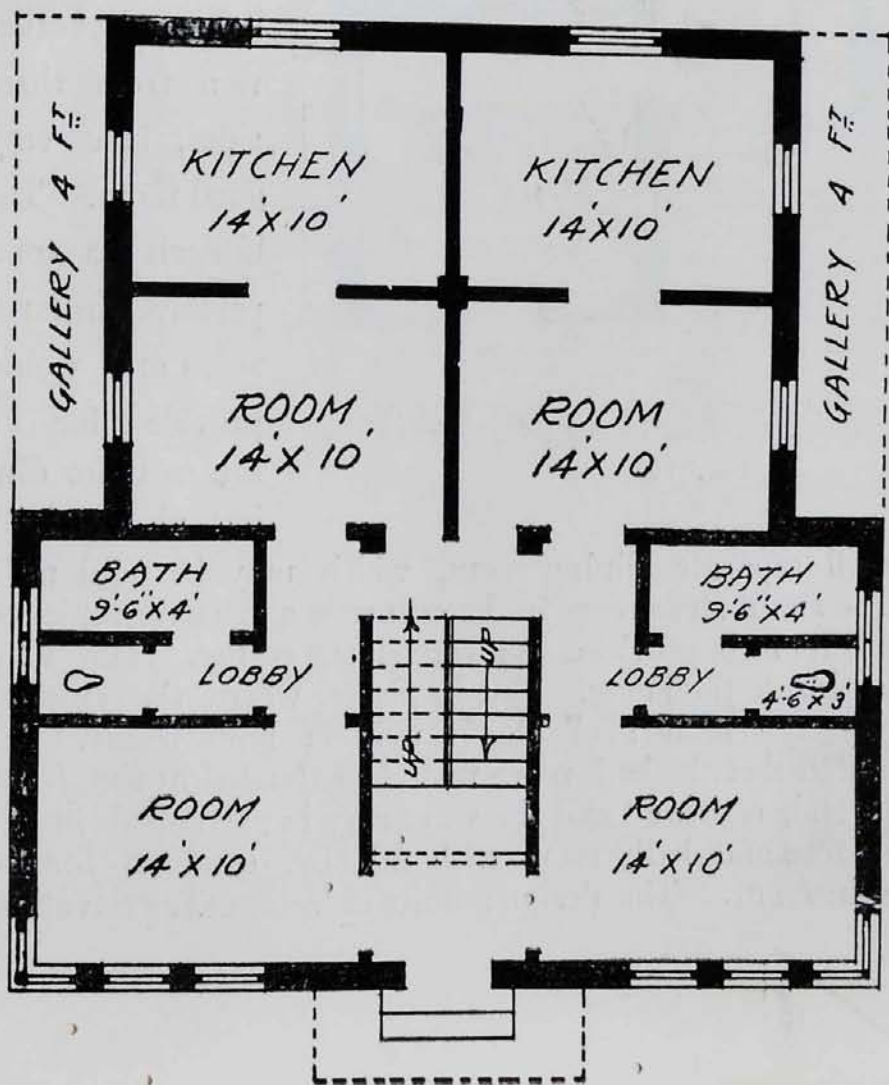
Cost Rs. 12,250

The plan on the opposite page represents a design of a very convenient building containing three room flats. It occupies a space of approximately 42ft × 35ft. or roughly 1450 sq. ft. of ground, within which, decent living accommodation for two families has been provided. All the three rooms are of equal size and as their shape is oblong they are more useful than if they were square. Thus, the kitchen can normally provide the necessary space for a few seats for dining, which the lady finds very convenient, particularly when the school children are having their hurried meals, which she can serve and at the same time give some finishing touches to a few dishes. There is plenty of light and ventilation in every room. The reception room in the front, which is, in fact, the show room of the family, is treated particularly well with the front and corner windows and the overhanging canopy over them, so that if the workmanship and the materials used in construction are as good as the design, the flat, even though of three rooms, would create an impression of a stylish living of the family. The bath and w. c. have received a best position—easily accessible and yet unobtrusive. A cloth curtain hung from the top of the door, in the reception room near the lobby, and swinging shutters of half the height in the main door of the same room, would afford the best privacy in the entire flat. The space occupied by corridors is minimum possible, consistent with the necessary independent access to rooms. The stair case is wide and easy and provides sufficient headway below the landing.

On the upper floor there is a long and wide gallery provided for each flat which can be used as a small lounge, or a place for sleeping out on a hot or sultry day, and a balcony in front used in common. The same stair case gives an access to the roof terrace, and as the passage to it is quite independent, the occupants of any one or all the flats can make use of it. The general architectural composition is vigorous and unaffected and carries every air of domesticity inspiring confidence in the mind of every body that the house must be pleasant to live in.



Fig. 207



Architect: PROF. N. S. GUPCHUP.

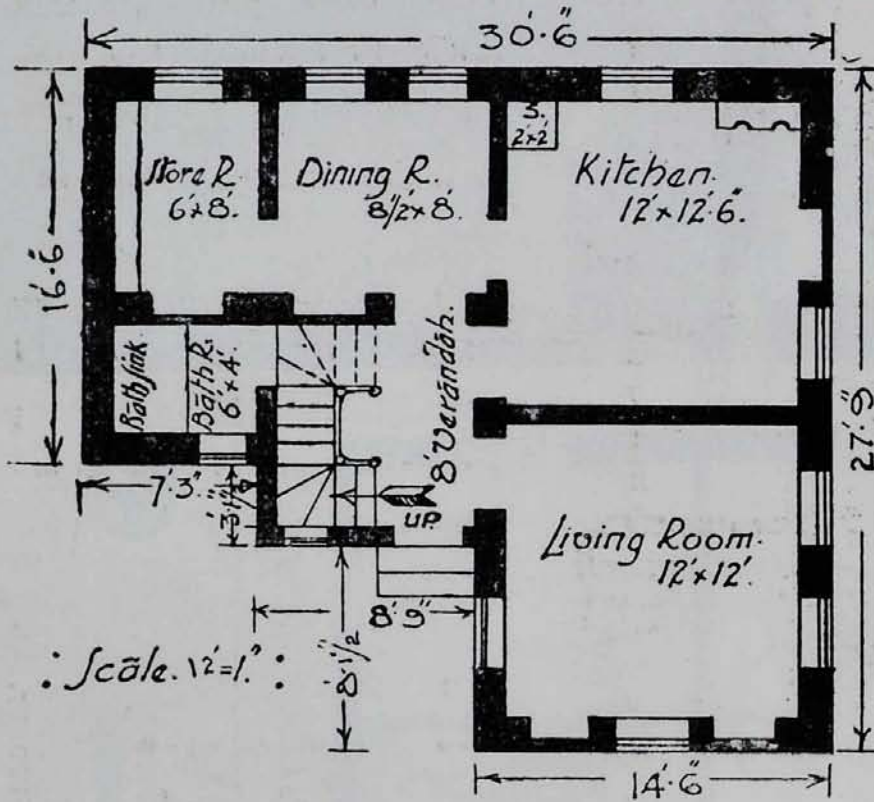
Fig. 208

Floor Area of each
storey. 694 sq. ft.]

Plan No. 74

[Cost Rs. 2750

This plan represents a very compact design of a $3\frac{1}{2}$ rooms flat. It occupies a plinth area of less than 700 sq. ft. and yet provides all the necessary decent accommodation for a small family. As the entrance to the stair case is quite outside and independent, it admits of several storeys being built with an independent flat on each floor, or if a family requires more accommodation, two or more floors can be occupied by it. In the latter event a small stair case on the rear side, no matter even if it is exposed, would add much to the convenience.



∴ GROUND FLOOR PLAN. ∴

Fig. 209

There is just a small vestibule in the front which serves also as a landing to the stair case. The living room, with light and ventilation from three sides, is a very good room. The kitchen is comparatively a large room and would provide for a few seats for dining also. Still,

there is a small separate dining room, which may be used as a bed room. The small store room in the corner is a great convenience. A separate bath room is provided in a convenient corner. The w. c. is not provided inside the house. But in places, where the amenity of water carriage system is available, it may be built inside. For this it is suggested that the bath room may be extended in the front, right up to the stair case wall and the w. c. may be arranged in the corner of the store and bath room with a lobby, common for the bath and w. c. in front. The design admits of a beautiful elevation.

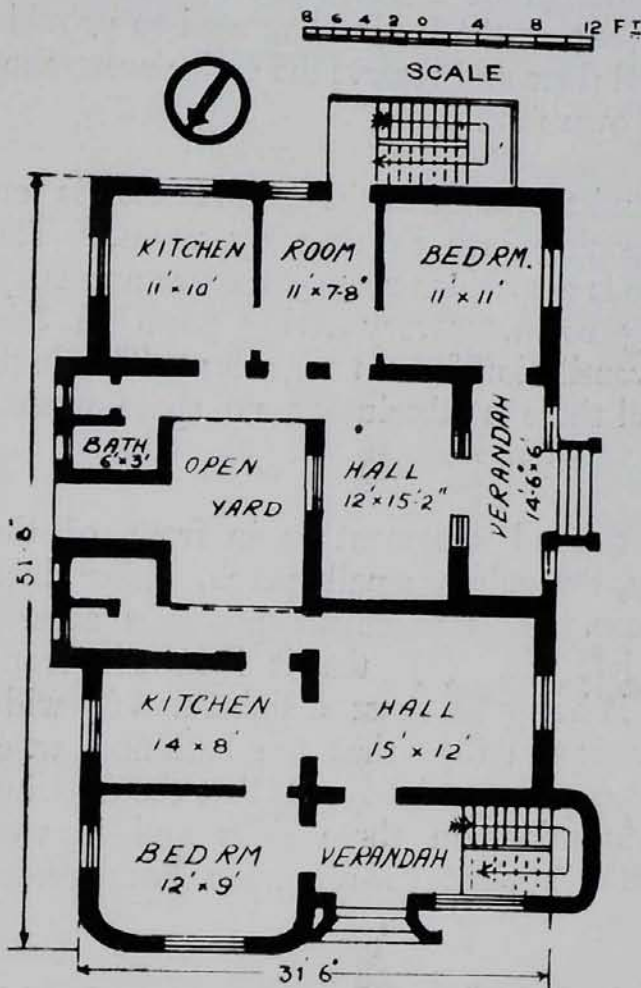
Floor Area of two
storeys. 3430 sq. ft.]

Plan No. 75

[Cost Rs. 13,500

The flats represented by the above plan, have the different rooms

very skilfully arranged. The arrangement of lighting and ventilating the rooms is made both from the outside, and also inside from a small court yard or *chowk* open to the sky. The bath room and w. c. are both arranged inside the flat with very convenient, independent access provided to them. Still, in respect of privacy the flats in the previous plan are infinitely superior.



GROUND FLOOR PLAN.

Fig. 210

Architects: ADALJA & NOORANI, BOMBAY.

The sizes of rooms in these flats are better than those in the preceding. The drawing hall is large and occupies a prominent position. The kitchen, an oblong room, though small, would be more serviceable. The verandah, in the case of the front flat, serves just as a vestibule, because, there is a common passage through it to the flats on the upper floor or floors; but in the case of the rear flat it can be used as a sitting out place. In fact, the rear flat is more convenient, spacious and private, as the stair case is on the outside. It would prove more comfortable, also from the point of view of the orientation.

Floor Area.
3298 sq. ft.

Plan No. 76

Cost Rs. 15,100

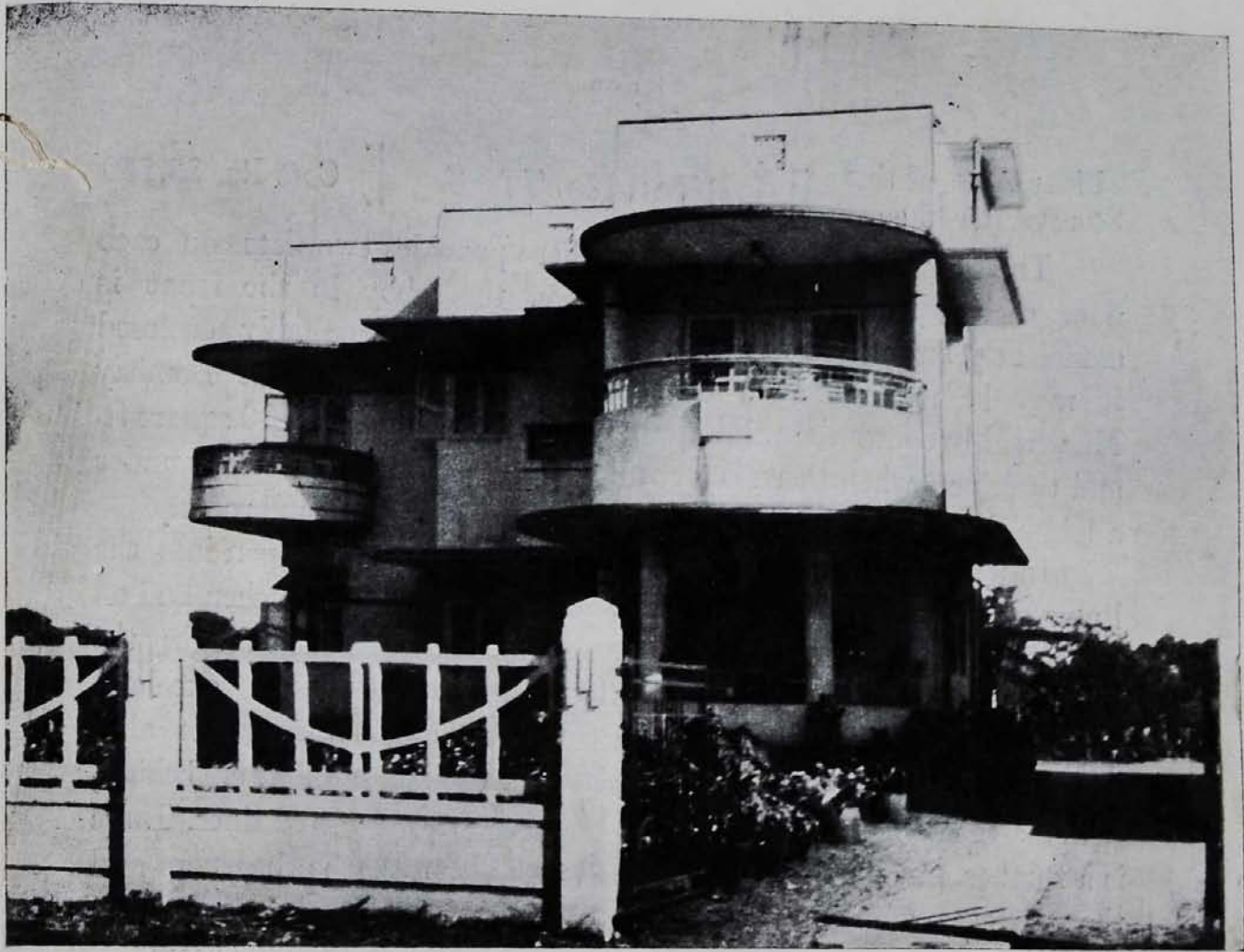
This is another clever design of three room flats erected in the same compound of the building represented by the plan, No. 73 as will be seen from the same design of the compound wall. The requirements of the building were that the landlord wanted to provide for two tenements on the ground floor and reserve the entire accommodation on the first floor for his own family.

The entrance to the left hand tenement on the ground floor is on the left hand side, directly opening into the drawing room. The kitchen, though square in shape is a spacious room to serve normally both as a kitchen and a dining room. Every living room in this tenement derives its light and ventilation from two sides. The bath and w. c. are well situated, and there is absolutely no space wasted in unnecessary long lobbies.

The entrance to the right hand tenement is in front of the middle row of rooms and opens, through a small porch, either into the drawing room or bed room. This tenement possesses several advantages over the one on its left viz. (1) that it is in the front and nearer the road, (2) that it has got a most delightful 7ft. wide semi-circular verandah in the front and (3) that the bath and w. c. are in a secluded, inconspicuous corner and lastly, (4) that the drawing room is open to light and ventilation on three sides and is well protected by the deep verandah, against the afternoon hot breezes from the West.

The stair case is on the back of the front row of rooms and with some winding steps, gives an entrance into the drawing room on the first floor. Two bed rooms with a common bath and w. c. between them, are provided on the top of the left hand row of rooms, the middle row is utilised for a kitchen, dining and a drawing room, and in the right hand row there is a bed room with a terrace in front, balcony on the left side and a bath and w. c. behind. This room would prove very good as a guest room. The roof over the terrace in front of this room is overhanging for the most part, which is a bold feature. Similarly, the 4'-6" balcony projecting beyond the front corner of the bed room in the left hand row, gives also a boldness to the architecture.

The same stair case is continued to give access to the terrace and the few rooms on it. The area of the two floors is 3298 sq. ft.



Architects : SATHE, MASTER & BHUTA, BOMBAY.

Fig. 211

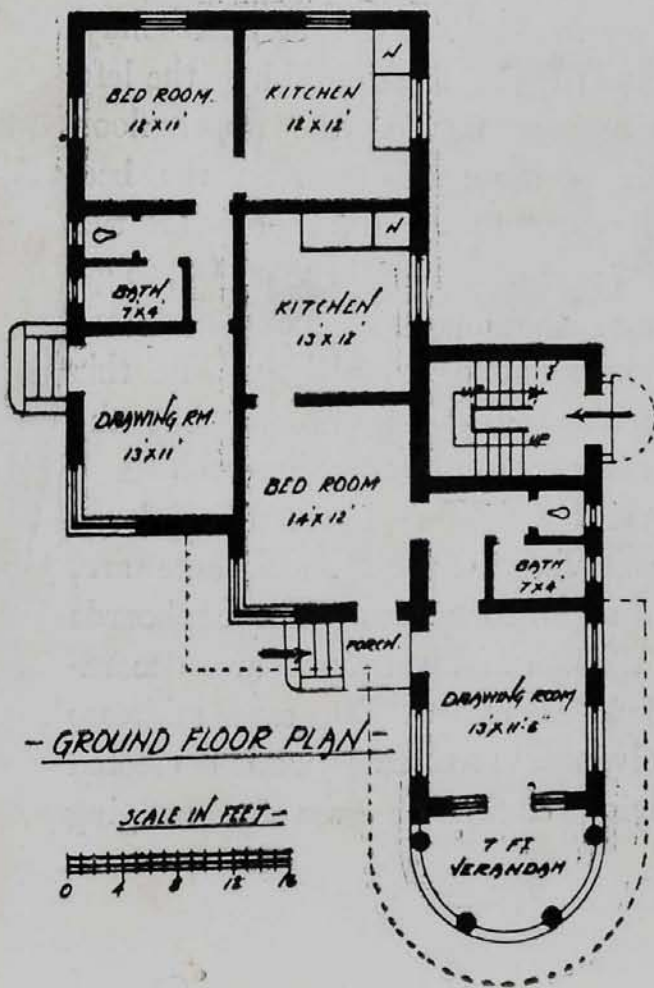


Fig 212

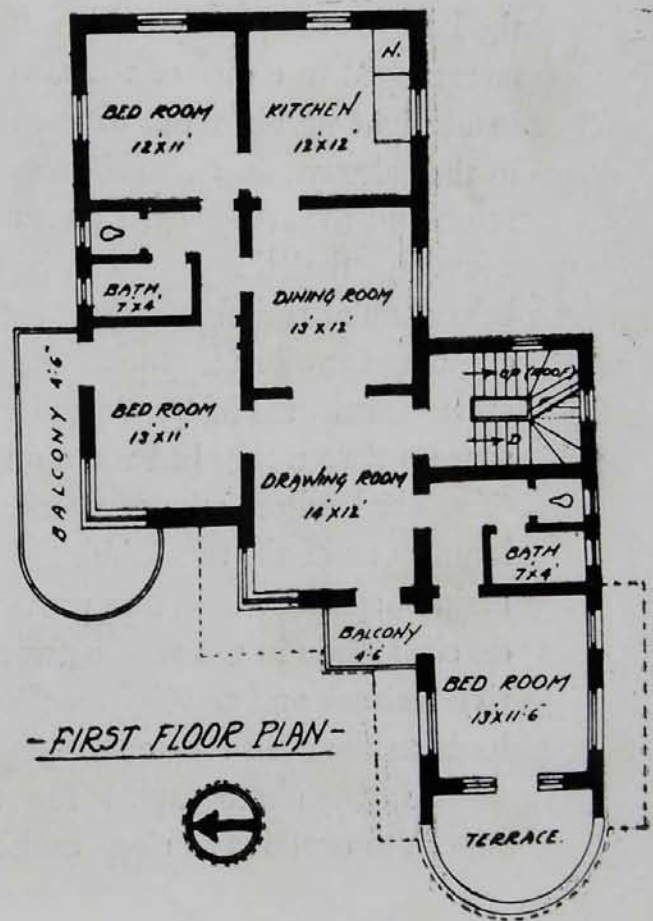


Fig. 213

Floor Area of three
Storeys. 5718 sq. ft.]

Plan No. 77

[Cost Rs. 25,250

The charming building pictured here provides two flats on each floor, each consisting of $3\frac{1}{2}$ rooms, since, the lobby in the front is sufficiently large to serve as a store room at least, if suitably enclosed it may be regarded as a half room. According to the Bombay Municipal bye-laws the minimum area of a room must be 100 square ft. and therefore, when there is a space of less area, it is classed under a lobby though, in fact, it serves all the purposes of a small room.

In this plan, the entrances to the ground floor flats open into the living or drawing rooms, on one side of the latter is a kitchen and on the other, a bed room. All these rooms are spacious enough; the lobby, in the case of the ground floor flats, serves as an excellent anti-rooms, which can be used, as a tea room or a dining room also. There is a partition between the lobby and the bath and w. c. behind, with a self-closing swinging spring door, shown by dotted lines. There is a further amenity of a small useful space between the bedroom and the staircase, which may be used either as a second bath room, near the bed room, or as a fuel, or store room or even as a prayer room.

For the upper flats, the entrance is, of course, from the staircase; the latter is fire-proof, wide and easy to climb. The staircase may be arranged in either of the two ways: (a) to start climbing the left hand flight just in front of the entrance and land on the upper floor in the balcony and enter the flat through the space between the bed room and the staircase (shown bath room in the plan.) This has the advantage that the lobby can be used as a perfect anti-room. Or, to go below one of the flights, turn to face the entrance door and start climbing the other flight, to land in front of the lobby. In this arrangement, the lobby loses its privacy as an anti-room, but the space between the bed room and staircase can be fully utilised.

The landlord who occupies the entire 2nd floor has made one large lounge out of the two lobbies by removing the partition. There are, besides, spacious balconies provided on all four sides. The cupboards on either side in the wall between the hall and bed room are decorative features and serve as excellent clothes closets. The same staircase leads to the deck roof on which galvanised pipe frame work is erected (seen in the photograph) for drying clothes or even for hanging mosquito curtains to sleep under.



Fig. 214

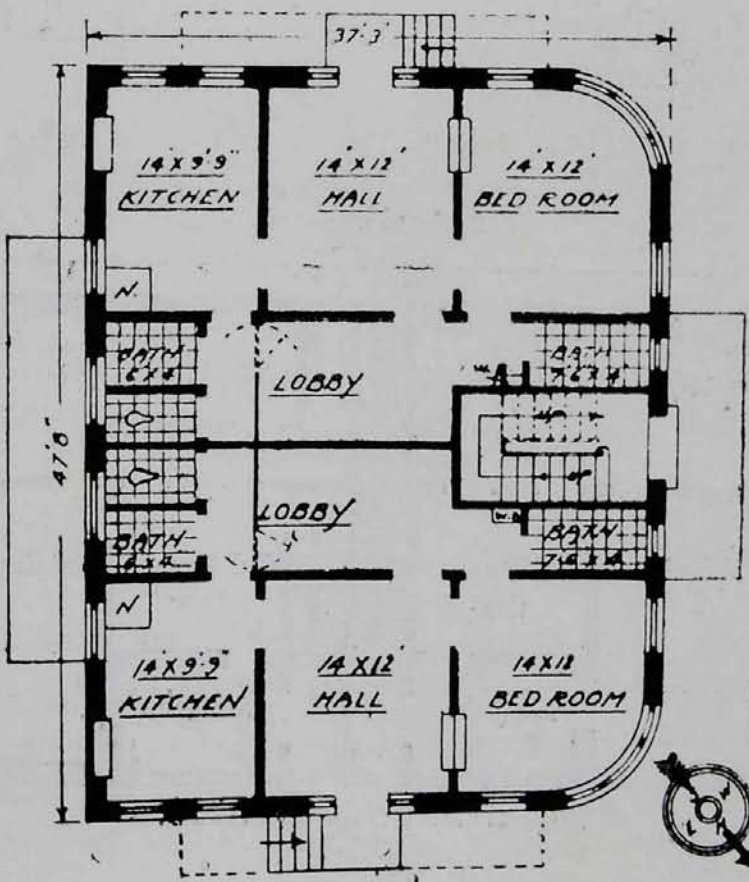


Fig. 215

-GROUND FLOOR PLAN-

SCALE IN FEET



Floor Area of two
Storeys. 3240 sq. ft.]

Plan No. 78

[Cost Rs. 12,860

The plan pictured below represents a very compact design of three room flats. It provides, in a small space, all the necessary living accommodation required by a middle class family. The main entrances to the flats are on the right and left hand sides of the entrance passage through doors which, if normally closed, would preserve the privacy of the flats from the occupants of other tenements. Though each individual tenement occupies an area of less than 750 sq. ft. all the necessary accommodation has been provided for in a small space. The kitchen is oblong and is spacious enough to serve also as a dining room. A loft over the bath room and w. c. would serve as a store room. The space below the staircase would be useful for storing coal or fuel. The passage behind the bed room gives an independent access from any room to the bath and w. c. There is just a small verandah in front to serve as a waiting place for visitors or also as sitting out place for the members of the family. The verandahs on the upper floors would be more enjoyable since being at a higher level they would be more private. Thus considered from every point, these small flats afford all the elements of comfort.

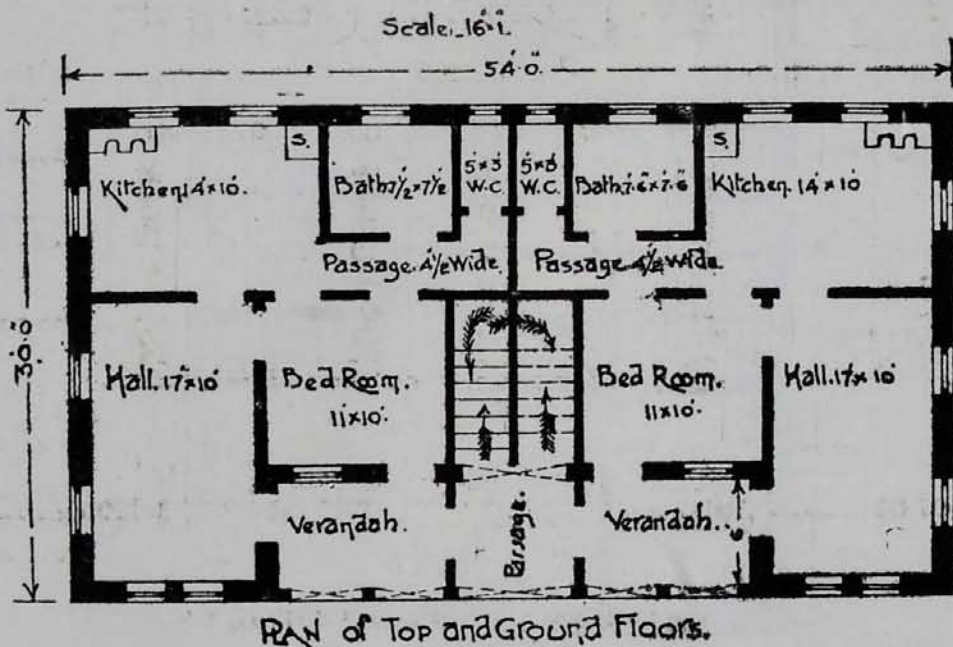


Fig. 216

Four-Room Flats.

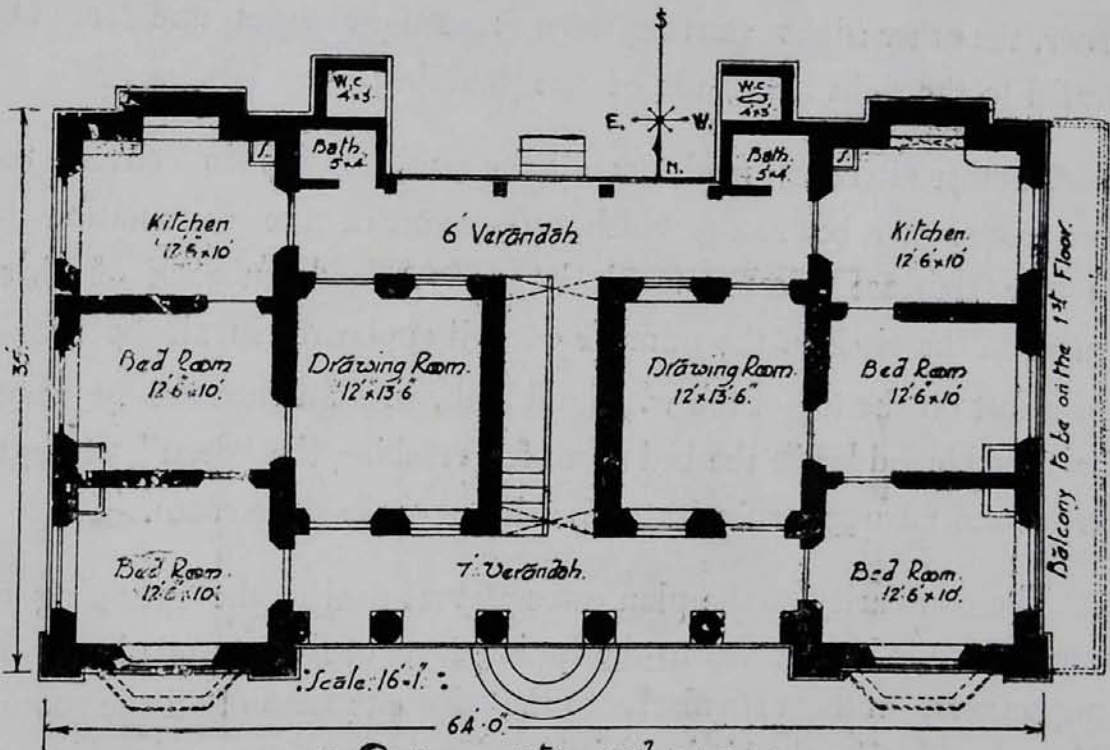
Floor Area of two
Storeys. 4475 sq. ft.]

Plan No. 79

[Cost Rs. 18,850

This is a very compact design of flats, in which, the minimum accommodation required by a middle class family viz. of a kitchen, two bed rooms, a drawing room and a verandah, is provided. The drawing room is quite an independent room, so that, even if outsiders occupy it, the privacy of other rooms will not be disturbed. There is a smoke outlet provided by projecting a part of the kitchen on the back side. If light partitions be erected across the front and rear verandahs in line with the outer lines of the wall of the drawing room, with self-closing shutters hung by means of sprung hinges, the front verandah would become a useful sitting room and the rear one, a small dining room for occasional use. There are projecting balconies provided in front of windows on the front side and a cantilever gallery on the west side on the upper floor. The w. c.s are placed just outside the building abutting against the bath rooms.

The kitchen and both the bed rooms are all of the same size and their oblong shape makes them very serviceable. Wall cupboards are provided in the space below windows. Thus the flats supply all the needs of a slightly larger family.



: PLAN OF 1st AND 2nd FLOORS :

Fig. 217

Floor Area of two
Storeys. 1924 sq. ft.]

Plan No. 80

[Cost Rs. 8,000

The plan of these flats is taken from my Residential Buildings Suited to India. This is one of the plans most favourite with medium sized middle class families, and so far as I am aware of, no less than ten buildings have been erected on the scheme of the plan with slight alterations in different places. The alterations made are very interesting as they indicate the general trend of this class of people. In all the ten cases the rear staircase has been altogether omitted. An improvement also has been effected in all the cases in the arrangement shown in the plan viz. the w. c. first and bath afterwards. In some houses the positions of these are reversed, a small through lobby being provided to reach the w. c., while in others, the w. c. is located as it is, but it is made to face the left hand side. Third alteration made by some families is to shift the main staircase from the verandah and put it just outside the building in two flights at right angles to each other. The first flight starts just in front of the second post in the verandah, near the tail of the arrow in the plan, with a square landing at the corner, the other flight starting from it at right angles and running parallel to the right hand side of the building.

Another alteration made by all the families was to convert the store room into a bed room, which, on account of the cancellation of the rear staircase became much larger. A godown rack of three shelves in the kitchen, the number of wall cupboards in all the rooms and a loft on the top of the w. c. and bath, with an entrance by means of a portable ladder in the bed room for reaching the "dead" storage, were found adequate substitutes for the separate store room.

The popularity of the plan owes a great deal to the grouping of rooms which is best suited to the Indian style of living, and also to the compactness, and particularly to the adequate sizes of all the rooms, which, (excepting the kitchen) being oblong, are very serviceable and therefore more 'roomy', though small.

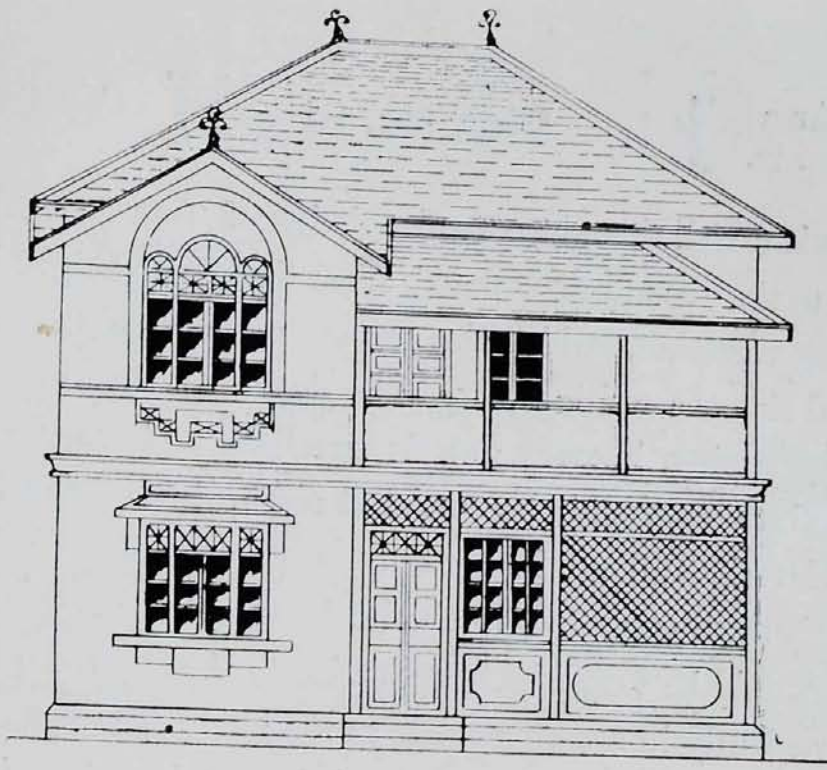


Fig. 218

◦ FRONT ELEVATION. ◦

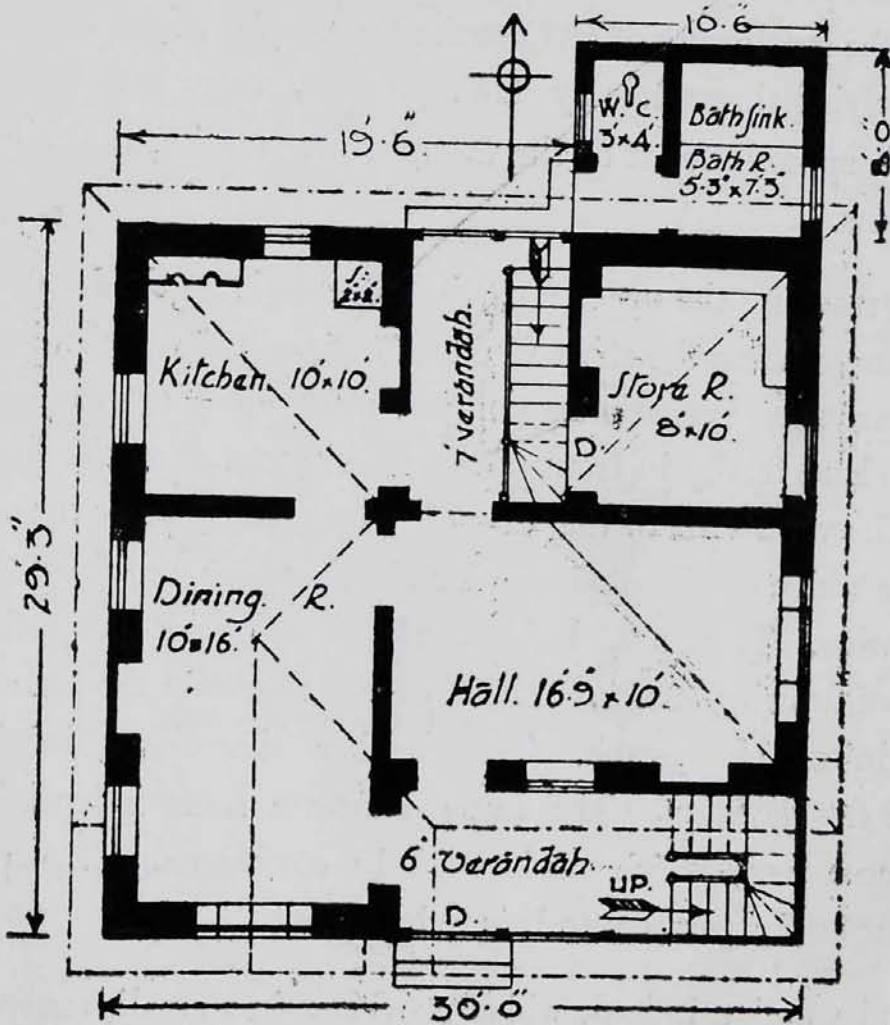


Fig. 219

◦ GROUND & 1ST FLOOR PLAN. ◦
◦ Scale. 1/2" = 1' ◦

Floor Area
4616 sq. ft.

Plan No. 81

Cost Rs. 19,500

This is a well thought out, nice design of four-room flats. The entrance to the ground floor flats is from the left and right hand sides into a long verandah, which also serves as a passage to the different rooms and also as a waiting place. The sizes of all the rooms are good, and their grouping, in every flat, is excellent and very economical. The space between the kitchen and bed room, in front of the passage is very cleverly utilised in forming cupboards on all four sides. Particularly those cupboards in the kitchens and bed rooms, which are spacious, would be very highly appreciated. A store room is arranged very conveniently in a corner, close to the kitchen, and the bath and w. c. are given such quarters, that being unobtrusive, both afford the greatest privacy and are independently accessible from every room. Perhaps the sentiments of some orthodox people might revolt, when, after purifying themselves by taking a bath, they have to tread the "defiled" space in front of the w. c., before reaching the kitchen or other rooms.

For reaching the upper flats the entrance is on the front side and one has to go below the short flight of stairs on the right hand side, face towards the main entrance, and start climbing the left hand flight, to land finally in front of the drawing room on the right hand side. The verandahs in the case of upper flats, serve as excellent balconies which can be used also for sleeping out as they are sufficiently wide. There are, besides, round balconies projecting from corners of drawing rooms. These are not shown in the plan but can be seen in the photograph. These lend a charm and heighten the effect of the elevation. The same staircase leads independently to the terraced roof, which can be used in common by the people of either flat as the passage to it is independent.

A nice design indeed, which provides, in a small, compact space, most of the facilities of a cottage home.

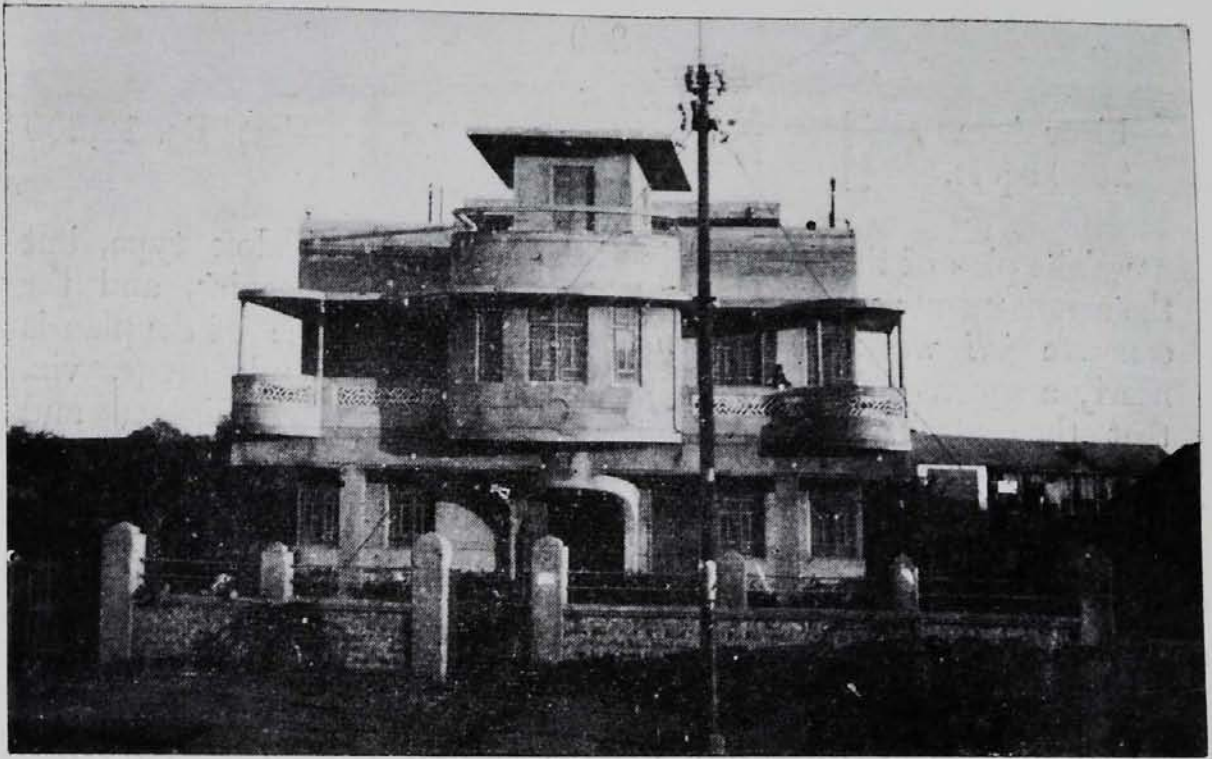
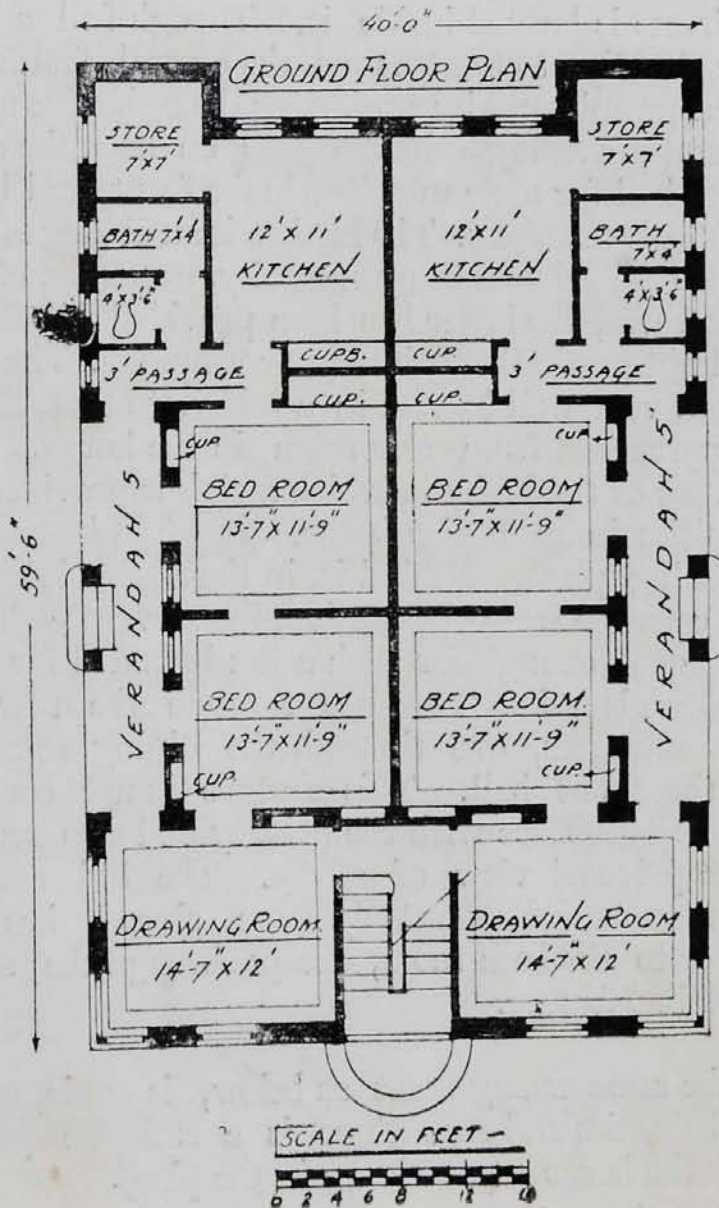


Fig. 220



Architects SANE & CHEMBURKAR, BOMBAY.

Fig. 221

Floor Area
2980 sq. ft.

Plan No. 82

Cost Rs. 12,200

The plan of this building is of the common, orthodox type, but the arrangements are simple and the projecting balconies, and the concrete *jali* work are modern features. The outline of the plan is nearly a square. A square plan has usually one disadvantage, viz. that the central room or rooms cannot be adequately lighted and ventilated. To overcome this it is usual, if the building is large, to leave an open courtyard or *chowk*, in the centre, large or small, according to the size of the plan. In the present house, the difficulty is surmounted by providing an unimportant room, viz., a store room, in the centre, which does not necessarily need direct light and ventilation.

The main front entrance is not in the centre, but a little on one side, and a staircase is located inside it. Though full advantage is not taken of the situation to treat it as the central feature, it has, still, been given a prominence by projecting the staircase and entrance bay about 3ft. and providing concrete *jalis* on both the sides of it. There is a drawing hall for male members in the front, and behind it is another for the female members. The kitchen is an oblong and spacious room, so that there should not be any necessity, normally, of a separate dining room. However, the latter has been provided for. The store room derives its light partly through the rear verandah. The bath room and w. c. are both very well located in a lobby, so that, they can be independently approached from any room in the house. There is a small room in front of the lobby in which a sink is provided. This is one of the necessities in an Indian home. It might be used either as a urinal or a washing place. Behind it, in the right hand corner, is a w. c. with an entrance from the outside, for servants. The sizes of all the rooms are good enough for such a flat intended for a middle class family. There is a back entrance through the rear verandah and also two side entrances, one through the dining room and the other through the front hall. This feature is not commendable. Too many entrances interfere with the privacy and also are disadvantageous from the point of view of safety. The bed room in the front would be more useful as a study room, since it has no access to the back side or to the bath room, except through the store room, which is another bad feature.

Upstairs the same arrangement as below, is made, except, that there are a few balconies and that there is a staircase provided on the rear, outside the house (not shown in the plan).



Fig. 222

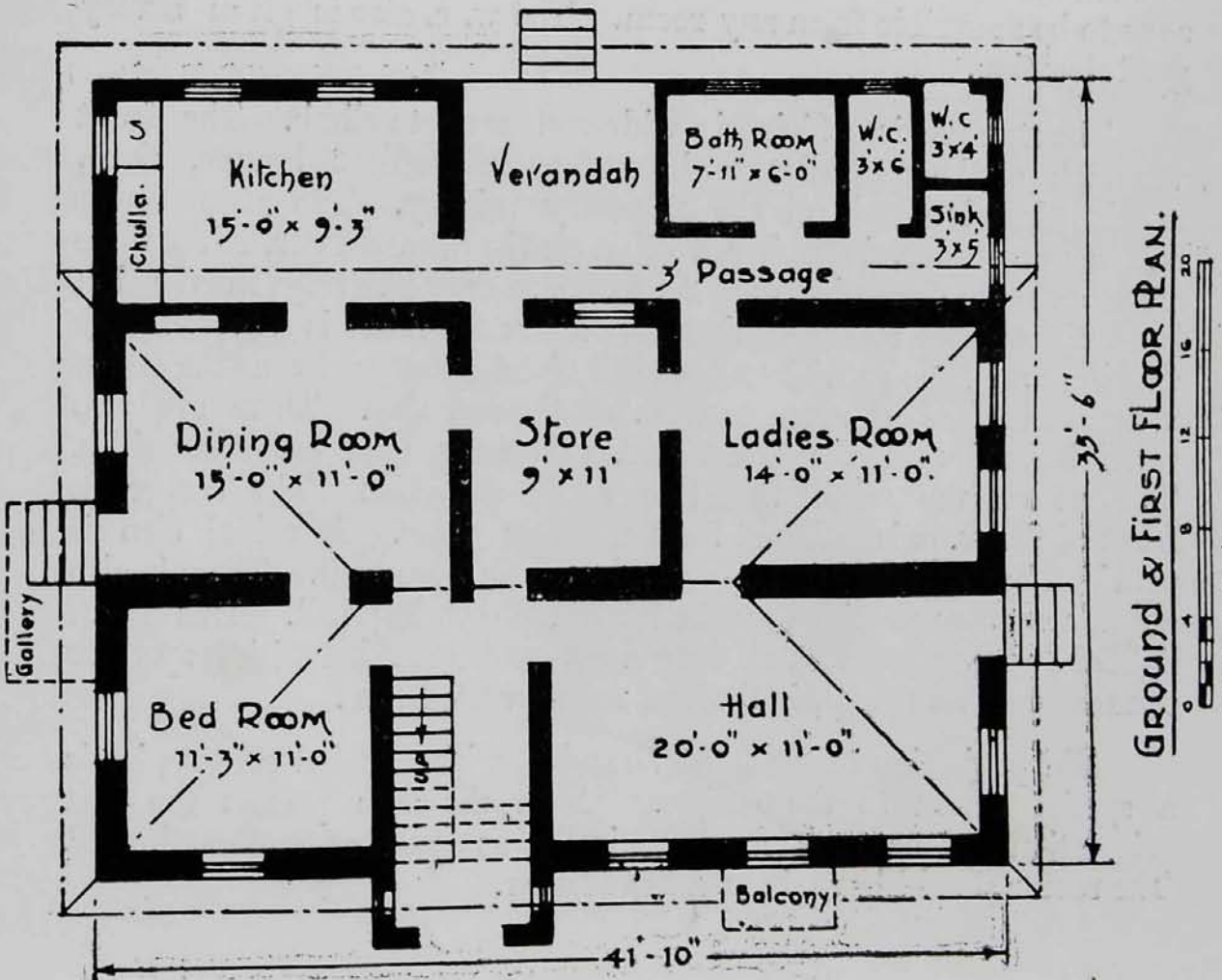


Fig. 223

Floor Area
3000 sq. ft.]

Plan No. 83

[Cost Rs. 12,600

The plan on the opposite page represents five room flats, one on each floor. The building stands on a corner plot with roads on the south and west side. There are two entrances on the front to the verandah. The latter, though spacious enough serves mostly as a passage. Just behind the verandah are the staircase for the upper flat and a drawing room. The latter is of an adequate size for the type of the home. As there are verandahs on the front and rear of it and only a blind wall on the bed room side, even if strangers occupy it, the privacy of the family would, in no way, be disturbed. All the three bed rooms are open to the Western or South-western breeze. The kitchen is of an oblong shape and occupies the best position in the North-east corner, so that, smoke and smells from it are not likely to spread into the adjoining rooms. There is no special dining room provided, but the bed room adjoining the kitchen would be a very suitable room in normal times. On special occasions, when a large number of guests are to be treated, the drawing hall would afford the necessary room, particularly as there is a passage provided to it from the kitchen below the landing of the staircase. The bath room is in the rearmost corner in a very convenient place, so as to be accessible from any room. The w. c. also is given a very good location.

The staircase is sufficiently wide and easy to climb. The front verandah of the upper flat can be used as an excellent lounge, since, at this height it affords all the necessary privacy. The arrangement on the upper floor, is similar to that on the ground floor, still, there are a few more conveniences. As there are only five steps in the left hand flight of the staircase, the space above the latter is covered with flooring and thus provides a through direct passage from the front verandah to the bath room or w. c. on the rear side. There are two small balconies in the front and two long ones on the sides. The one on the south would be really enjoyable. The corner in front of the w. c. is utilised for a washing place. A urinal also is provided in the right hand corner of the rear verandah. There is also a spacious room provided on the top of the drawing hall. This room lighted and ventilated on all four sides, and provided with a spacious terraced roof all round, is the best room in the house.

The projection of the front verandah, with rounded corners, lends a special charm to the design. Both the flats possess the best orientation and as such are practically as good as cottage homes. The rooms should have been a little larger.



Fig. 224

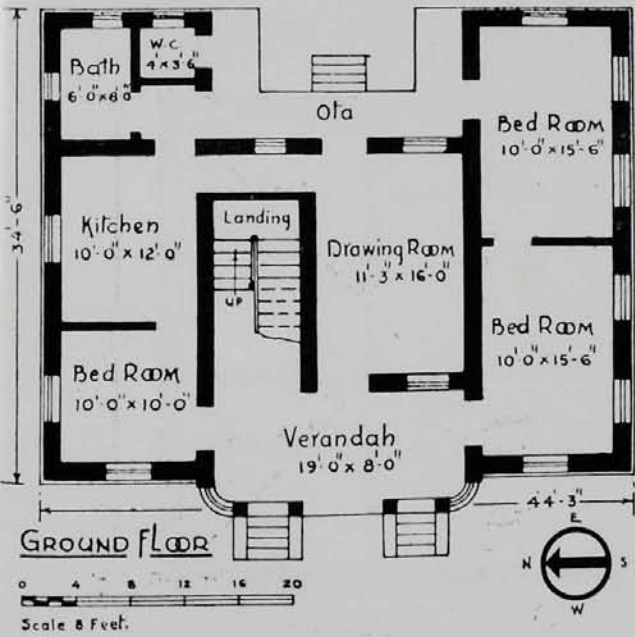


Fig. 225

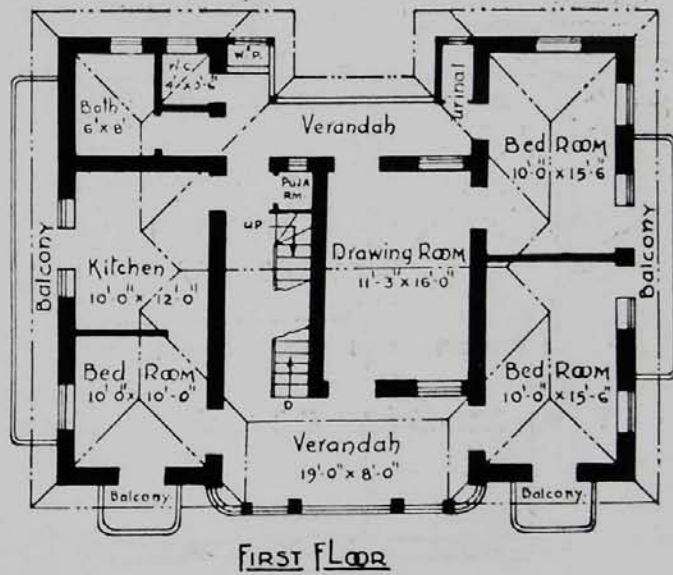


Fig. 226

Architects: S. J. NARVEKAR & CO., BOMBAY.

Floor Area of two
Storeys 5168 sq. ft.]

Plan No. 84

[Cost Rs. 22,000

The flats represented below belong to the type of plan Nos. 78 & 79, but are an improvement upon them. The verandah in front is altogether omitted, and similar economy is made in doing away with the lobby, which has resulted in increasing one room. The sizes of all the rooms are large. There is a separate store room provided and the bath room and w. c. are arranged in a separate appurtenance on the rear side, and they can be reached either by the door in the hall, dining room or kitchen. The latter is a bit smaller room but the separate provision of a dining room and a store room, more than counter-balances it. If a further improvement is desired, a six ft. verandah may be provided in front of the main hall. This would increase the size of the bed room to 18' x 12'. Though this would cause some increase in the cost, it would make the flats at once suitable, for a higher class of people, who are in a position to pay a higher rent.

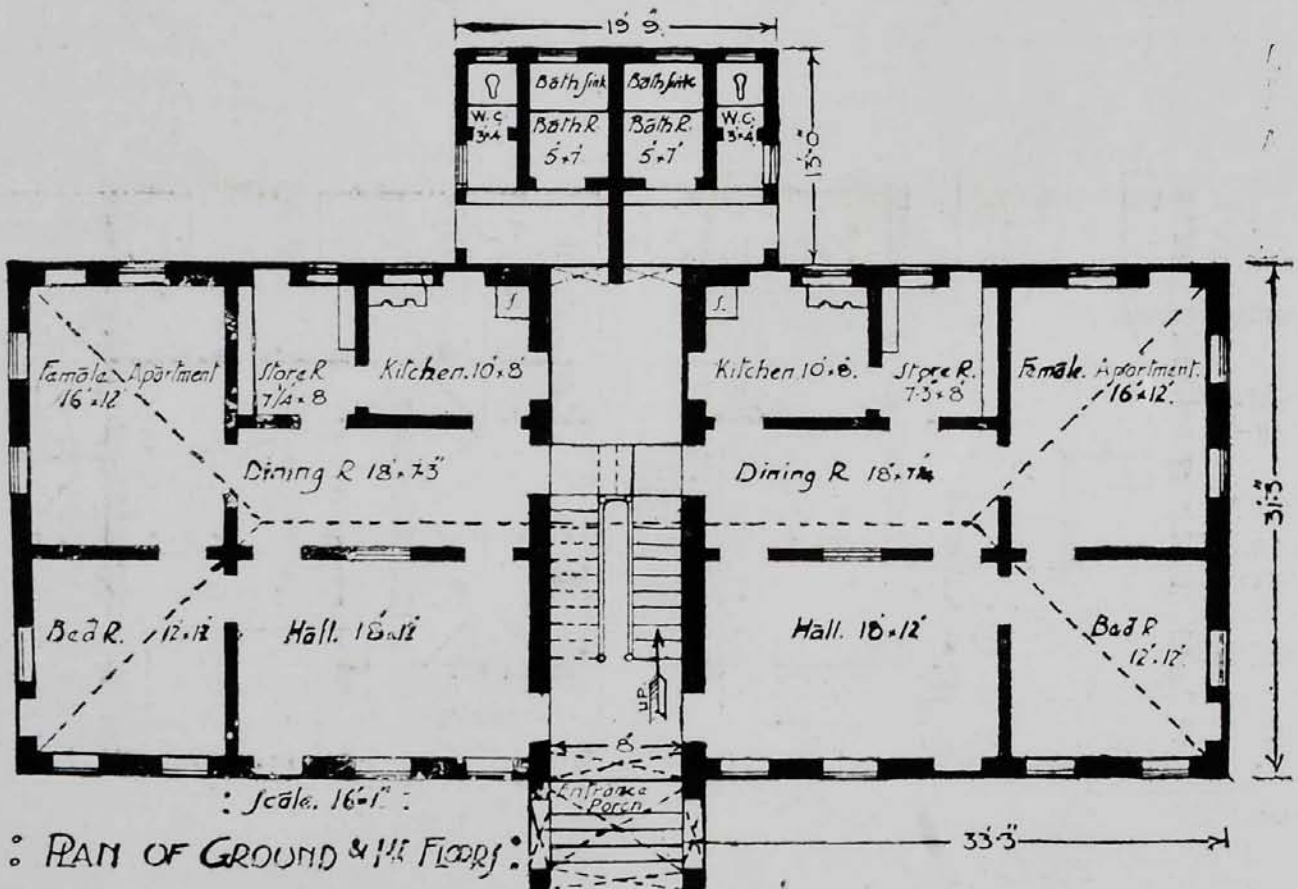


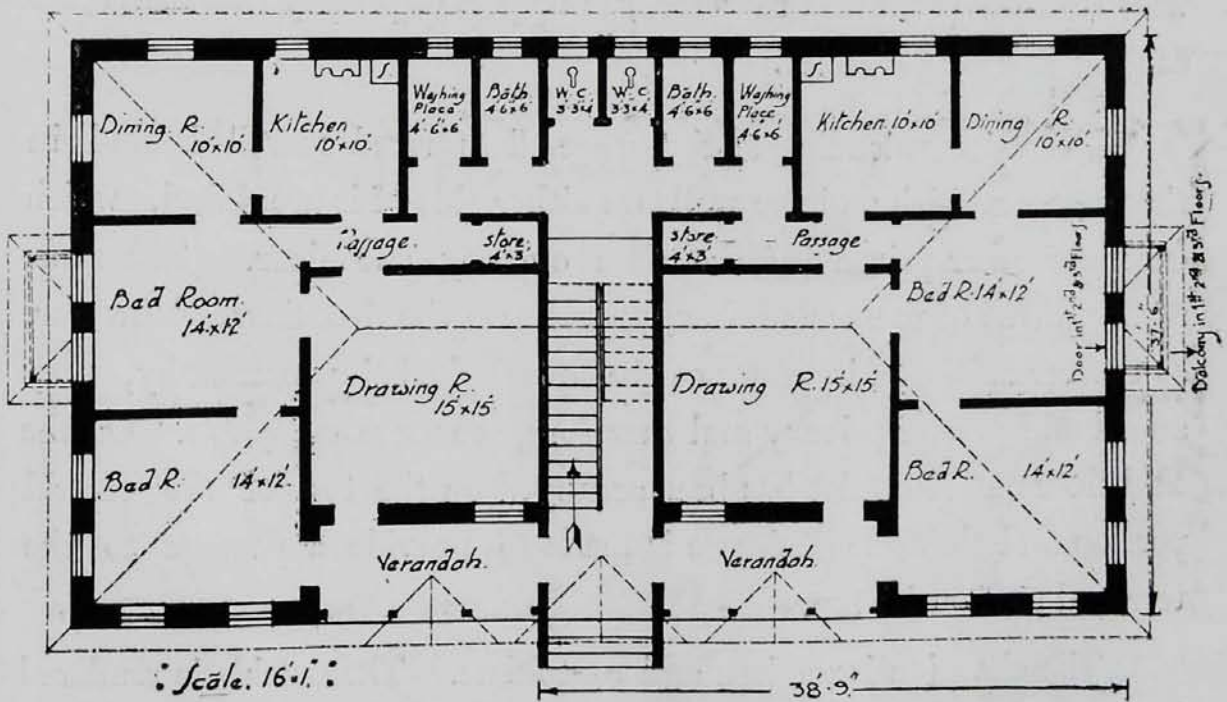
Fig. 227

Floor Area of two
Storeys 5250 sq. ft.]

Plan No. 85

[Cost Rs. 22,500

The flats represented by the plan below provide accommodation for an upper middle class family. The sizes of all the rooms are very good. The kitchen though small, would serve quite well as there are separate rooms for storage and dining, close by. The outer walls are 15 to 18 in. thick, and all the partition walls are half brick thick. The weight of the upper floor and roof is taken up by a frame work of steel, which is hidden in the partition walls. The staircase is very easy. If another private staircase is required either for servants or for ladies on the upper floor to go down, when the front verandah is occupied by visitors, one flight can be provided with its entrance, for going down, in the passage opposite the washing place, which would lead to the middle landing of the main staircase, from where the lower flight of the main staircase can be used for reaching the ground. But this has to be done at the sacrifice of the small store room. The central position of the staircase, with a slight projection of its bay would suggest a number of ideas to the architect to make the elevation as attractive as required.



PLAN OF GROUND, 1st, 2nd AND 3rd FLOORS :

Floor Area
6086 sq. ft.

]

Plan No. 86

[

Cost Rs. 27,000

The flats in this plan are designed on a generous scale. There is a common entrance in the centre on to a verandah, from which independent entrances are provided on the left and right hand side for the respective flats. All the rooms including even the kitchen are of very liberal size, and the 4 ft. passage between the drawing hall and dining room, gives an independent entrance to every room in the flat. When the entrance door of the flat across the front verandah, is closed the verandah can be used as a sitting out place. There is also a back verandah, full six feet wide provided, but it serves merely as a passage. Because it is too close to the drawing hall, to be used as a work verandah of the kitchen. The small store room in the corner provides a further necessary amenity. The bath room is in a convenient place, and the w. c. is close to it with an outside entrance. A loft is built on the top of the bath and w. c. Thus the flat provides all the amenities, which a small well-to-do family needs for a decent living. Each flat forms an independent unit separated from the other, by the wide staircase room and therefore, in respect of privacy these flats are as good as cottage homes.

The staircase leading to the upper flats recedes well behind in the front verandah and the walls on either side of it are blind, which ensures further privacy of the flats on any one floor. The same arrangement of rooms as below, prevails on the first floor. However, as the verandahs on it can not be overlooked by passers-by, they afford still greater privacy and therefore, are more enjoyable. On the 2nd floor one more flat has been arranged on the top of the central portion and the same staircase is made to provide a passage to the terraced roof on its top.

The elevation is modern and up-to-date. The outside is rendered in light cream colorcrete cement, with the vertical and horizontal bands in red cement which have enhanced the effect.



Fig. 229

- GROUND FLOOR -

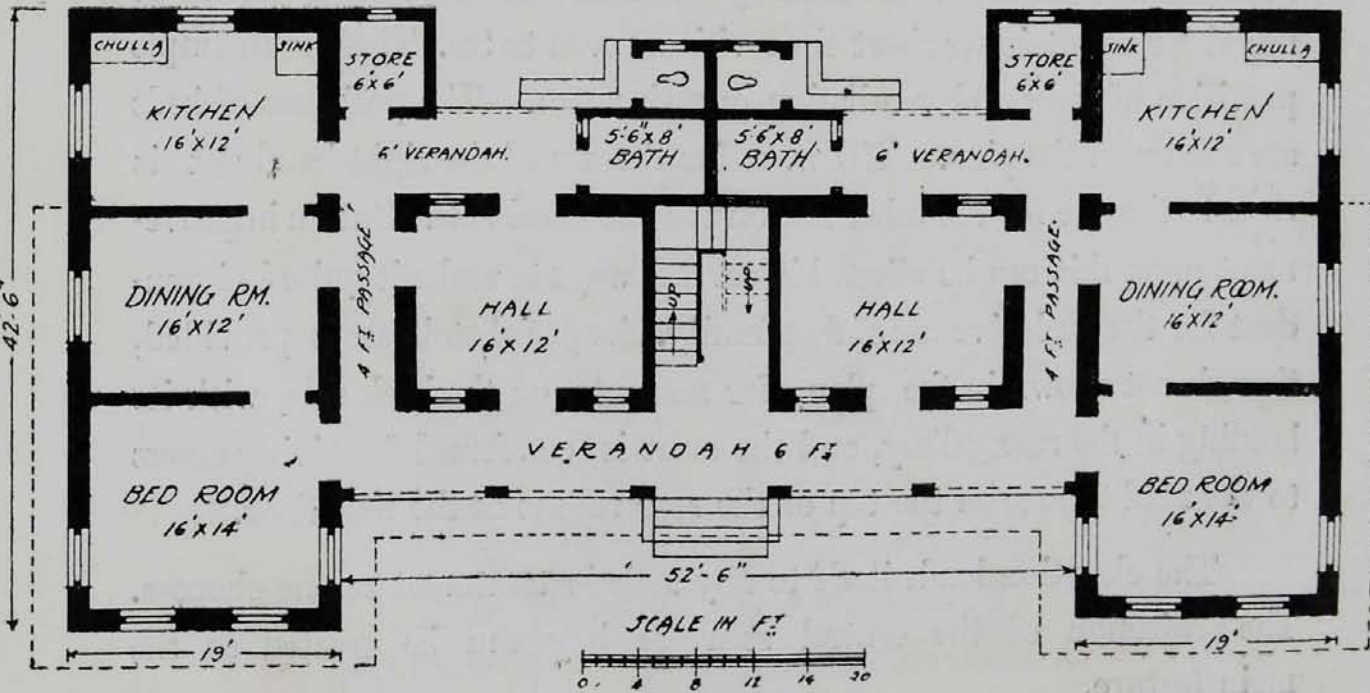


Fig. 230

Floor Area
3850 sq. ft.



Plan No. 87



Cost Rs. 16,000

It is a common experience that the occupants of large tenements use the property more carefully and also pay the rents regularly without grudge. But there is the risk of these large tenements remaining vacant, since there is a less demand for them than for smaller ones. The plan represented by the flats pictured on the opposite page solves this dilemma. Its special feature is that there are two flats on each floor — one of two rooms and the other of four rooms. Further, the grouping of the rooms is made in such a way, that if a family, belonging to a upper middle class, be forthcoming to occupy both these flats they could be easily combined in the manner shown on the plan of the first floor. Not only this, but if a still larger and richer family wants still more space, both the floors can be combined for the occupation of one such family. Thus, it is possible to entertain one, two, three or even four families in the building.

The building faces North and therefore, the rooms on the right hand side derive the full benefit of the western breeze. The verandahs in front of the flats, though small, are very valuable, particularly if the tenements are used by different families, as they would be useful for entertaining short time visitors even to tea. There is an ample provision of light and ventilation in each room. The positions of beds are shown on the plan. The w. c. for the use of the right hand flat is close to the one for the other flat on the left hand side. But an improvement upon this can be effected in several ways to make it quite independent for the exclusive use of that family. A special staircase is provided, though not shown in the plan, for servants, on the back side, with its landing in the rear gallery, and the same is continued for giving access to the roof terrace on the top of the rear rooms of the first floor.

The elevation lends itself to any artistic treatment as one chooses. The projection of the central staircase bay can be treated as the main feature.

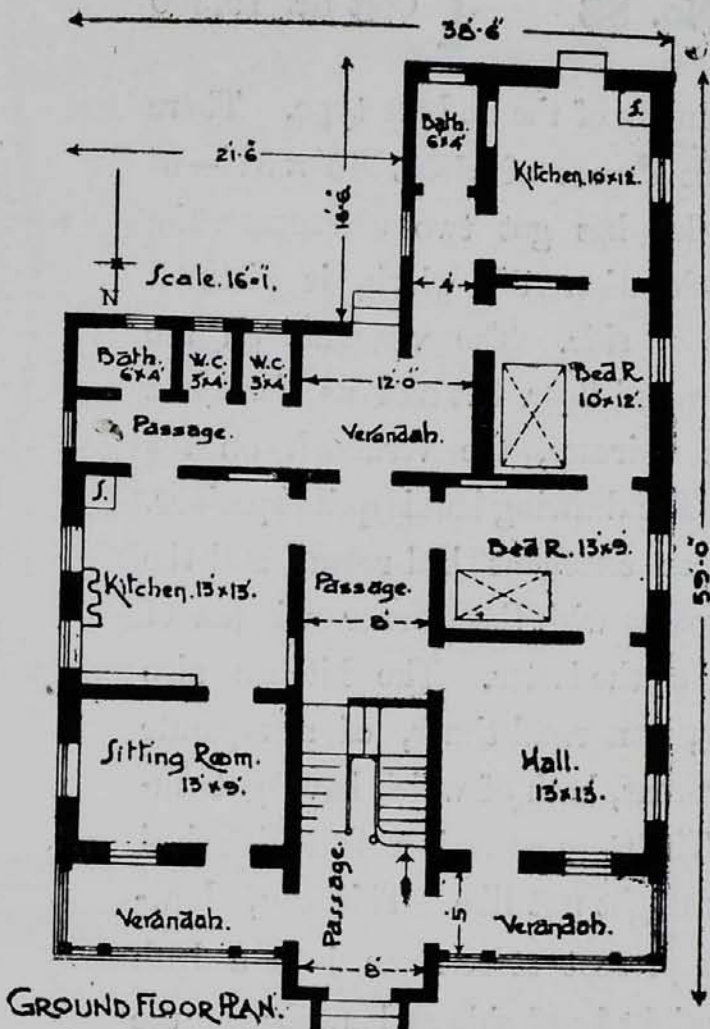


Fig. 231

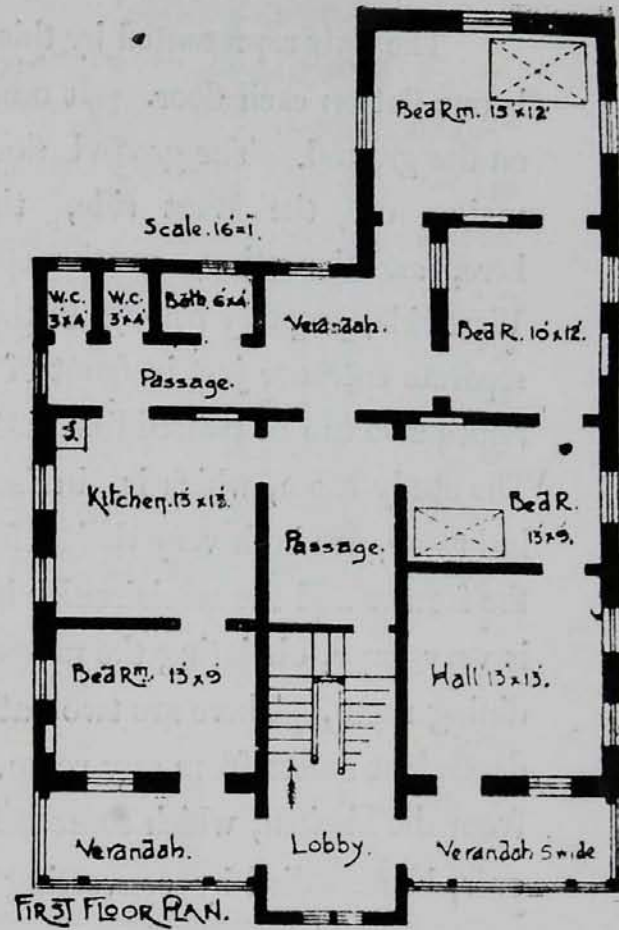
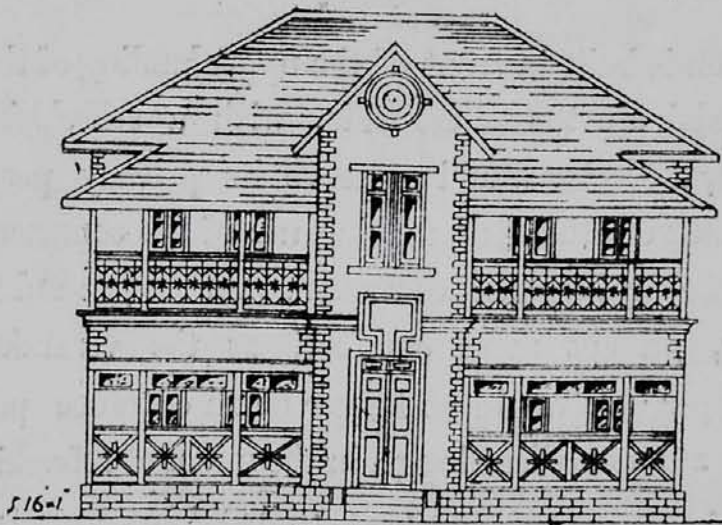


Fig. 232



FRONT ELEVATION.

Fig. 233

Floor Area. of three
Storeys. 4695 sq. ft.]

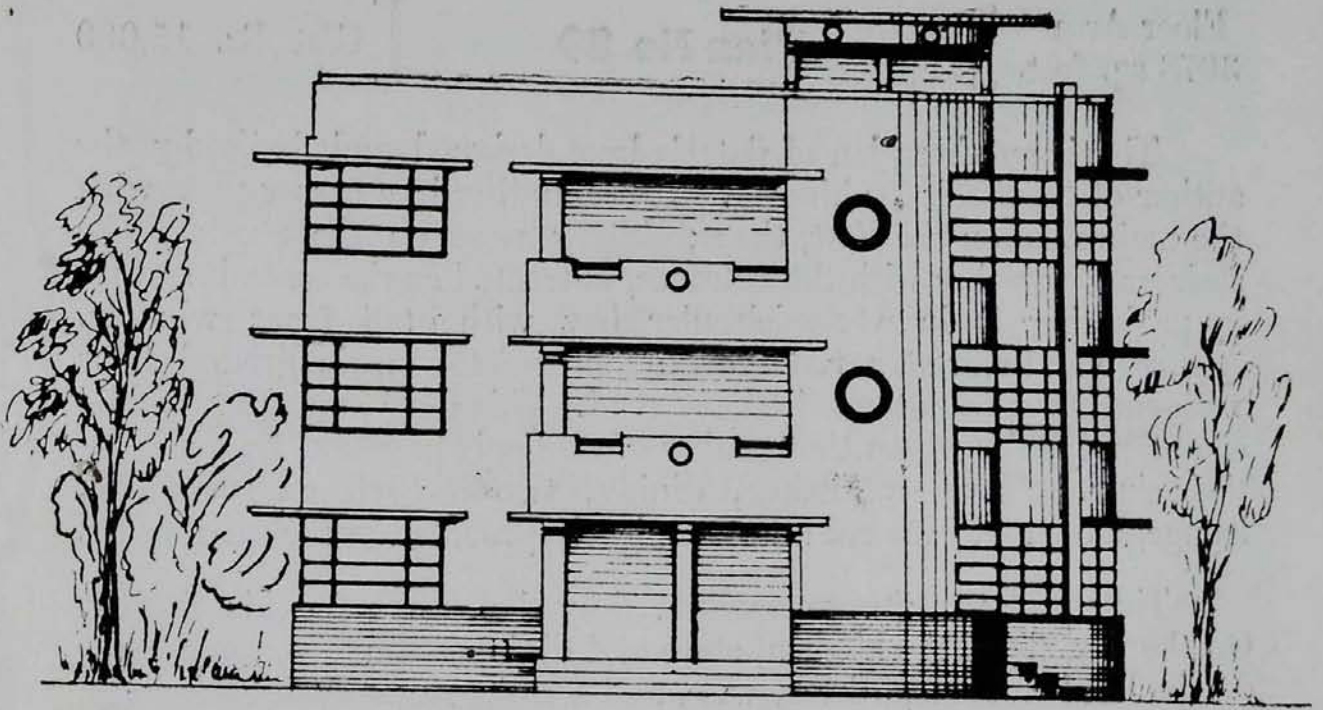
Plan No. 88

[Cost Rs. 19,300

The flats represented by this plan are of the de luxe type. There is one flat on each floor. It occupies a space of about $45' \times 31' - 6''$ on the ground. The ground floor flat has got two entrances—the main, on the West side, the elevation of which, is pictured here, and the other, on the staircase side. The verandah on the West side, properly belongs to the ground floor flat and as there is a separate entrance just in front of the staircase, the verandah on the South also can be treated like that. The drawing hall is quite spacious. The study room, which is, in fact, an excellent bed room, and the bed room, are both very delightful rooms with the corner window of the former and the semicircular bay of the latter. The kitchen also is very large, obviating the necessity, in normal times, of a separate dining room. There are two bath rooms, both of which have got independent access from any room. The store room is a little detached from the kitchen, which some ladies might not like. This can, however, be remedied by converting the present store room into a bath room, arranging a small w. c. on its right hand side and utilising the remaining large square space, for a store room, with an entrance from inside the kitchen. This would be a more compact arrangement and provide also a convenience with economy.

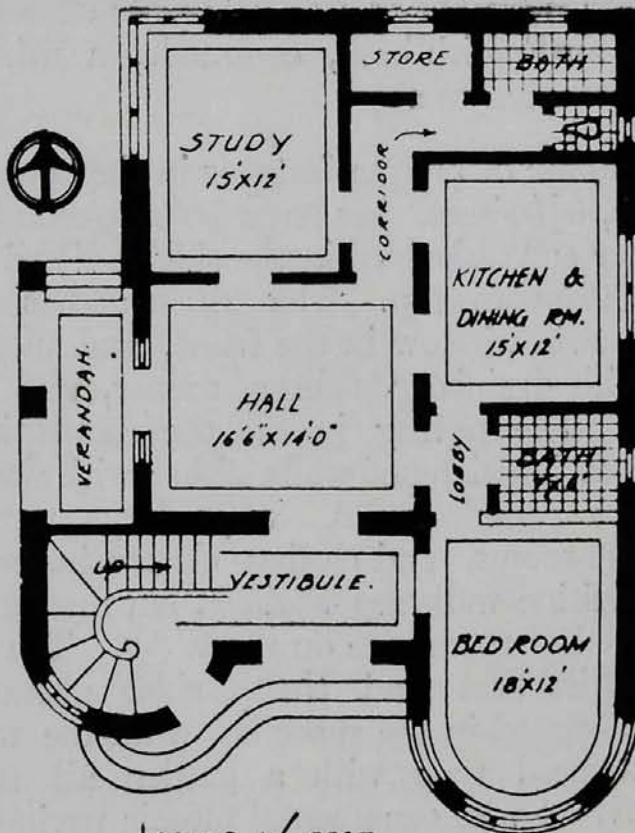
If a partition is built in front of the upper landing of the staircase, across the verandah on the West side, with a self-closing entrance door for the flat, the latter would preserve its privacy perfectly well from the occupants of other flats making use of the common staircase, and thus the same arrangement of rooms as on the ground floor would give equal, or, perhaps more comfort, as the verandahs on the West on the upper flats would no longer be an entrance passage, and therefore, serve as an excellent lounge, in the midst of refreshing breeze.

The elevation is modern and lends itself to any variations according to the choice and taste of the landlord.



WEST SIDE ELEVATION

Fig. 234



GROUND FLOOR

Fig. 235

Floor Area
3978 sq. feet.]

Plan No. 89

[Cost Rs. 15,000

This is another plan of flats-de-luxe designed and built by the author of this book for himself. It is standing in a corner plot with the main road on the East, the subsidiary road on the south. The staircase, together with the entrance, is treated as the central feature by projecting it in a semicircular bay with a tall front window. A garage and servant's room are accommodated on the ground floor with entrances from the subsidiary road. This floor is let to a middle class family, for whom the number of rooms is increased by reducing their sizes. Thus, a kitchen, dining, two bed rooms, veranda, lounge, store and bath are all conveniently provided in the small space.

The upper two floors are reserved by the owner for his family. On the first floor, the kitchen, store and dining room form one unit, on the left hand side, a bath, w. c. and a sink with a wash hand basin are arranged between the dining room and the staircase, and a ladies' room, drawing room and a lounge are accommodated in the remaining space.

The second floor is treated as a private suite of four bed rooms and a library, with an English bath, commode, a urinal and toilet room attached for common use.

There are a number of unique features in the house. The R. C. C. staircase $3\frac{1}{2}$ ft. wide, $6\frac{1}{2}$ " risers, has steps 18' at one and $4\frac{1}{2}$ " broad at the other, with outer end embedded in the side wall and the inner overhanging from bottom to top. The kitchen has chullas on a platform 2' high, a twin window in the front, and another on side, a glazed china sink with drainboards in a corner, and a number of cabinets all round. The paving in all the rooms is of polished slabs. All corners at junctions of walls, either with floors, or ceiling, or other walls are rounded. A very large number of wall cupboards in all the rooms, and clothes closets in bed rooms, are provided. The partition walls are 4" thick, but insulated against fire and sound. All the bed rooms are on the West. The lounge in all the floors has the entire East and North sides glazed. Additional wall cupboards are formed in the space below all the windows. The roof is of the flat terraced type with a garden all round and the enclosed space, provided with ornamental mosaic paving, serves either as an excellent lounge, or as a sleeping out place, or also as a dining place amidst refreshing breeze and most cheerful surroundings. Every room is full of sunshine both in the morning and evening. There is arrangement provided for excluding it in the evening in the summer.



Fig. 236

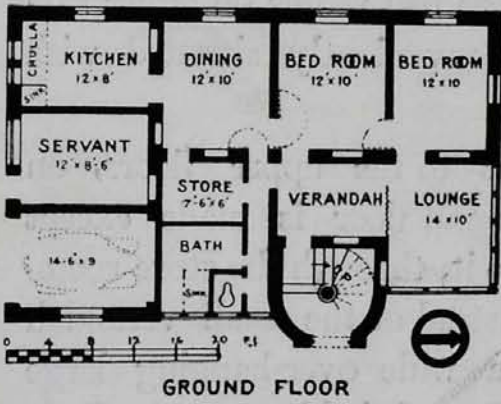


Fig. 237



Fig. 238

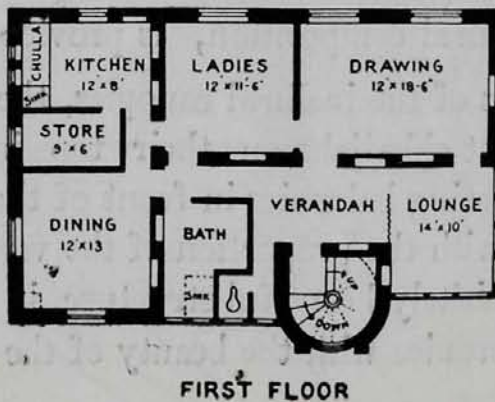


Fig. 239

Floor area of three
Storeys 4353 sq. feet.]

Plan No. 91

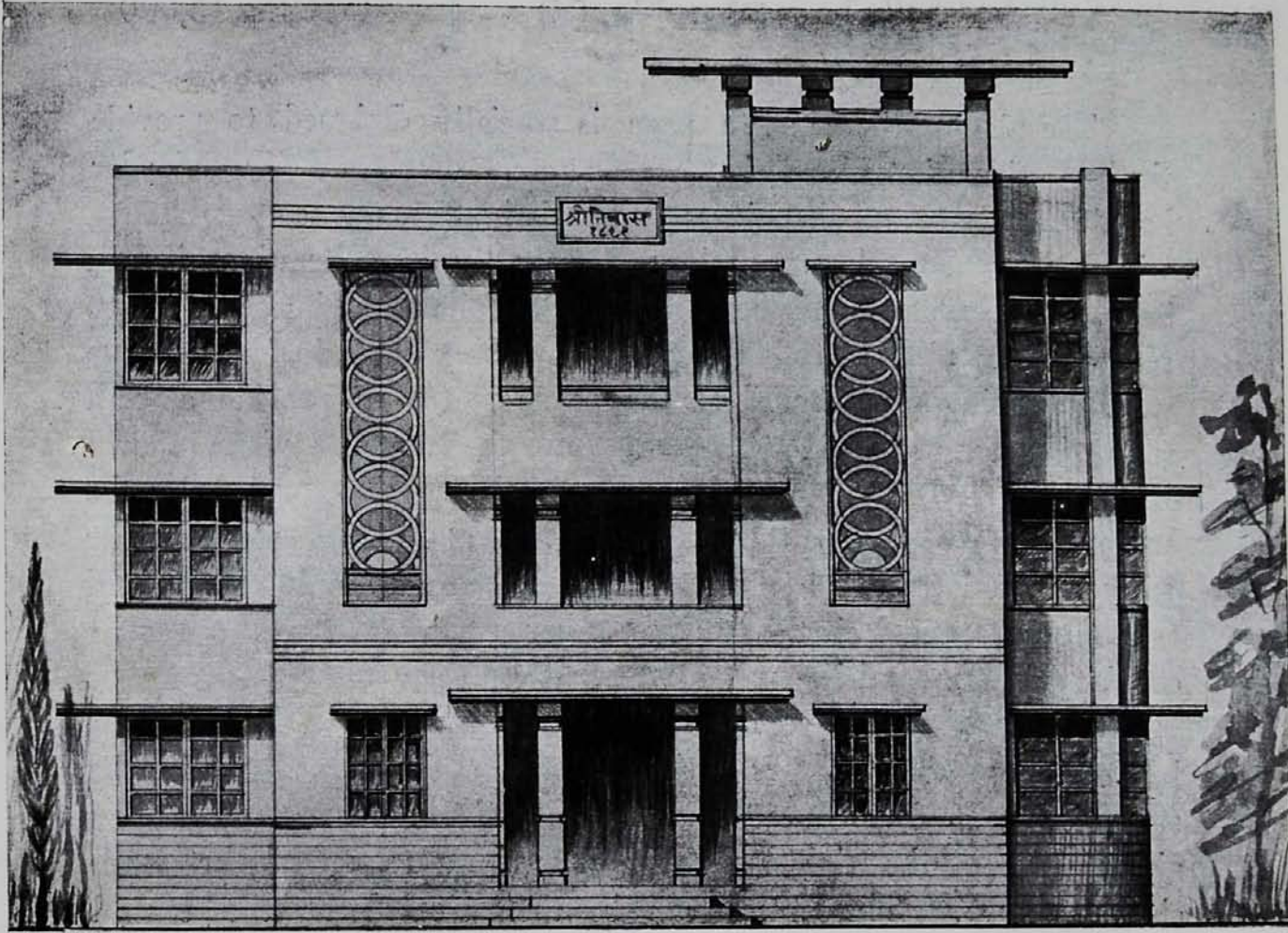
[Cost Rs. 19,500

This is a plan of flats intended for the occupation of a family belonging to the upper middle class. One flat for one family is arranged on each floor, but the arrangement is more convenient and suitable for one family occupying the whole building. There is a seven feet verandah in the front, but if different families occupy different floors, it loses its privacy, unless an independent door be provided through the opening on the right hand side of the main entrance, and the passage to the stair case is closed by means of a partition wall across the verandah. The drawing room occupies the central position and is of a good size, but the verandah beyond it does not serve any better purpose than that of a passage, for which, a corridor of even three or four feet width, would have sufficed. The bed room on the right hand side, with its semi-circular projecting window bay, is a charming room and the proximity of a bath and w. c. to it, makes it more valuable. The w. c. however, is facing the door in the dining room and therefore, to conceal it from the view, a self-closing half swing door, to close the bath and w. c. block, is necessary.

The architect has sought to bring about a symmetrical effect in the elevation by mutilating one fourth space of the ladies room and projecting a corner inside. This is strongly objectionable and has resulted in making the shape of the room awkward, and space, smaller and inconvenient. The room could have been made square within the same expense.

Another blemish in the plan is that the passage beyond the store room does not serve any useful purpose. If it had been included in the store room and an exit door, if necessary at all, in the kitchen, were provided in the corner of the store just opposite to the door between the kitchen and dining room, it would have given more useful space without increasing the cost.

On the upper floors the same general arrangement, as on the ground floor, has been made. The stair case is continued to give an access to the terraced roof. The elevation is graceful and imposing. Colorcrete rendering on the outside surface, with the bands on the surface in another contrasting colour, would further enhance the beauty.



WEST-SIDE ELEVATION

Fig. 242

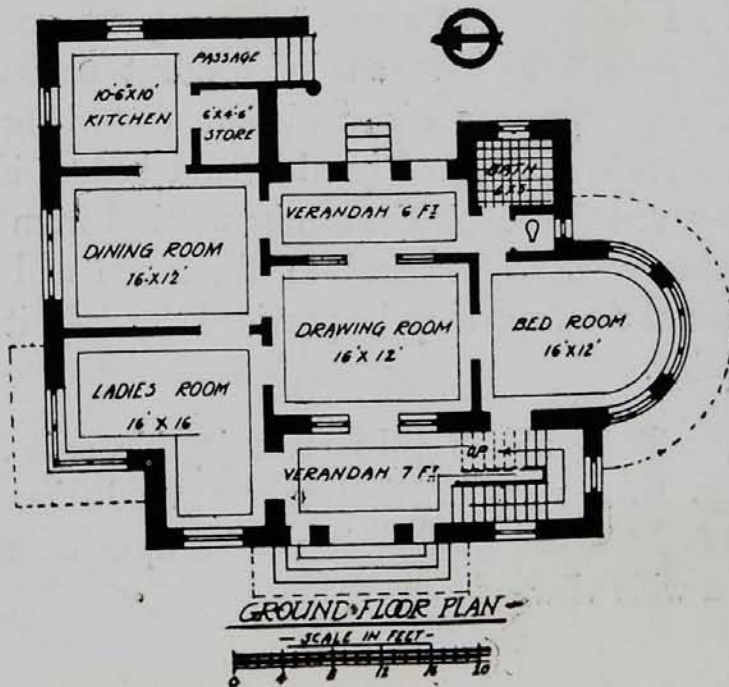


Fig. 243

Floor Area of two
Storeys 3475 sq. ft.]

Plan No. 92

[Cost Rs. 15,000

The plan on the opposite page is specially designed to provide the best orientation, circulation, privacy etc. — factors which make for health, comfort and happiness. It is designed as a cottage home, with bed rooms on the upper floor. But with some alterations it can be adopted also as equally comfortable flats, one on each floor. These alterations are: (a) to build a small washing place, in front of the w. c. adjoining the east wall of the garage, (b) to provide a bath room, in place of the right hand w. c. and the washing place, shown in the plan, (c) to locate the store in the space occupied by the present bath room, (d) to shift the kitchen and dining room further to the north, in place of the existing kitchen and dining room and (e) to convert the dining room into a bed room. Further, the stair case may be arranged in such a way as to leave a clear headway of $6\frac{1}{2}$ ft. below the landing, if an entrance to the upper flat is made by providing a door in place of the window on the right hand in the stair case room. This can be done by projecting the stair case bay about 4 ft. on the right hand side either in a rectangular or semi-circular form. The latter can be then treated as the central feature.

The plan faces the South, so that all the living rooms derive the benefit of the South-west breeze. The 8 ft. verandah in the front would be an excellent lounge. The drawing hall is open on three sides and is an independent room. The guest room is almost detached. The guests can have an independent access to the bath or the w. c. through the open *chowk* without disturbing the privacy of any room. The central paved yard would be an ideal place for children to play, and their activities can be watched from any room of the house. The garage is attached to the house and if necessary, a door in front of the w. c. may be provided to reach it from inside when it is raining.

The upper flat would be still more enjoyable, as it would provide greater privacy. Every room has the best cross ventilation, and if a room is built on the top of the garage, it will be open on all four sides commanding a wide view.

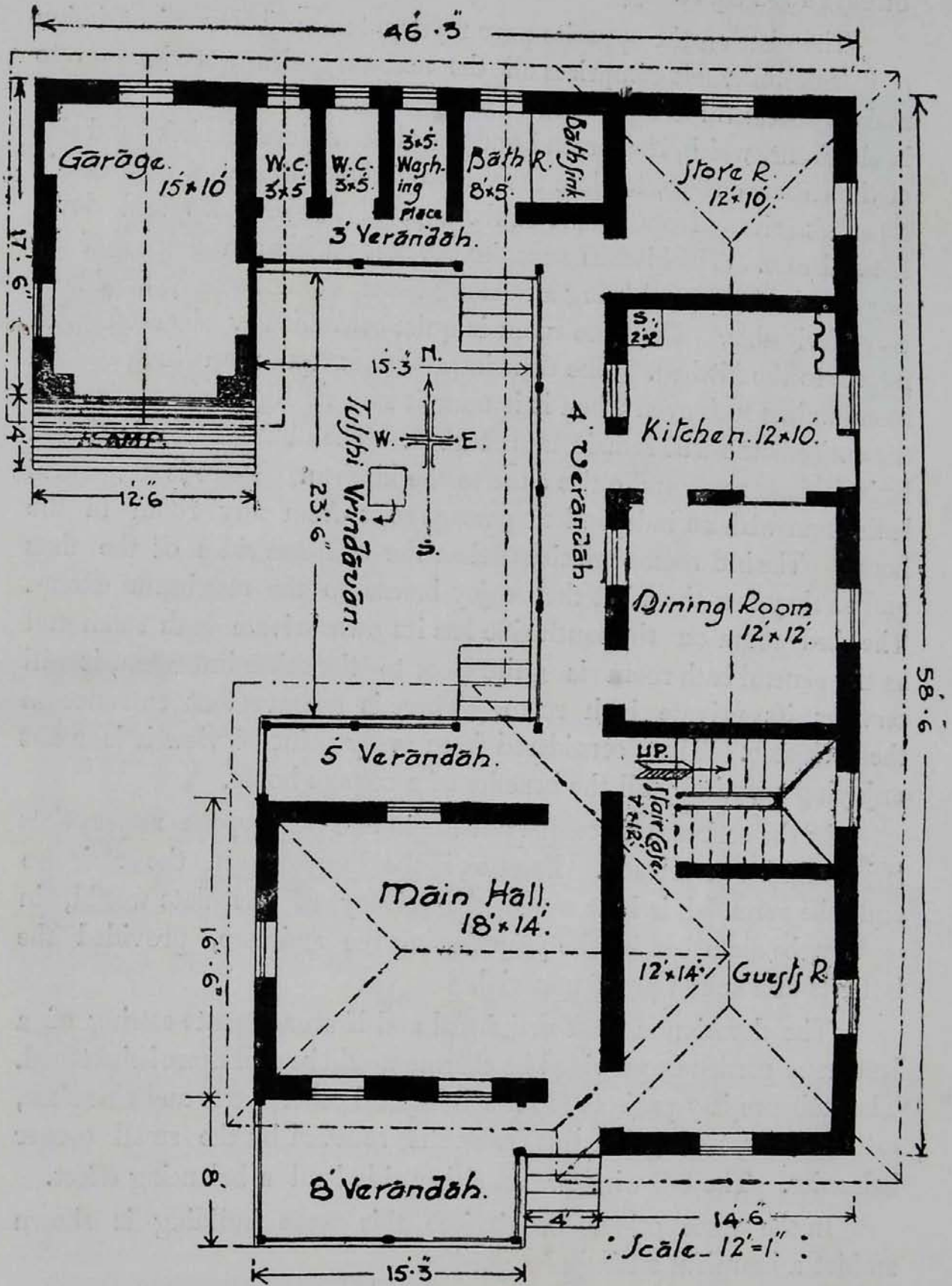


Fig. 244

: GROUND & 1st FLOOR PLAN. :

Floor Area of three
Stores 4602 sq. ft.]

Plan No. 93

[Cost Rs. 20,300

The plan on the opposite page represents a very convenient design of flats-de-luxe. It comprises all the necessary elements that go to make a successful design. There is a spacious verandah of 8 ft. width in the front, which, if a screen be arranged across it on the left hand side of the entrance steps, to close the view of the staircase, would obtain a perfect privacy from people of the upper flats going up and down the staircase. The kitchen occupies the best position in respect of the proper orientation and being an oblong room, though small, would be very serviceable. The store room is quite conveniently situated with respect to the kitchen. The drawing room is quite an independent room and as such even when it is occupied by strangers the privacy of the entire house will remain undisturbed. The dining room is also a large, oblong room and quite close to the kitchen. There is a general bath room with an independent passage to it from any room in the house. The bed rooms are situated at the extreme sides of the flats and as they face the West they enjoy breeze to the maximum extent. The bed room on the south side has its own private bath room and as the general bath room is quite close to the other bed room, it will serve as its private bath room. There is a convenient entrance on the back side. Thus, considered from every point of view it is a flat enjoying practically all the benefits of a cottage home.

As the staircase is on the outside in one corner, the upper flats enjoy still better privacy. Because, if the door between the staircase and the verandah is kept closed, the privacy of the flats would, in no way, be disturbed by the people using the staircase, provided the latter is of a sound proof material.

The elevation is most delightful and if an adequate setting of a landscape garden be provided its charms would be still more heightened. The staircase bay projects too much beyond other parts and therefore, catches the eye first, but this feature is relieved by the small corner balconies. The tall windows on either side lend a balancing effect.

In the three colour frontispiece this same building is shown amidst a beautiful setting of a garden.

Perhaps the only defect of the building is that there are too many corners which must necessarily increase the cost.

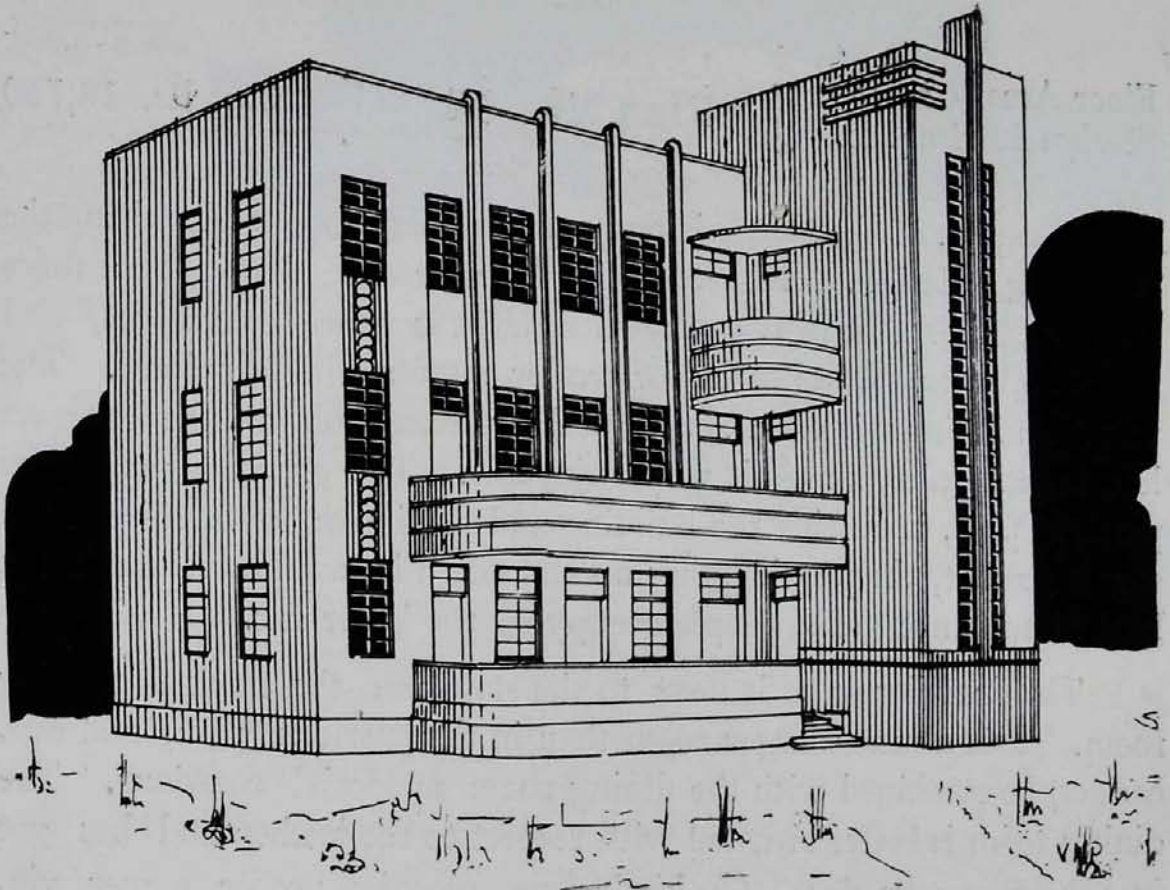


Fig. 245

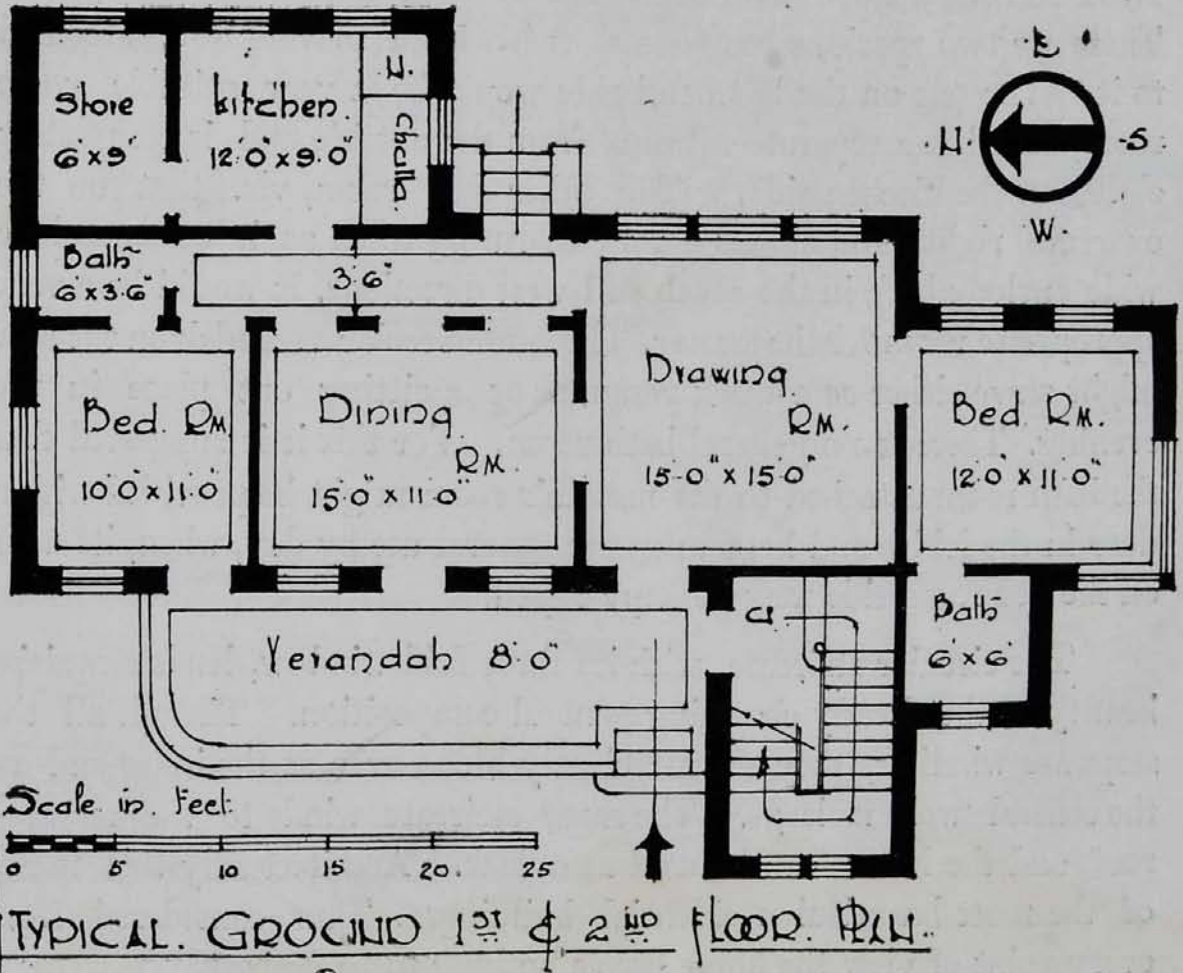


Fig. 246

Floor Area of two Storeys 4024 sq. ft.] **Plan No. 94** [Cost Rs. 18,750

The plan of these flats is on a more luxurious scale than the preceding design. Not only is every room larger and more spacious, but the general arrangement also is more convenient, and therefore, calculated to make for greater comfort and happiness. The verandah in front is ten ft. wide and its extension on the extreme left, in particular, makes it very enjoyable. The staircase, as in the previous plan, is outside the building and on its extreme right hand corner so that, the people going up and down it, would not cause the least disturbance to the people occupying the lower flat.

The drawing room is next to the staircase, the most advancing room. It is a much larger room than in the previous plan, and can, besides, be combined with the dining room on special occasions. The dining room is better situated with respect to the kitchen and has got just the necessary size. The kitchen occupies the proper corner viz. N. E. and has a store room connected to it in a convenient manner. There are two spacious bed rooms, each with a private bath attached to it. The one on the left hand side would be a very suitable guest room, as it has a separate entrance from the outside and is completely closed on the kitchen side. The other bed room, viz. that on the extreme right hand side is a very charming room as it commands a wide outlook both in the south and west directions. It would be a very appropriate room for the master. The semi-circular verandah on the rear might serve either as a work verandah or a sitting out place in the evening. There is no general bath room. For this it is suggested that the bath room attached to the master's room might be provided with a door in the lobby and kept open for general use by day, when, its door on the bed room side may be kept closed.

The circular staircase, with its three fold window, lends exquisite beauty to the already charming general composition. Though all the steps are winding, they are sufficiently broad even at the inner end as the central 'well' is large. The same staircase winds to the terraced roof, and the latter can be used as a deck. Architecturally this is one of the most beautiful residential buildings. Thus, considered from every point of view the home leaves nothing to be desired.

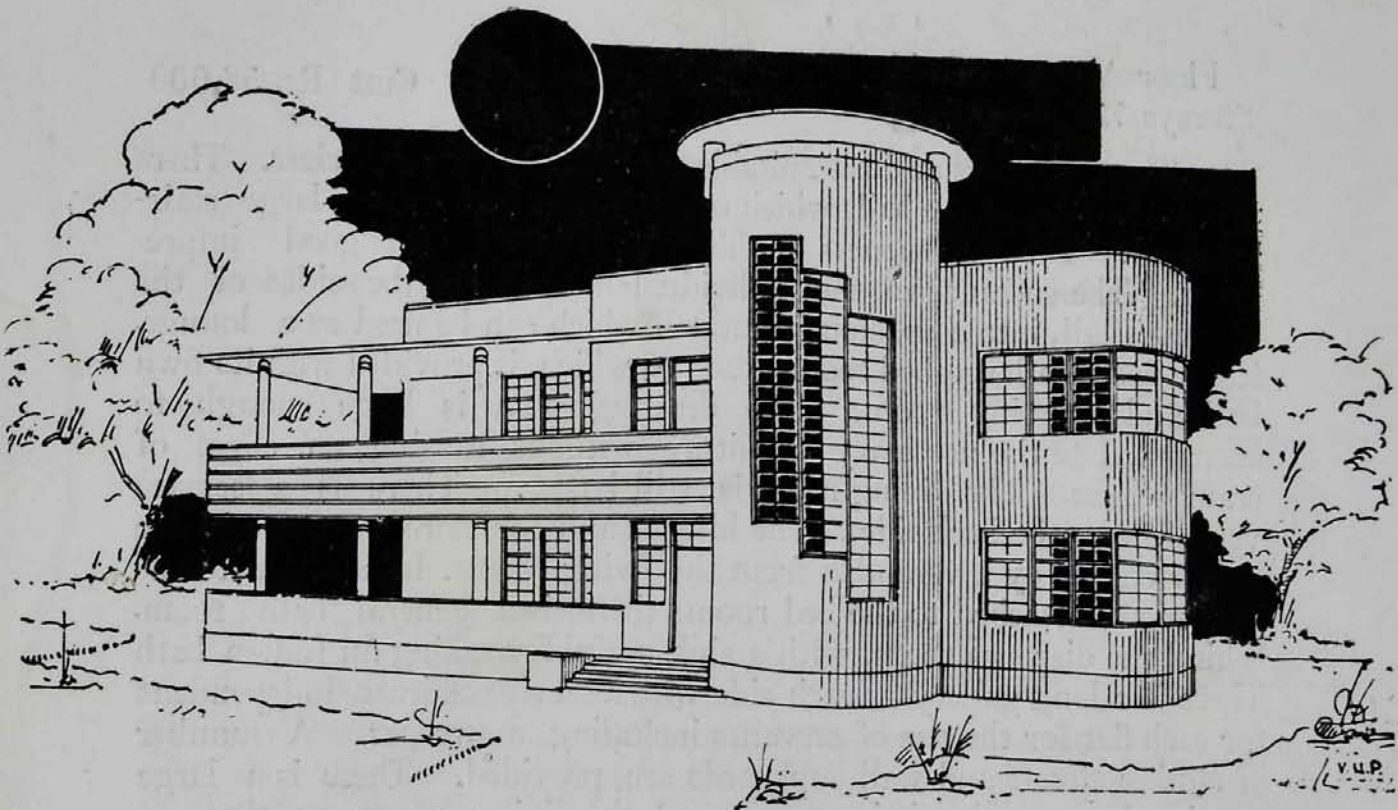


Fig. 247

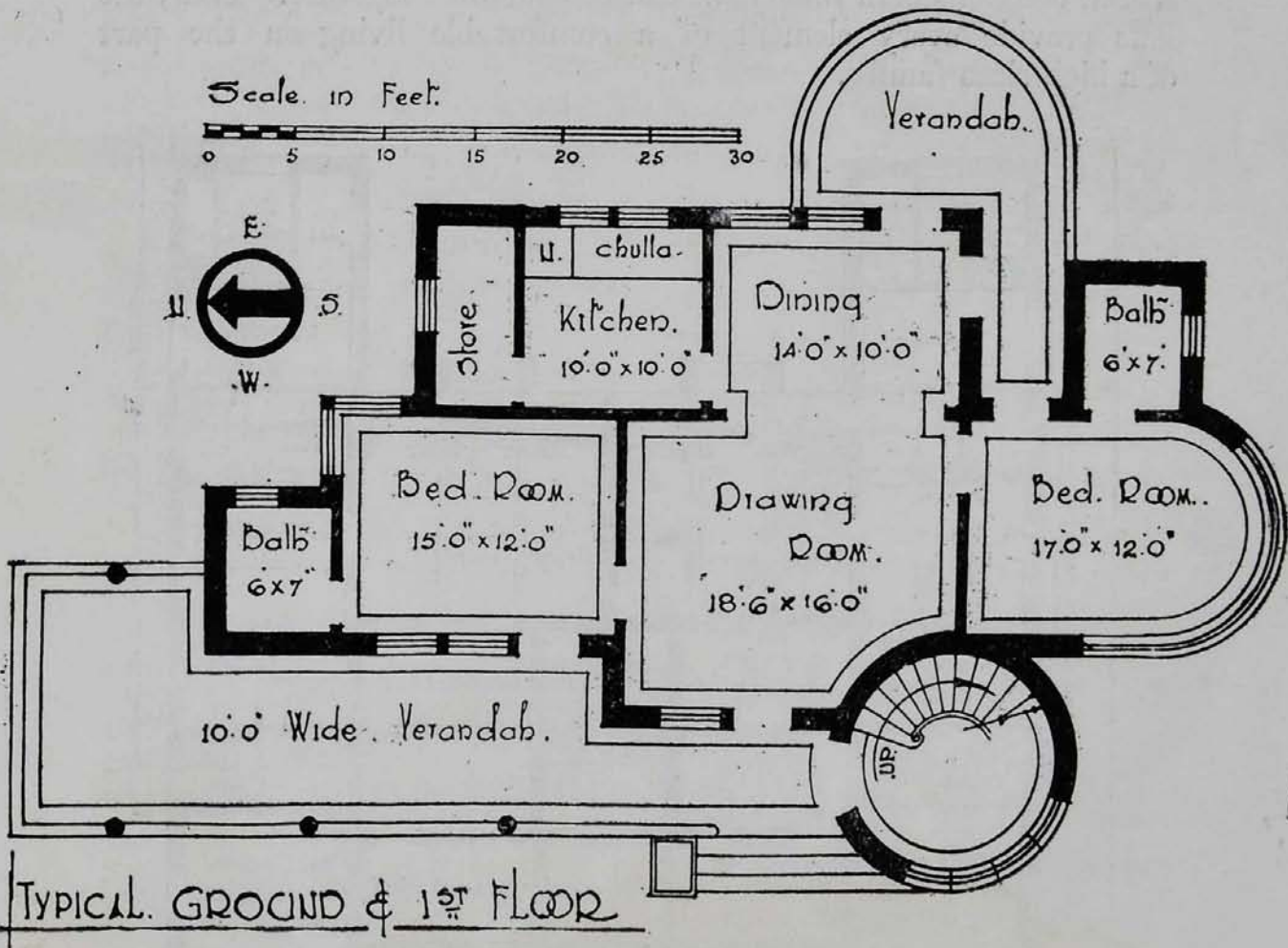


Fig. 248

Floor Area of two
Storeys 12500 sq. ft.]

Plan No. 95

[Cost Rs. 58,000

These are flats-de-luxe suitable for families of a rich class. There is a spacious entrance hall, which opens by an arch into a large staircase hall. The spaciousness of this hall creates a first good impression. The entrance to the individual flat is on the sides of the entrance hall, into a spacious verandah which can be used as a lounge. There are two large bed rooms, each of which, is provided with its own bath and dressing room. The drawing room is large enough to accommodate the necessary furniture without causing an effect of crampedness. The dining room is still larger. There is a service verandah on the back side. The kitchen and the store room are in one corner cut off by a verandah from the living rooms. In addition to the bath rooms attached to the bed rooms there is a general bath room behind the dispense room, with a sink useful for taking an Indian bath. There is a long gallery on each side with a service staircase independent for each flat for the use of servants including a sweeper. A number of clothes closets and wall cupboards are provided. There is a large opening between the sitting room and the dining room, so that on special occasions both these halls can be combined together. Thus, the flats provide every element of a comfortable living on the part of a high class family.

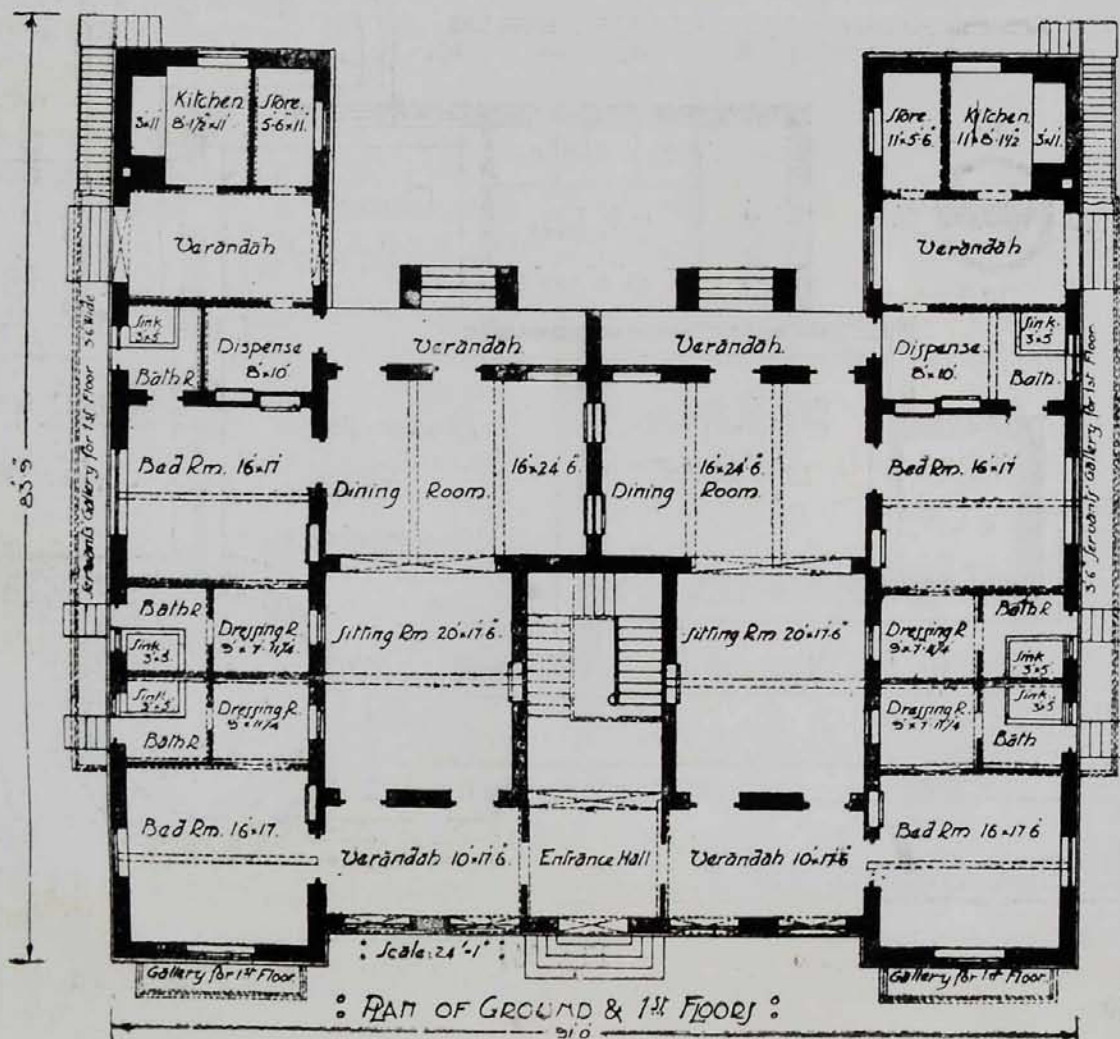


Fig. 249

INDEX

- Advantages of a square plan 13
do of rocky site 21
Aesthetic stair case 68
After noon tea—space for 40
Air bricks 52
Air conditioning 93, 115
Air cooling 68
Air washing 122
Air requirements of nursery 72
Allowance of air for furniture 52
Alterations in plan 18
Amenities of a nursery 72
Analysis of a home 42
Ancestral home—value of 1
Angle of vision 83
Ante room of comfort room 69
Appurtenances in a home 46
Arbour 84
Architect's service 13
Architecture modern 76
do must change with times 80
Aspect 29
Attic as a store room 59
- Bakelite 77, 92
Balancing effect in elevation 84
Balcony 47
Bamboo matting for insulation 114
Bath room 45, 64
do in bed room 53
Bay windows 18, 31, 32, 85
Bed room—condition of—in Indian
homes of the poor 51—orientation
of 9, 52—windows in 52
Behren 16
Bicycles storage 59, 61
Bird rest 89
Breeze 26
Built—in wall cupboard 53, 92
Bulky storage 60
Busy street not good for home 22
- Cabinets in kitchen 55
do in store 61
Cantilever canopy 120
Carbonic acid gas 3
- Causes of exodus from villages 5
do of low vitality 51
Cellar as store 59
Central system of air cooling 120
Cesspool 21
Chawl 266
Cheerful surroundings 82
Chesterfield chair 76
Chest of drawers 53
Child play 39, 43
Choice of cottages 5
Chowk 268
Chromium 77
Circulation 29, 46
Clayey site 21
Cleanliness 34
Clock 56
Closet 44, 53, 61, 136, 142, 148
Coat hanger 62, 63
Colour—psychological effect of 95
—effect on radiation, 114—cold and
warm 106,—depends upon light 105
—recommendations of, in different
rooms 109—schemes 104—schemes
based on harmony 101—Schemes
in ancient India 106
Colorcrete 77
Colour chart 98
Coloured birds in tropics 105
Coloured pictures in nursery 72
Comfort 31—room 68
Concentration of mind 44
Concrete flower boxes 44
Concrete jali 184
Conservatory 94, 248
Cooking range 55
Cooling by ice 127—by night air 119
effect by trees 21
Co-operative movement 5
Copying nature 79
Corbusier Le 7
Corners in plan, too many 18
Cornice 50
Cost depends on shape, 13—on local
materials 16—a season of work
17—of homes 8, 128—of labour 9, of
materials 10
Cross ventilation 52

- Courtyard 130, 132, 296
 Counsel of wife 3
 Cupboards 43--built in walls 53, 84,
 61, 92--underground 58, 62

 Dado in drawing room 50--in
 nursery 72
 Davenport 70
 Decoration 95--of new house 105
 Dead storage 61
 Defective drain 21
 Development Department Bombay 5
 Devices for automatic opening of
 garage 74
 Dining 42--table 92--in the open
 air 58
 Direction of wind 52
 Discomfort--causes of 21
 Discord in colour 97, 101--effect of
 102
 Disposal of solid and liquid refuse 35
 Distance of building from Street 83
 Division of labour 16
 Doors in drawing room 49--in kit-
 chen 57
 Double drawing room 50
 Drainage facilities of site 21
 Drain boards 53
 Drawing room 49--size 50
 Dressing room 52
 Drying court 45, 85, 152
 Drying line 85
 do linen 57
 do yard 85
 Dudock 76
 Dust 35, 83, 116

 Earth closet 35
 Economy 13
 Effect of colour on mind 94, 95
 do of discord 102
 Embellishment 4
 Enclosed area looks small 83
 Entrance 45, 84
 Environments mould character 94, 82
 Equipment of kitchen 56,--dining
 room 57--bath 65 73,--nursery 71
 Esprit Moderne 78
 Estimate of home necessary 13
 Evaporation from body surface 21,
 115
 Excess over estimate 2, 3

 Facing of buildings 26
 Fencing 87
 Ferro-concrete 77
 Filtering air 116
 Fire proof garage 74
 do stair case 68, 269
 Flat roof 18, 77
 Flats 21, 266
 Flexibility in a home 29, 33, 38
 Flies--nuisance of 54
 Floor in kitchen 92
 Flower beds 88
 Folding partition 146, 158, 172, 190
 Fountain 89
 Freehold site 23
 Front yard--treatment of 83
 Fuel room 44, 59
 Functionalism 78
 Furniture in nursery 72, 91
 Furniture requirements 29, 33
 do in modern architecture 81
 Furnishing 91

 Gangway for serving food 92
 Garge 74
 do inside home 74, 85, 186
 do--placement of 85
 Garbage bin 56
 Gas cooking and plants 74
 Geometrical stair case 68
 Glass in building and furniture 77,
 92
 Good planning 4
 Grass matting for insulation 119
 Gravelly site 21
 Grille w. i. 202
 Gropious 7, 78
 Grouping 29, 32, 46
 Guest room 45, 70

 Handicrafts 44
 Harmony 95, 97, 98
 Hatstand 61
 Hedge 86
 Height of floor 78
 do of walls--apparent increase
 in 107
 High plinth 15
 Hobbies 44--shop 70
 Home in centre of plot 84
 Honey comb 4

- Horizontal angle of vision 83
 House should be growing 41
 Hue 96
 Humidity 26
 Humus 35
- Improvement of orthodox kitchen 110
 Importance of bed room 50
 do of sunshine 25
 Ingle nook 18
 Inflation of rent 5
 Insulation from heat 110
 do from sound 124
 Introduction 1
 Instinct of building home 1
 Investment 20, 267
- Japanese house 53
 Junctions of walls with floor 92
- Kiln 22
 Kitchen 54—size of 54—equipment of 56—smells in 57
- Labour saving 31
 Landscape garden 82, 204, 216
 Larder 43, 54
 Ladies apartment 58
 Lavatory basin 73
 Lawn 86
 Le Corbusier 76
 Library 188
 Light—importance of 54
 do in colour scheme 105
 Local materials 16
 Loft for store 58
 do on garage 62, 75
 do about bath room 64
 Law building—remedy for 84
 Lumber room 44, 59
 Lying—in room 58
- Main entrance—position of 84
 Maintenance cost 83
 Maistry 2
 Masonry box 2
 Meals—hurried of children 39
 Minimum size of drawing room 49
 Mirror type insulation 113
- Modern Architecture 76, 81
 do trend in colour 10
 do in landscaping 82
 do kitchen in West 56
 Morning sun 25
 Morning tea 42
 Mosholu Parkway 42
 Mouldings 36, 50
 Movement of air 37
- Needlework 44
 New Materials 77
 Nhani traps 56, 65
 Nuisance of flies 22
 Nursery 58
 North light 106
- Oblong kitchens better 54
 Orientation 24,—aim of 25—of kitchen 50,—bed room 52
 Outer thick wall 16
 Outdoor dining 58
 Oud 7
 Oven 56
- Pantry 43, 62
 Partition 15
 do folding 146, 172
 Parties 42
 Pegs 50
 Pergola 89
 Percentage cost of labour 9
 Perspiration—causes of 21, 115
 Physical features of site 21
 Picture rail 50
Pise de terre 114
 Plants in room 93
 do—selection of 87
 Plantation about building 87
 Play room for children 172
 Plinth area rate 8
 do height of 15
 Plywood 72
 Polished paving in bath 65
 Pool 89
 Position of store 59—of stair case 68, of kitchen 56
 Practical conveniences 21
 do considerations 29, 40

- Prayer room 63
 Prevention of flies 54
 Primary colours 98
 Privacy 29, 36, 83—of bath 73 of sound
 30, 125
 Prospect 29, 31
 Provision store 43
 Purpose of landscaping 82
- Racks 56
 Radiation of heat 24, 114
 Radio city 124
 Radio—listening to—space for 44
 Refrigerator 56
 Refrigerant 121, 123
 Railway—proximity to 23
 R. C. C. construction 128
 Reception room 45
 Recreation 44
 Requirements of good planning 4
 do of nursery 58
 do of comfort room 59
 do of guest room 70
 Rise and tread—relation of 21
 Rocky site 21
 Rockefeller centre 124
 Roof terrace 68
 Roominess 29, 32
 Rough cost 9
 Rules of design of bedroom 53
- Salty water and roofing iron
 Sheets 22
 Sandy surface 21
 Sanitary fittings 73
 Sanitation 29, 34
 Sanitary consideration of site 22
 Saraswat Brahmin Colony 5
Saree catching fire—remedy for 55
 Scullery 54, 55
 School near home site 23
 Seat in garden 89
 Season of building work 17
 Sea breeze 21
 Seclusion 31—in prayer room 63
 Selection of site 20
 Service stair case 242, 248, 269
 Setting round building 82
 Shade of trees 97
 Shady trees 84
 Shams in architecture 93
- Shelves in kitchen 54, 57
 " in store 59
 Shrubbery 87
 Sick room 53
 Sink in kitchen 56—in bath 64
 Site on reclaimed ground 22
 Skirting 50
 Sleeping—space for 43
 Smells in kitchen 57
 Smoke outlet 55, 56—in bath 65
 Smoke—effect of on plants 94
 Soft murum foundations 21
 Soil conditions of site 21
 Sound—proofing 124
 Specification 16—of ideal home 126
 Speculative builders 20
 Statues in garden 89
 Stair case 66—requirements of 66—
 fire proof 68, 269
 Stainless steel 77, 93
 Standardisation reduces costs 17
 Steel wool 122
 Stock sizes 19
 Storage 43—space in bed rooms 53
 Store room 58
 Storing bicycles 59, 61
 Storied house cheaper 14
 String course 84
 Study 43
 Stuffiness 27
 Sultriness 27
 Subsoil water 21
 Suggestions for economy 13
 Summer air conditioning 117
 Summer house 89
 Sun dial 89
 Sun's rays 25, 30, 95
 Supply of drinking water 22
 Symmetry in architecture 79, 84
- Table—dining 92
 Tall building—remedy for 84
 Tall trees 22
 Tanneries 22
 Temperature affects comfort 37
 Terrace 86
 Toileting 45
 Toilet room 72
 Trays of wire for vegetables 56
 Tree for shade 84
 Trellis work 33

- Under ground cupboard 58
- Undeveloped localities 20
- Uneven settlement of funds 22
- Unit system of air conditioning 120
- Urine—reaction of—on lime 65
- Urinal 45
- Uses of dining room 57
- Utility 82

- Valuables 60
- Vegetable garden 89
- Ventilation 36
- Venetian blinds 93
- Verandah on S. W. 26, 47
 - do width of 47
- Vertical angle of vision 83
- Victor Bourgeois 163
- Vitamins in fresh vegetables 90

- Walks and drives 84, 86, 88
- Wall construction in western countries 111
- Wall cupboards below windows 52
 - „ in kitchen 54, 61
- Wardrobes 92
- Water closet 45, 72—inside bath room 16
- Western kitchen 54
- White washing for insulation 144
- Windows in kitchen 54—in
 - do in stair case—air conditioned rooms 93
- Window area minimum 52
 - do sills as flower boxes 71,94
- Wright Frank Lloyd 76
- Worship room 63