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CENTRAL HOUSING ADVISORY
COMMITTEE

DESIGN OF DWELLINGS

REPORT OF THE
DESIGN OF DWELLINGS SUB-COMMITTEE
OF THE CENTRAL HOUSING ADVISORY COMMITTEE
APPOINTED BY THE MINISTER OF HEALTH

and

REPORT OF A STUDY GROUP OF THE
MINISTRY OF TOWN AND COUNTRY PLANNING
ON SITE PLANNING AND LAYOUT
IN RELATION TO HOUSING

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INTRODUCTION

TERMS OF REFERENCE

1. We were appointed at the meeting of the Central Housing Advisory Committee on the 20th March, 1942, with the following terms of reference:

“To make recommendations as to the design, planning, layout, standards of construction and equipment of dwellings for the people throughout the country.”

2. Our terms of reference would justify an examination of the whole field of housing. We have decided, however, to confine our consideration to the types of permanent dwelling commonly built by local authorities, bearing in mind that their present powers under Part V of the Housing Act, 1936, are restricted to the provision of dwellings for the working classes. Nevertheless, the standards we recommend are equally applicable to all types of housing, and we feel that steps should be taken to ensure that development by private enterprise does not fall below them. We have not considered standards of temporary construction as we regard it as outside the scope of our inquiry and the subject has been considered by another Sub-Committee.

3. In considering one section of our terms of reference—namely layout—we have entered on a wider field. Here we suggest means for the erection of complete communities rather than the development of purely residential estates for a single social class. The creation of such communities depends for its success upon the collaboration of all types of enterprise, both public and private, working towards a common goal.

METHOD OF INQUIRY

4. In view of the close relationship between the layout of residential areas and town planning, we approached the Minister of Town and Country Planning who set up a special study group to assist us in the examination of this matter. Two of our members served on this group and we are indebted to the Minister for permission to reproduce their report with which, so far as it concerns the subjects of our inquiry, we are in general agreement.

5. We have had regard to the researches of the study groups of the Post-War Building Directorate of the Ministry of Works, and have consulted the Inter-departmental Committee on House Construction under the chairmanship of Sir George Burt. We have also had a joint discussion with the Sub-Committee on the Design of Dwellings appointed by the Scottish Housing Advisory Committee, which revealed a striking similarity of views on the subject.

6. Evidence has reached us from a large number of local authorities, local government organizations, professional and voluntary bodies (particularly women's organizations), and individuals with a special knowledge of housing. A list of the bodies and persons who have submitted evidence is given in Appendix IV. We have held twelve meetings to consider this evidence and prepare our report. Some of our members have also inspected examples of special types of accommodation, so that we might have first-hand knowledge of the more recent experiments in working-class housing.

7. We take this opportunity of thanking all who have so generously contributed of their time, knowledge, and experience to assist our investigation, and we also thank the many individual members of the general public who made suggestions.

8. Our report is divided into two parts, the first setting out our general recommendations and the grounds on which they are based, and the second containing detailed technical notes on the way in which we think these recommendations could best be carried into effect.

DESIGN OF DWELLINGS

PART I

RECOMMENDATIONS AND REASONS

I. GENERAL PRINCIPLES

INTER-WAR DEVELOPMENTS

9. The design, planning, layout, standards of construction and equipment of the houses built by local authorities in the inter-war period were based largely on the recommendations of the committee under the chairmanship of Sir John Tudor Walters, which reported in 1918. This report, which is a landmark in the history of building small houses, exhaustively reviewed every aspect of house-building and layout, and set standards which were higher than those sometimes observed in practice—especially during the “economy” drive of 1931. Many of the recommendations in the Tudor Walters Report hold good to-day. In the twenty-five years which have since elapsed there have, however, been developments which were not foreseen by the Tudor Walters Committee, including changes in our national habits and ways of life. The country has had twenty-five years of experience in the actual building of small houses on an unprecedented scale and is now on the threshold of a further immense housing programme. Therefore it is both timely and necessary that the subject should again be examined.

POST-WAR PROGRAMME

10. We understand that the Government contemplate a housing programme of between three and four million houses to be built in the ten to twelve years following the present war. This would entail doubling the rate of building during the interval between the wars, when four million houses were built in twenty years—approximately three millions by private enterprise and one million by local authorities. We contemplate that in the post-war housing programme the proportion of houses built by local authorities may be larger, and that these authorities may be called upon to build up to two million houses during the first decade.

CHANGES OF OUTLOOK AND HABIT BETWEEN THE WARS

11. The Tudor Walters Committee assumed that the total number of houses built by local authorities would probably not exceed two hundred thousand. The type of layout advocated for development on this relatively small scale was the extension of existing communities by small estates of municipal houses. In fact, however, local authorities have already built five times the number of houses contemplated by the Tudor Walters Committee, with the result that too often the development of municipal housing estates has become distorted, and there has emerged a new conception of planning which involves the creation of independent or semi-independent mixed social communities provided with all the industrial, social and other activities and amenities on which community life depends. These matters are dealt with in detail in the report of the Study Group of the Ministry of Town and Country Planning.

12. At the same time there have been changes of outlook and habit affecting the design and the equipment of the houses themselves. The last quarter of a century has seen a steady rise in the general standard of living and a growing desire for and appreciation of good housing—in particular, of convenient domestic arrangements and labour-saving fittings. We expect this tendency to continue after the war. The Government's post-war proposals envisage a wide extension of education and a fuller measure of social security. Housing will be expected to keep abreast of

progress in these fields. Moreover, the experience gained by the vast number of women now in industry and in the services will influence their attitude to housing ; for war-time factories and hostels often provide high standards of services and equipment, which will make such women intolerant of inferior conditions in their own homes. In the same way, both men and women have become conscious during the war of the potentialities of modern scientific developments and will expect to enjoy the benefit of these discoveries at home.

13. Finally, the wide extension of public services between the wars, e.g., piped water, electricity and gas, has wrought changes in our domestic habits, particularly as regards appliances for cooking and the selection and planning of the room in which it is to be done. As the internal planning of small dwellings is very largely dependent on the arrangements for cooking, this factor has an important influence on design.

WOMEN ON HOUSING COMMITTEES

14. It is in our view of the greatest importance that, in designing and equipping dwellings, account should be taken of the way in which a house is run and the use which is made of the various rooms. In this matter the housewife is the expert and local authorities should have constant regard to her views. We find that she is still inadequately represented on many local authorities, and we should like to see a much fuller use by local authorities of their powers under Section 85 of the Local Government Act, 1933, to co-opt suitable women to their Housing Committees.

DESIGN

15. Before we discuss in detail the various aspects of our terms of reference, there is one matter of paramount importance which affects them all—namely, good design.

16. Good design implies good layout, good internal arrangement, good equipment and good appearance. It is lack of design that has produced so much dreary and monotonous development in the past. Our evidence shows a widespread, if rather inarticulate, dissatisfaction with this state of affairs and an innate desire for well-ordered and pleasant surroundings.

17. Design is the function of the architect. In the past too little use has been made of trained architects in the planning and design of housing estates in spite of the fact that we have now a school of modern domestic architecture which can hold its own with the work of any other country. This is an outstanding national asset and we must ensure that the fullest advantage is taken of it.

18. The first step is to ensure that local authorities shall not lack architectural advice. We therefore recommend that, in the absence of special circumstances, the Minister of Health should require all local authorities to employ a trained architect in connection with their housing schemes.

19. Whilst it must be left to local authorities to decide whether their housing schemes are to be carried out by their own architects, by architects in private practice, or as the result of public competition, we desire to emphasize the advantages of all these methods being employed.

20. We also recommend that the Minister of Health, in co-operation with any other Ministers concerned, should prepare a manual of illustrative type plans for the assistance of local authorities and their architects. While such plans need not be copied literally, they can be of great assistance by indicating some of the ways in which the required accommodation may be arranged.

21. Too often in the past the most that was hoped for of a Council housing estate was that it should be "unobtrusive." We hope that in future local authorities will set out with the intention of adding positively to the beauties of the town and countryside.

II. LAYOUT

22. Many serious mistakes were made in the planning and layout of housing estates during the inter-war period. Foremost amongst these were the following :

- (a) The development of large estates in which private and municipal housing are conspicuously separated.
- (b) Insufficient attention to the provision of churches, schools, club buildings, shops, open spaces and other amenities.
- (c) The location of residential estates too far from the tenants' places of employment, thus involving long and expensive journeys to work.
- (d) Too rigid an interpretation of density zoning, resulting in insufficient variety of types of dwelling and in a lack of smaller open spaces and play-grounds.
- (e) Failure to appreciate the value to a neighbourhood of good design, applied not only to the houses themselves but to their setting.

23. These problems are bound up with issues that lie outside our terms of reference, such as national planning, industrial location, restriction of the over-growth of cities, and the protection of agriculture, and we therefore asked the Minister of Town and Country Planning to institute a special study of the subject of layout. We believe that the recommendations of the Study Group reproduced with this report will, if adopted, go far to avoid a repetition of former errors.

III. DWELLINGS IN GENERAL

24. We deal in this section with factors common to all types of municipal dwellings. Factors peculiar to special types, e.g., rural cottages or flats, are discussed in the sections dealing with these types. Defects in equipment and storage are dealt with in Section XII.

PRINCIPAL DEFECTS IN EXISTING COUNCIL HOUSES

25. The following are the principal defects of the accommodation provided between the wars, all of which were reflected in the evidence :—

- (1) There was a lack of variety in the type of dwelling provided.
- (2) The living accommodation was too cramped, and sometimes ill-adapted to the present ways of living.
- (3) The outbuildings were inadequate, shoddy and badly placed.

POINTS MADE IN EVIDENCE

26. The lack of variety of types of dwelling was the cause of many complaints. It was suggested that inadequate provision had been made for large families, old people, childless couples and single persons—particularly single women. This was alleged to be the main reason why elderly couples so often cling to a modern Council house after their children have left home and they no longer need so much accommodation. An investigation carried out on a housing estate near London in 1931 showed that nearly half the families consisting of three persons or less were occupying dwellings containing four rooms or more owing to the lack of smaller dwellings in the neighbourhood.

27. Inadequate living space gave rise to a great number of complaints. The strongest complaint was that the scullery or kitchen was too small. It was also represented to us by working housewives and those speaking on their behalf that there was no convenient place in the inter-war house for many ordinary family activities. These include study and homework by the older children, a need which is likely to become more urgent with the new proposals for continued part-time education for all young people ; the reception of visitors ; and the transaction of the minor business necessary in every household. Finally, it was frequently said

that there ought to be a separate place for laundry work, the drying of clothes, and dirty jobs which should not be done in a room in which meals are eaten.

28. The inadequacy of the outbuildings gave rise to many complaints about difficulties in storing fuel, household goods, and other possessions. The efforts of tenants to supplement their outbuildings led to the erection of unsightly sheds in the gardens.

TYPES OF DWELLINGS

29. The vast majority of the million dwellings built by local authorities between the wars were of the three-bedroom type, providing accommodation for five persons. Local authorities also built a small proportion of other types, e.g., houses for large families, with four or five bedrooms, and small houses, bungalows and flats for aged couples and single persons. These municipal houses amount to about a twelfth of the total number of houses in the country. There are in addition roughly eight million privately owned dwellings built before 1914, and some three million dwellings built by private enterprise between the wars. A large proportion of the privately owned dwellings built before 1914 was of the two-bedroom type, but these older houses are lacking in the conveniences and amenities of the more modern Council dwellings.

30. The variety of types of dwelling required depends on the distribution of the population in families. The average family in England and Wales in 1931 consisted of 3.72 persons: of the total number of families (10,233,139) 21.9 per cent. consisted of two persons and 6.7 per cent. of one person. The fact that the great bulk of the new Council houses were of the three-bedroom type, coupled with the fact that local authorities are required by statute to give preference in letting their houses to large families, resulted in these small households having very little chance of obtaining the tenancy of a Council dwelling. If, therefore, their means were insufficient to pay for modern accommodation provided by private enterprise, they were necessarily relegated to the old houses built before 1914.

31. While we see the need for the provision by local authorities of a greater variety of types of dwellings, it is important to bear in mind that the needs of the population must in every case be related to the whole pool of houses available in the area concerned. This pool is not confined to municipal houses, but includes houses built by private enterprise, both new and old. In most districts at the present time the pool contains too large a proportion of accommodation of the two-bedroom type, and while it is true that this accommodation is for the most part old and inconvenient, it must continue to be used for some years to come.

32. For the present we recommend that local authorities should continue in general to concentrate on the provision of the three-bedroom house interspersed with a proportion of other types. But the distribution of the size of families, as also of the types of existing dwellings, will vary considerably from place to place. There are areas where there is already a reasonably adequate supply of three-bedroom houses. Before preparing their programmes, local authorities should have regard to the prevailing type of house now existing in their area and the extent to which the needs of particular sizes of households remain to be met, and they should be allowed considerable latitude to determine the types of dwelling necessary to meet local needs.

HOUSE VERSUS FLAT

33. We are aware of the keen controversy of the house versus the flat. Our evidence shows that flats are unpopular with large sections of the community, particularly families with children. It also suggests that the principal reasons for this unpopularity are noise; lack of privacy; the absence of a private garden; the difficulties of supervising children at play; and the necessary rule against keeping pets. We make suggestions for overcoming some of these objections in Section VI.

34. On the other hand, as we have already indicated, a considerable proportion of the population are not members of families with children, and here there is often a preference for flats. For instance, in Welwyn Garden City, where the demand for flats might be expected to be very low, it has been found that roughly 10 per cent. of the households prefer accommodation of this kind.

35. Our own view is that while flats are open to many objections for families with children, they are less objectionable for other persons. There is need, therefore, for a mixed development of family houses mingled with blocks of flats for smaller households, as suggested in the report on site planning and layout in relation to housing.

STANDARD OF FLOOR SPACE*

36. There was a considerable variation in the standards of floor space in the houses built by local authorities between the wars. In the three-bedroom houses for five persons, floor space varied between roughly 750 and 850 sq. ft., giving 375-425 sq. ft. on each floor. In the commonest type of house the first floor was entirely taken up by the bedrooms; on the ground floor there was a large living-room (180 sq. ft.) a small scullery with a copper for laundry (80 sq. ft.) and the bathroom, usually combined with the W.C. In the absence of adequate outbuildings, the fuel store was within the main building.

37. The evidence is unanimous that the scullery in this type of house is far too small. This we believe to be largely attributable to changes in our manner of living. When the original type of Council house was evolved, cooking on a coal range was almost universal. The range was frequently the only source of heating in the house, and was therefore commonly placed in the living-room and, at first, all meals were cooked and eaten in that room. But with the widespread extension of public services this practice has changed, and except in mining areas, in country districts where no services are yet available, and certain places in the north of England where housewives are accustomed to bake their own bread, gas or electricity is now widely used for cooking.

38. The gas or electric cooker is, however, usually placed in the scullery, and most of the weekly cooking is now carried out there instead of on the coal range in the living-room. The natural tendency has been for all the kitchen equipment, including the dresser, to follow the stove into the scullery, where most of the week-day meals are now taken. For these purposes, the present scullery is quite inadequate.

39. We have also examined the use to which the living-room is put. It was originally intended to be the room in which meals would be cooked and eaten and all other family activities carried on. We find to-day a growing desire to use it for the social and recreational side of family life undisturbed by constant interruption for meals, and this tendency, coupled with the greater convenience of eating in the same room in which the food is cooked, has no doubt led to the custom of taking most meals in the scullery, despite its unsuitability for this purpose. We do not think it is generally realized how frequently separate meals have to be prepared for a working family, where meal-times depend on hours of work and school and where on week-days it rarely happens that the whole family can sit down to table at the same time. The following time-table is not unusual in an average working household:

- 7 A.M. Breakfast for husband.
- 8 A.M. Breakfast for children.
- 12.30 P.M. Lunch for children.
- 4.30 P.M. Tea for children.
- 6 P.M. Tea for husband.
- 7-8 P.M. Supper for children.
- 9 P.M. Supper for husband.

* This section relates to the standard of floor space of a two-storey house. Modifications for flats are dealt with in Section VI.

40. If all these meals are eaten in the living-room, it is clear that it will seldom be available for any other purpose, whereas our evidence shows an increasing need for a quiet place for study, social intercourse and recreation. These needs cannot properly be met by a room which is never free from the constant bustle of getting meals.

41. To meet these needs we consider that the municipal house of the future should provide two good rooms on the ground floor, so that meals need not interfere with other activities. We suggest, that meals be taken either in a kitchen designed for the purpose, or in a dining recess off the living-room. A kitchen which is to be used for meals must be a pleasant livable room, large enough for the table and all the kitchen fittings and equipment, and easy to keep clean and tidy. Laundry and dirty household work should not be done in a kitchen of this type but in a small separate compartment which we propose to call the "utility room."

42. We accordingly suggest the following alternative ways of dividing up the ground floor of a modern family house. The first two arrangements are based on the assumption that cooking will be done by gas or electricity.

MINIMUM AREAS *

Alternative 1 (illustrated on page 34)

Living-room	160 sq. ft.
Kitchen, with space for meals	110 "
Utility room for laundry, etc.	35 "

Alternative 2 (illustrated on page 36)

Living-room with recess for meals	210 sq. ft.
Kitchen for cooking and laundry	100 "

A third way, which is intended to meet the needs of those districts where cooking will continue to be done on a coal range, is as follows :

MINIMUM AREAS *

Alternative 3 (illustrated on page 38)

Large kitchen-living-room	160 sq. ft.
Scullery	50 "
Sitting-room	110 "
Utility room for laundry in outbuildings	35 "

43. These apportionments of the ground floor provide what has been the long-felt want of the average family, namely, a clean cheerful room where meals can be taken with the maximum of convenience to the housewife who does the cooking, but which is kept free from the dirty work of washing clothes, and another more private room for other activities. We think the expression "parlour" carries an implication which is old fashioned and obsolete. Therefore we do not employ it. But we do not think it matters what these rooms are called provided that they are used to the best advantage in the way we have described.

44. All these arrangements are based on the three-bedroom house for a family of five. Larger families will require more bedrooms as well as more space on the ground floor. In such cases either an extra sitting-room should be provided or the areas of the rooms we have recommended enlarged.

45. The sizes of bedrooms have remained more or less constant since the date of the Tudor Walters Report. The sizes recommended in this Report were :

AREAS

First bedroom	150 sq. ft.
Second bedroom	100 "
Third bedroom	65 "

* These minimum room areas should be related to minimum aggregate areas as explained in paragraph 155 in Part II.

In general we agree with these areas, but we think that both the second and the third bedrooms should be slightly enlarged. The second bedroom is required to accommodate two persons and must therefore be large enough to contain one double bed or two single beds in addition to other necessary furniture. For this purpose we consider that an area of 110-120 sq. ft. is necessary. The third bedroom, being designed for a single person, should not be smaller than 70 sq. ft. The sizes we recommend are therefore :—

	AREAS *
First bedroom	150 sq. ft.
Second bedroom	110 „
Third bedroom	70 „

These sizes include the areas of built-in cupboards. It will be seen that we draw a sharp distinction between bedrooms intended for two people and bedrooms for single persons. Rooms of intermediate sizes are wasteful as they provide more space than is necessary for one person, but insufficient for two.

46. The bathroom in the inter-war house was usually on the ground floor. If, as we recommend, the living space on the ground floor is enlarged, the bathroom cannot remain there without producing a larger area on the ground floor than is required on the first floor for the bedrooms. Therefore both the bathroom and water closet should be upstairs. This arrangement, as our evidence has made abundantly clear, will also be far more convenient to the occupier, particularly in case of illness.

47. In the inter-war house the bathroom was usually combined with the water closet. This arrangement takes up less space and is accordingly less costly. But there was much evidence that, especially in the case of large families, the combined arrangement is inconvenient. In our view it is permissible in dwellings with two bedrooms or less, but we recommend a separate water closet for dwellings with three bedrooms. In larger houses two water closets are necessary. One should be downstairs and contain a lavatory basin. The other should be upstairs and may be combined with the bathroom.

48. *We recommend that the minimum over-all floor area that is necessary to give effect to the foregoing recommendations is 900 sq. ft., subject to slight variations according to aspect and siting. We are convinced, however, that no substantial reductions can be made in this figure if the majority of the defects of the inter-war house are to be remedied.* War-time experience has indicated a close connection between over-crowding and morale. The nervous strain of living in too cramped quarters is an enemy of healthy family life and cannot be ignored. Rooms must be large enough both for the furniture they are to contain (which is so often of a massive nature) and for the people who are to use them. Moreover the reduction in space below a certain limit greatly increases the work of running the house and keeping it clean.

MINOR POINTS OF INTERNAL PLANNING

49. It is for the architect in charge of the scheme to decide how our recommendations as to the standard of floor space can best be translated into plan. We recommend, however, that the following principles should be observed in every case :

- (a) All rooms should be of a simple and convenient shape.
- (b) There should be separate access to each of the principal rooms in the house from a common entrance hall or landing.
- (c) No room should be so arranged as to serve as a passage.

* These areas should be related to minimum aggregate areas as explained in paragraph 155 in Part II.

- (d) The living room should have a sunny aspect ; the larder should be on the shady side.
- (e) In planning the bedrooms, account should be taken of the beds and other furniture they are to contain and the intended position of the beds should be shown on the plans.

HEIGHT OF ROOMS

50. We were asked specially to consider whether, both in the case of houses built by local authorities and by private enterprise, the present average height of rooms can be reduced. In general, under existing byelaws, the minimum height of all habitable rooms must be 8 ft., a standard which is also normally observed by local authorities in their own houses.

51. The grounds on which it has been urged that this limit might be reduced are as follows :

- (a) that the appearance of the house would thereby be improved ; and
- (b) that there would be a saving in cost.

52. The objects of the present rule are to ensure :

- (a) Proper lighting.
- (b) Efficient ventilation.
- (c) Sufficient cubic air space.

53. It is argued that all these advantages can be secured in rooms less than 8 ft. high, and we agree that where the house is designed with special attention to these points the results may be quite satisfactory. But any modification of this rule would affect all houses, those built by private enterprise as well as municipal houses, and we fear that the result might be a general lowering of hygienic standards. We are accordingly unable to recommend any alteration in the existing byelaws. We do not think that either the æsthetic results or the saving in cost (which, on a reduction of 6 in. in the height of the rooms of a two-storey house, would rarely exceed £20) are sufficient to outweigh the consideration of public health.

OUTBUILDINGS

54. A large number of the houses built between the wars had no outbuildings at all. Fuel was commonly stored in the body of the house with resulting dust and dirt. Nor was there any place for keeping bicycles, tools, garden produce or the innumerable other things which are commonly kept in a shed. As the result, local authorities were constantly applying to the Minister of Health for permission to add outbuildings to their existing houses. In other areas it was the practice for the tenants to provide their own sheds usually with most unsightly results.

55. In our opinion adequate outbuildings are essential to the reasonable comfort and convenience of the family. Their provision encourages many of those activities which it is the object of the new educational programme to bring about, e.g., individual hobbies, odd jobs, and active rather than passive forms of recreation. Most of these things need a shed and we accordingly recommend that appropriate outbuildings should be provided for every Council house. They should include the fuel store, which should be easily accessible for fuel delivery, and wherever possible be reached from the backdoor under cover. Their total area should not be less than 70 sq. ft. In rural areas larger outbuildings will be needed. These are dealt with specifically in Section IV.

PAVING AND PATHS

56. In many housing schemes carried out between the wars the area of paving or gravel was often cut to the minimum. This is false economy. It is also specially objectionable to the housewife whose large family of young children patter in and out all day long with muddy feet. We recommend that paths leading to and from all outside doors should be adequately flagged and that a small amount of extra paving should be provided between the outbuildings and the back door.

IV. RURAL COTTAGES

57. The defects of the inter-war house have been particularly marked in rural areas. Council cottages have frequently been built in remote places where no public services can readily be made available. Because the country household is compelled to be more self-sufficient than the urban household, the lack of out-buildings and storage space has been a serious deprivation. The internal plan of many inter-war rural cottages has not been adapted to the mode of life of their occupants, and their outward appearance has been singularly inappropriate to their surroundings.

58. In considering how these defects can be remedied we have postulated that so long as housing has to be subsidized it would be inequitable to give the countryman (at the public expense) a higher standard of housing than would normally be provided in the town; conversely the standard of the new country cottage must not be lower than the urban standard. We certainly do not contemplate that the type of provision made in town and country should be exactly the same, but insist that the country cottage should not represent a lower standard of life.

SITING

59. We recommend that new cottages in rural districts built by local authorities should be situated in or adjoining existing villages or hamlets. We know that the inter-war practice of scattering new cottages about the countryside sprang from the desire to house the worker within easy reach of farms. With better transport and higher wages we do not think that this reason is any longer valid. In our view, it is far better that the worker should have to travel some distance to his work than that he and his family should be remote from the school, church, shops and all the other amenities of village life.

PUBLIC SERVICES

60. The absence of public services in rural areas largely accounted for the difference in standard between urban and rural houses built between the wars. We have already recommended that, in future, cottages should be built in or near existing villages where services should be more readily available than on scattered sites, and we assume that all new cottages built by local authorities after the war will at least have some form of piped water. We hope that the time is not far distant when main sewerage, electricity and gas will also be available in all the larger villages. We wish particularly to stress the need, as shown in our evidence, for the widest possible extension of electric light and power. The substitution of electricity for the inconvenience and danger of oil lamps undoubtedly adds greatly to the satisfaction of rural life.

SANITATION

61. We realize that the provision of a public sewerage system in rural areas is often a difficult matter. We recommend the issue by the Ministry of Health of some general notes for the guidance of rural authorities on the various methods of providing drainage for small groups of houses. In view of the great advantage to the tenant and his family of a water closet over any other form of sanitation, we hope that the water carriage system will be provided wherever possible, but there will be cases where, notwithstanding that piped water is available, water-borne sewage disposal is not practicable, and an earth closet or similar form of sanitation will continue to be used. The earth closet system can be made much less objectionable if tenants are properly instructed in its use and we recommend the preparation by the Ministry of Health of a model handbill which could be issued by rural authorities to tenants in areas where earth closets are the only practicable solution.

STORAGE

62. Domestic economy in country districts differs in many ways from that of the town. The prime need is for storage space—for food grown in the garden that must last through the winter ; for groceries and all household requisites which in an emergency the townsman can purchase at a moment's notice ; for tools for garden and for work ; for bicycles as a necessary means of transport ; for food for pigs and poultry. All these things must be stored. We therefore recommend a larger larder and the provision of at least the indoor storage space that we have specified for urban houses. In addition, we recommend the provision of ample outbuildings which in no case should have a floor-area of less than 100 sq. ft.

ARRANGEMENT OF DWELLING

63. In Section III we recommended three methods of arranging the ground-floor of a three-bedroom house, and we indicated that the third method, based on cooking by a coal range, would be the most suitable in country districts. When public services have become more general in rural areas it is probable that the domestic habits of the countryman will change accordingly. When this time comes it may be that the first or second of our suggested methods of internal arrangement will become more popular. In the meantime we advocate the third method, which provides a large kitchen where meals can be taken, with a small sitting-room on the lines of the old-fashioned parlour, together with a scullery and a separate utility room for the laundry. We think that in country districts the utility room might most conveniently be placed in the outhouse, which will increase storage space and provide a convenient place for the drying of wet clothes and boots.

DESIGN

64. We have complained that the appearance of many of the cottages built in country districts between the wars was singularly inappropriate. We know, on the other hand, of many cottages which were admirably designed. We are thus concerned to ensure that in future all shall reach the level of the best. To this end Rural District Councils as rural housing authorities need to pay special attention to the whole subject of cottage design. New cottages are more conspicuous in the country than in the town, and to that extent the countryside can more quickly be spoilt.

65. We have already recommended that, in the absence of special circumstances, all housing authorities should be required by the Minister to employ architects in connection with their housing schemes. The design and layout of the individual scheme must be left to the architect, but we hope that architects in charge of rural schemes will devote special attention to the following points :

- (a) The planning of the interior to suit the country way of life.
- (b) The blending of new cottages to be in keeping with existing buildings, the use of suitable materials, and regard to local architectural features such as porches, chimney stacks and roofs.
- (c) The arrangement of the new cottages on the site with an eye to the landscape.

GARDENS

66. The size of gardens must vary according to the siting of the cottages, the custom of the locality and the nature of the soil. In general the aim should be to provide as large a plot as is likely to be cultivated. A garden attached to the cottage is generally very much more popular with tenants than an allotment some way off, and is much easier for the tenant and his family to cultivate at odd moments. It should be borne in mind that in acquiring land for cottages the cost of providing gardens of sufficient size is relatively small.

V. TERRACED HOUSES

67. Our evidence shows that in most parts of the country there is a prejudice against terraced houses and a preference for the semi-detached. The objections to terraced houses appear to be based primarily on :

- (a) Lack of privacy.
- (b) Noise.
- (c) Absence of windows on the third side of the house.
- (d) Difficulties of access to the backdoor.

68. In the case of the old-fashioned type of terraced house built before 1914 these objections are very real. But we believe that they can now be largely overcome and that the continued prejudice against terraced houses is mainly because so few people have had the experience of living in a well-designed modern terrace. We propose to indicate very briefly the lines on which the earlier objections to terraces can now be met. Further particulars are given in the technical notes in Part II.

PRIVACY AND FREEDOM FROM NOISE

69. Effective sound insulation can be obtained by building cavity walls instead of solid party walls between the houses. The placing of halls and staircases between the living-rooms in adjoining houses will prevent noise being carried from one house to the next.

LIGHT AND AIR

70. The fact that a terraced house can only have windows on two sides generally makes the staircase dark. The plan can be arranged, however, so that the staircase is directly lit from the outside or light can be obtained from fanlights over the doors of the rooms on the first floor. We are satisfied that by skilful planning full compensation can be made for the lack of windows on more than two sides of the house.

ACCESS TO THE BACKDOOR

71. In some areas, notably in mining districts, it is customary to provide a back lane for the delivery of fuel, etc., and for the removal of refuse. This is expensive and undesirable. We recommend instead a ground-floor passage between every two houses in the terrace. It is essential that no tenants shall have to pass a neighbour's backdoor in order to get to his own.

VI. FLATS

72. We have already referred to the unpopularity of flats with large sections of the population. To some extent this is accounted for by the defects of many of the flats that were built between the wars. The most common of these defects were :

- (a) Dreary and barrack-like appearance and surroundings.
- (b) The absence of lifts.
- (c) Unsatisfactory means of access.
- (d) Difficulties of removing refuse (in the absence of chutes).
- (e) Cramped accommodation.
- (f) Inadequate laundry facilities.
- (g) Absence of gardens.
- (h) Lack of communal amenities.

73. We propose to indicate briefly the lines on which we think these disadvantages can be overcome. Further details appear in the technical notes in Part II.

APPEARANCE AND SURROUNDINGS

74. We believe that the remedy for the depressing appearance and surroundings of some of the earlier blocks of flats is to be found in the mixed form of development advocated in the report of the Study Group of the Ministry of Town and Country Planning, involving, as it does, a mixture of blocks of flats with two-storey houses. This form of development makes possible more intimate and varied grouping of the buildings around churches, shopping centres, public houses and community buildings; more imaginative use of open space and of the contours and natural features of the site; more attractive gardens; and more diversity in the height of blocks and in the treatment of roof lines.

LIFTS

75. Passenger lifts should be provided in all blocks of flats containing more than three storeys above the ground floor level. But lifts are expensive and in the past have caused difficulties in management and upkeep. Moreover, the view has been generally held that automatic lifts are impracticable in blocks of this kind owing to the possibility of their abuse by adults and the certainty of their abuse by children. As, however, the development of high blocks in the future is largely dependent upon the provision of automatic lifts, we have investigated an experiment by the Leeds Corporation of providing automatically operated passenger lifts in their large estate of flats at Quarry Hill.

76. The installation serves 938 flats housing more than 3,000 persons. The lifts are of single-speed type with fully automatic push-button control from car and landings. The fittings throughout are specially designed to prevent interference and to minimise the possibility of children's fingers being trapped in the mechanism. The installation has functioned perfectly successfully since the blocks were opened, and it was interesting to learn that such abuses as have taken place were as much by adults as by children. Thus, we were told that such stoppages as occur are mainly due to the tripping of the ultimate-limit switches owing to overloading by adult passengers. When this occurs it was intended that the trapped occupants should signal their plight by blowing a whistle. But as the whistles for such an emergency were placed in glazed boxes fixed in the cars, and as the children on the estate stole all the whistles during the first few months, the present situation is that a party of passengers trapped in a lift must bide themselves in patience until rescue comes. It occurred to us that for those who have caused the stoppage by overloading the lifts this enforced exercise of patience may not be so unsatisfactory as it sounds.

77. In point of fact the number of inadvertent stoppages is negligible, as is shown by the fact that over a period of twelve months they averaged not more than one stoppage in every 20,000 journeys. There have been no accidents involving either death or injury. And so far as children are concerned we were told both by the managers of the flats and by the children's own parents that whereas for the first few months the lifts were in constant use for joy-riding, at the end of that time the children's interest suddenly flagged, since when the lifts have ceased to excite their slightest interest.

78. We believe that the lifts at Quarry Hill provide the complete answer to those who contend that it is impracticable to provide an automatic system in blocks of this kind. It should be noted that the service provided is as complete and as efficient as in blocks of flats let at much higher rentals. We are convinced that half-hearted measures, limiting the use of the lifts to certain persons at certain times, are undesirable and would tend only to make the system inefficient. The cost of the installation at Quarry Hill is equivalent to an average of 7d. per week on the rent of each flat on the estate. Having in mind that the 88 lifts make on

the average five million journeys a year—which is equivalent to more than a hundred journeys per week per flat—we do not consider this cost to be prohibitive.

ACCESS

79. The two alternative means of access to blocks of flats are commonly described as "separate staircase access" and "balcony access." In the first case access to the front door is from a staircase serving two or three flats on each floor, in the second case all the front doors abut on to continuous projecting balconies.

80. Balcony access is said to be the more economical method. It is also said to be safer in case of fire, more healthy and more sociable. It also facilitates the economical provision of refuse chutes. Its disadvantages are the lack of privacy and noise in the rooms overlooking the balcony and the shadowing of rooms below the balconies.

81. The objections to balcony access do not apply to the separate staircase, though this is undoubtedly a more expensive form of access for tall blocks. It is certainly the best arrangement for all low blocks and also for schemes which are designed to accommodate large families.

REMOVAL OF REFUSE

82. Except in the case of low blocks we do not favour any system of disposal of refuse which involves carrying dust-bins downstairs. In general, the disposal of refuse should be accomplished by the provision of chutes on each floor within easy reach of the flats they are intended to serve. The chutes must discharge into receptacles which can be closed when they are full and then be removed bodily by the sanitary authorities.

83. At Quarry Hill flats in Leeds, to which we have already referred, we inspected what we believe to be the only installation in this country of a water-borne system of refuse disposal, whereby the refuse is conveyed direct from the kitchen sink of each flat by means of large bore pipes. The specially constructed sink is combined with a large circular hopper into which the refuse is placed. The hopper is then filled with water and when the tenant raises a plunger it discharges its contents in much the same way as an ordinary W.C. The refuse, which may include without damage to the system, ashes, tins and bottles, is then conveyed by suction through underground pipes to a central chamber. Here the liquids and solids are mechanically separated, the liquids discharging into the ordinary sewerage system and the solids being burnt in the furnaces which heat the water for the communal laundry. The system appears to work extremely satisfactorily, although we were told that new tenants require some instruction in its use. In particular it takes time to convince them that they may safely dispose of their bottles and tins by this method.

84. Owing to the cost of equipping the central chamber, which contains an expensive plant, a water-borne system of refuse disposal would scarcely be a practical proposition except on a large-scale development. But at Quarry Hill, with its 938 flats, the average cost of maintaining the system does not exceed 1·7 pence per week per flat. We recommend that in any future large development the promoters should give careful consideration to an installation of this kind.

ACCOMMODATION

85. We think that the feeling of being cramped, which seems so common among flat-dwellers, springs from two causes—namely, the size of the rooms and lack of space for the activities which the occupant of a house would carry on in the garden or outbuildings.

86. In many blocks of flats built between the wars the rooms have often been smaller than those of contemporary houses. In our opinion this is most undesirable, and we recommend that the areas of rooms which we have specified for houses shall always be observed in flats. The lack of a small garden and outbuildings constitutes an inherent disadvantage of flat life which it is impossible to remedy.

LAUNDRY WORK

87. There are two schools of thought on the best arrangements for laundry work. Some witnesses favour the communal laundry and others prefer arrangements for doing laundry work in the flat itself. There is still a good deal of prejudice among tenants against the communal system, but we believe that this is largely due to the fact that relatively few of them have ever had the use of a well-designed modern communal laundry. In our view the communal laundry offers the best line of future progress and we have, accordingly, examined in some detail a number of examples of existing communal laundries. These range from large buildings that can accommodate more than 100 women at one time, to small rooms with accommodation for 7 or 8. The size of the laundry seems to us unimportant so long as the accommodation is well-arranged and adequately equipped for the number of people for whom it is intended.

88. The equipment must provide for all the processes which laundry involves. These are, in brief, washing, boiling, rinsing, drying, mangling and ironing. Certain appliances—for example, power mangles and certain types of mechanical dryers—must be shared, but with these exceptions we recommend that every tenant should be provided with a separate unit of equipment for her exclusive use for as long as she reasonably requires it. We further recommend that the units should be so arranged that the women using them can enjoy as much privacy as possible. This may be achieved by grouping the equipment in cubicles. Sufficient attention has not yet been given to the question of how small children can be properly supervised while their mothers are using the communal laundry. The difficulty might be overcome by linking the laundry with a day nursery or creche where small children could be left under supervision.

89. Small communal laundries or communal utility rooms with less elaborate equipment could be planned at the end of balconies off the staircase in conjunction with communal drying rooms. The use of these laundries is arranged during the week by a rota of tenants, and is a useful alternative to the more public communal laundries, or to the carrying out of all laundry work within the flats. Ironing alone would, under this arrangement, be done in the flats.

90. But many tenants still prefer to do their washing in their own homes; therefore facilities for this purpose must be provided. We hope that the need for separate provision will diminish as communal laundries grow in popularity and we do not, therefore, recommend the provision in flats of a separate utility room. The washing equipment might be placed either in the kitchen or the bathroom. Of the two, we prefer the bathroom, which, being used for its normal purposes only at night and first thing in the morning, can be used for laundry in the daytime with less interference.

91. Where laundry is done in the flat there must be adequate arrangements for drying. Communal drying rooms are best provided in the roof space, at the ends of the access balconies, or opening off the staircases.

STORAGE

92. Storage space should be provided on the ground floor for such articles as perambulators, bicycles, tools, boxes and trunks, etc.

BALCONIES

93. The recreational needs of tenants can be met to some small extent by the provision of private balconies where the baby can sleep in the open air and where flowers or vegetables can be grown in window boxes.

GARDENS

94. We believe that after the war there will be a continuing demand for allotments by many people who have made gardening their hobby. We know the

difficulties of providing allotments in central areas but wherever practicable an attempt should be made to meet this need.

95. We further consider it essential that the central courtyards and immediate surroundings of blocks of flats should be much more attractive than many of them are at present. Central courtyards are unsuitable for private allotments, but they could be laid out as public gardens to the very great benefit of the tenants at relatively small expense. The advice of an expert gardener should be obtained when the gardens are first laid out. The cost of so doing will be many times repaid.

COMMUNAL FACILITIES

96. We understand that the general policy regarding the provision of community centres and all that they imply is at present under consideration by the Board of Education. We therefore confine ourselves to emphasizing the necessity for very much better provision in the way of community centres, common rooms and other accommodation for social and educational activities of all kinds (particularly for young people) than has in the past been available to flat dwellers. There is room for closer co-operation between housing committees and education committees in connection with these matters.

MORTUARY

97. A mortuary is a useful adjunct to any large estate. The lack of privacy in flats make them specially unsuitable for the retention of a body pending burial. On the estate of one housing association a basement room has been converted into a beautiful chapel which has been dedicated by ministers of all denominations. The room is available without charge to any tenant for the temporary reception of a body, and at other times for use as a Chapel of Rest. We recommend this as an example which might usefully be followed elsewhere.

VII. MAISONNETTES

98. We are attracted by the blocks of "maisonnettes" (i.e., super-imposed two-storey dwellings) which have been built in place of flats on central sites in some towns. We do not think that the merits of this convenient form of development have been sufficiently appreciated and we should like to see it more widely used.

99. Maisonnettes can be either super-imposed one above the other or placed on top of a block of ordinary flats.

100. The great advantage of maisonnettes lies in the question of access. Balconies can be used on alternate floors for access to the front doors without giving rise to two of the outstanding difficulties of balcony access in blocks of flats, namely, the overshadowing of the living-rooms and the exposure of bedrooms to the disturbance of traffic along the balcony.

VIII. ACCOMMODATION FOR OLD PEOPLE

101. The number of old people in Great Britain is steadily increasing. In 1900 there were 1,750,000 people over 65 years of age; by 1937 this figure had increased to over 3,750,000; by 1941 it was estimated to have increased to 4,300,000; and by 1951 it is expected to be 5,500,000. Expressed as percentages of the total population, the number of old people was $8\frac{1}{2}$ per cent. in 1937, $9\frac{1}{2}$ per cent. in 1941, and is expected to be $11\frac{1}{2}$ per cent. in 1951.

102. In the past the need for special accommodation for old people has been met by public institutions, private charities, and special small dwellings built by the local authorities. Institutions will continue to be necessary for old people who are no longer able to care for themselves, but with increased pensions and other proposed measures for social security it is to be expected that in future a larger proportion will remain independent. This tendency will increase the need for small dwellings adapted to their needs.

103. The number of such dwellings so far built by local authorities is 48,800, or 4.2 per cent. of the total number of municipal houses. Large numbers of old people will, of course, be housed in dwellings built by private enterprise, but we think there is a clear case for the provision by local authorities of a larger proportion of dwellings for old people.

SITING

104. Old people's dwellings should be situated within easy reach of churches, shopping facilities and centres of entertainment. We do not think it in the best interests of old people that they should be segregated and we, therefore, recommend that local authorities should provide a pool of dwellings for small households where old people can mix with those who are younger. A few small dwellings might well be included in every street.

ACCOMMODATION

105. The accommodation may be provided either in the form of separate dwellings or in dwellings with some communal facilities grouped on the lines of the old alms houses, or in hostels.

(i) *Separate Dwellings.* Separate dwellings can be provided either as self-contained flats on the ground floor of blocks of flats, or in two-storey houses divided into flats, or in single-storey houses. The type of accommodation is the same as that required by childless couples or single people who have not yet reached an advanced age. For couples it should comprise a living-room, a bedroom, a small scullery, and a bathroom combined with the water closet; for single persons a bed-recess off the living-room may be provided instead of a separate bedroom. The minimum standards of floor space we recommend are as follows:

Couples :

Living-room	160 sq. ft.
Bedroom	120 „

Single persons :

Living-room	150 sq. ft.
Bed-recess	50 „

The equipment should be arranged with an eye to the possible physical disabilities of the occupants. Points which should be considered include :

- Absence of steps.
- The height of the oven.
- A type of grate which is easy to clean.
- Easy access to the fuel store.
- A handrail above the bath.

Old people require more warmth than the young. A fireplace should therefore be provided in the bedroom as well as in the living-room.

(ii) *Grouped Dwellings.* We are attracted by the possibilities of grouped dwellings with some communal facilities on the lines of alms houses. But in order to avoid the disadvantages of segregation the groups should not be too large. Communal facilities should include a lounge or reading room, accommodation

for laundry and a garden. In addition, small private allotments should be available if desired. A warden is indispensable in a group of this kind and the layout should include a warden's house.

(iii) *Hostels*. Some of the war-time emergency schemes, e.g., the Government evacuation scheme and the arrangements for the care of the homeless, have resulted in the establishment of a number of hostels for old people. These experiments have been very encouraging, and we think that the provision of this type of accommodation might well be continued in the post-war period. Hostels are the only type of accommodation for old people which does not necessarily require new building: they can be conveniently and economically provided in old large houses with a modicum of adaptation. Experience with the war-time hostels suggests that the most successful unit is one which provides for 20 to 30 people. Occupants should have a separate small bedroom or cubicle but the living-rooms should be for general use. A single hostel can accommodate both sexes, married couples remaining together. A whole-time matron is essential.

IX. ACCOMMODATION FOR SINGLE PEOPLE

106. Very little accommodation has so far been provided by local authorities for young and middle-aged single people. A few of the larger authorities have built hostels or common lodging houses, but for the most part single people live either in rooms in privately-owned houses, or as lodgers. We are fully aware of the evils of sub-letting which have influenced local authorities to maintain a strict control over the taking of lodgers by Council tenants, but, where the house is not otherwise fully occupied, we think that, subject to proper supervision, the single lodger who takes his meals with the family can sometimes be admitted without danger. The necessary accommodation for such lodgers can often be found in Council houses where the children have grown up and left home. We fully share the objections felt in normal times to the taking of married couples as lodgers. Such arrangements quickly tend to produce all the evils of sub-letting.

107. Normal standards have had to be waived during the war, but as soon as the present acute housing shortage has been met we assume that rules for the control of lodgers and sub-letting in Council houses will again be enforced. When that time comes we hope that local authorities will have regard to the needs of single persons for lodgings as well as to the objections to sub-letting.

108. There is also a case for the provision of a certain proportion of purpose-built accommodation for such persons by local authorities. This accommodation may take two forms, the hostel or lodging house and the self-contained dwellings. The type of hostel we recommend provides sleeping accommodation for both sexes in separate wings and communal living-rooms as in a hotel. Units of this kind, housing as many as 500 persons, have proved successful.

109. Self-contained dwellings for single people can be successfully provided in the form of flats, and we should like to see more of this type of accommodation provided by local authorities. The need is particularly acute in the case of single women, who much prefer a home of their own to the best of lodgings.

X. DIFFICULT TENANTS

110. Some of our evidence has suggested the provision of special accommodation for difficult or sub-standard tenants. Experiments of this nature have been carried out in Scotland and abroad—particularly in Holland—with varying success.

On the whole, however, we do not recommend the general adoption of a policy which involves the segregation and intensive supervision of such tenants. Segregation deprives the tenant of the benefit of the example set by neighbours with a higher standard, while the degree of supervision required is both expensive and difficult to achieve.

111. In our view a better solution to the problem of the difficult or sub-standard tenant lies in a more general appreciation of the value of trained housing management combined with a system of filtering-up. We should like to see a wide extension in the employment of trained house property managers. Where a sound scheme of management is in force, the process of educating the difficult tenant will usually begin some time before he is moved into a municipal house: the tenant and his family will receive careful instructions in the use of the fittings and equipment of the better house to which they are moved: and filtering-up will be automatic. Some authorities have acquired a small pool of accommodation in old houses built before 1914 which they use as a stage in the filtering-up process. In conclusion, we would record our agreement with the recommendations made on this subject by the Sub-Committee under the chairmanship of Lord Balfour of Burleigh in their Report of the Management of Municipal Housing Estates published in 1938.

XI. STANDARDS OF CONSTRUCTION

112. Standards of construction can be summarized under the following headings:

- Strength.
- Resistance to damp.
- Fire resistance.
- Durability.
- Thermal insulation.
- Sound insulation.
- Protection against vermin.

113. All these matters are under investigation by technical committees advising the Post-War Building Directorate of the Ministry of Works. We do not wish to encroach on the terms of reference of these committees and have no comments on the first three items. We should, however, like to mention certain points in connection with the last four concerning the maintenance of houses by local authorities and the comfort of the tenants.

Durability. In their capacity as landlords, local authorities are closely concerned with durability in its relation to maintenance. During the "economy drive" of 1931 there was, we believe, a tendency on the part of the Ministry of Health to force local authorities to accept a lower standard of specification and materials than they themselves desired. There may be a temptation to revert to this policy in the immediate post-war years when building costs are high, but we are convinced that to do so would be a grave mistake. Local authorities, with their 25 years' experience of building and owning houses, should now be able to strike a proper balance between initial costs of construction and subsequent expenses of maintenance. We consider, therefore, that they should be allowed reasonable discretion in the specification and materials to be used.

Thermal Insulation. We have been impressed by the need for greater economy in fuel. One means of achieving this is by improving the thermal insulation of the structure of new houses. The extra cost, if any, of appropriate insulation can be balanced by the saving in cost of fuel. We recommend that careful attention should be paid to this point when houses are being designed. The simplest example is the provision of roofing felt under the tiling of the roof; where the roof is flat special attention should be given to this point. Another outstanding need is the protection of water pipes and tanks from frost.

Sound Insulation. Considerable research has been carried out to reduce the transmission of noise within buildings. Successful experiments have been made at the Building Research Station on the construction of 11-inch party walls and floated floors in blocks of flats. We recommend that future house and flat construction should incorporate the results.

Protection from Vermin. Crevices and cracks provide an obvious opportunity for infestation. Good design of details, careful workmanship and the wise selection of materials should go far to prevent cracks occurring. In general, all surfaces should be easy to clean, although it needs to be borne in mind that hard, washable surfaces may have disadvantages in other respects. For instance, condensation will be more apparent on such surfaces than on absorbent surfaces. The relative advantages and disadvantages of such surfaces must be considered in relation to the type of tenant for whom the dwellings are intended.

FINISHES

114. There should be a high standard of internal finish, particularly in the kitchen and bathroom, where we recommend that the walls should be painted or finished with some other washable material. The floor of the kitchen should be both easy to clean and attractive in appearance. There is likely to be a wide range of new materials for finishing purposes.

STANDARDS OF CONSTRUCTION IN RELATION TO NEW METHODS AND MATERIALS

115. New methods and materials must be judged by the extent to which they make it possible to maintain sound standards of construction and to meet the points we have indicated above. We cannot afford to ignore the possibilities of any new method which fulfils these criteria.

PREFABRICATION

116. The process of house construction is developing in the direction of the greater pre-assembly of parts of the house in the factory. It is not yet possible to state with confidence how far such methods can be carried with satisfactory results. While, therefore, the case for entire prefabrication is by no means yet established, it is possible that in the future complete houses may come to be built in this way.

117. Subject to sound construction coupled with sound planning and to due attention to the tenants' comfort, we should welcome any system of mass-produced prefabrication which would lead to greater speed in erection. We do not share the view that more extensive prefabrication need necessarily result in monotony of design, provided always that a competent architect is in charge of the scheme.

STANDARDIZATION

118. Many items of construction are already largely standardized—e.g., doors, windows, and sanitary fittings. In our view such standardization is valuable for the following reasons :

- (1) Standard fittings and equipment will be cheaper and will assist production at a time when materials are scarce.
- (2) Limitation of the number of types should encourage mass production and therefore greatly reduce costs.
- (3) Proper specification and good design can more readily be ensured.
- (4) Detailed manufacturing costs can be obtained for standardized articles. (Accurate knowledge of the costs of production of a standardized article provides a check on the cost of any un-standardized articles and is a means of controlling prices.)
- (5) Replacement is easy.

XII. EQUIPMENT AND FITTINGS

119. The equipment normally provided in the inter-war dwelling consisted of a bath in a bathroom, a water closet, a sink, one draining board, a copper in the scullery, a coal range in the living-room and latterly a cooker in the scullery (where services were available), a dresser either in the living-room or scullery, a built-in ventilated larder and about 20 sq. ft. of shelving. Some local authorities added a wash basin in the bathroom. Hot water was sometimes provided by a circulating system from the back boiler of the range, but more often the only hot water supply was from the copper to the bath by means of gravitation feed or a pump.

120. Extensive as this equipment appears on paper, it is deficient in the light of the advance in domestic practice of recent years. There is a strong case on the evidence submitted to us for improvements in the following directions :

- (a) Better heating arrangements.
- (b) Constant hot water.
- (c) Better cooking facilities.
- (d) Better kitchen fittings.
- (e) Better arrangements for washing and drying clothes.
- (f) More efficient plumbing and sanitary fittings.
- (g) More room for storage.
- (h) More connections for light and power.
- (i) Better day lighting.

NEED FOR FURTHER RESEARCH

121. In considering what improvements could be made on these points, we have been impressed by the need for further research and experiment on many aspects of domestic economy, for example :

There is an obvious need for more efficient methods of heating and maintaining a more even temperature within the dwelling.

There is need for a heating appliance which will heat several rooms from one source. Further research is necessary into methods of economical central heating both in houses and flats. Results of investigation into district heating are not yet available. The Heating and Ventilation (Reconstruction) Committee of the Building Research Board are now considering standards of heating as a guide to research.

There is a great need for more efficient labour-saving coal-burning grates and stoves which will give more complete combustion of fuel and reduce atmospheric pollution.

The existing types of cooker, whether for coal, gas or electricity, are all capable of improvement particularly from the point of view of conserving heat and reducing consumption of fuel.

There is need for improvements to windows which will reduce loss of heat.

The great advantages of new finishing materials which can be used to make attractive and easily cleaned floors, walls, window sills, draining boards and other fittings have not yet been fully absorbed into normal building practice.

122. On many of these points, however, theory has not yet been reduced to common practice and, in making our recommendations, we have confined ourselves to appliances which have passed the experimental stage.

STANDARDS OF FITTINGS AND EQUIPMENT

123. Our recommendations are based on the minimum amount of equipment that a dwelling for five persons should contain. Full details are given in Technical Notes.

124. The following main principles should be kept in mind :

- (i) Where public services are connected to the dwelling there should be sufficient points to enable the tenant to make full use of labour-saving appliances.
- (ii) Appliances should be selected for maximum efficiency and minimum consumption of fuel. We suggest that all appliances consuming fuel or power should be fully tested to standards of performance to be established.

125. We recommend that so far as possible fittings and equipment of the standard we recommend should be provided in reconditioned houses. There may be certain difficulties in building them into houses not originally planned to receive them, but we believe them to be essential to the proper running of a house, whether new or old.

(a) Better heating arrangements

126. We have considered whether we could recommend any form of central heating, but while we should like to see further experiments with this form of heating having particular regard to developments in other countries, we have come to the conclusion that at the moment there is not sufficient evidence to allow us to make any practicable proposals for central heating in small houses. The Heating and Ventilation (Reconstruction) Committee of the Building Research Board are considering the question of central heating but have not yet reported. Pending further developments, the solid fuel appliance (whether open fire or some form of stove) is likely to remain the main source of heat in a small house, but it should be of the most efficient type available. While we are not entirely satisfied with any of the types at present on the market, we think the slow-burning type of stove is probably the best so far produced. Where there are services, electric or gas points will be required for auxiliary sources of heat.

(b) Constant hot water

127. We recommend that arrangements for the supply of constant hot water to all fittings should be included in every house. Supply from the back boiler of an open fire is not economical, though greater efficiency might be possible with grates of better design. But even so, some other source of heat is needed in summer when the open fire is not in use. We call attention to the advantages of the installation of a small independent boiler.

128. Where services are available, electric and gas heaters are the simplest appliances to run. They are particularly suitable for flats, where flue construction and fuel storage present difficulties.

129. We have had evidence that a central system for the supply of domestic hot water in blocks of flats is satisfactory, and can be installed at a cost within the tenant's capacity to pay. We strongly recommend that in the planning of post-war flats serious consideration should be given to the provision of a central supply of hot water.

(c) Better cooking facilities

130. Where electricity or gas is available, electric or gas cookers should be provided in all municipal houses, unless it is clear that there is a local preference for cooking with solid fuel. In the latter case, and in areas where there are no services, a solid fuel cooker of the modern insulated type should be provided.

131. We note that the Electric Installations Committee of the Institution of Electrical Engineers appointed at the instigation of the Ministry of Works, while contemplating that vertical cookers will continue to be in common use, recommend that in planning the post-war kitchen provision should be made for the use of horizontal cookers. The horizontal type of cooker will require about twice the space required by a vertical cooker.

(d) Better kitchen fittings

132. We would emphasize at the outset that the equipment and the room in which it is placed must be designed in relation to each other, otherwise waste of space and domestic inconvenience is bound to result. The individual units of equipment should be designed so that they may be combined into groups of fittings eliminating corners and waste spaces, which are difficult to clean and are a source of unnecessary labour to the housewife.

133. We recommend the provision of the items of equipment set out below as a minimum :—

- Sink.
- Two draining boards.
- Work table top.
- Plate rack.
- Store cupboard.
- Dresser.
- Broom cupboard.
- Open shelving.

Dwellings should be equipped in proportion to the probable number of occupants. In every case fittings should be of a type which will stand heavy wear and which can be easily cleaned. A separate larder should be provided as heretofore.

134. We have considered the possibility of providing certain other items of equipment, for example, refrigerators, and dish-washing machines. We hope that methods of mass production may in time bring refrigerators within the reach of the great bulk of the population, but we do not consider it at present practicable to provide them in municipal dwellings. We doubt the advantage of dish-washing machines for small houses.

(e) Better arrangements for washing and drying clothes

135. In paragraph 42 of Section III we recommend the following arrangements for washing clothes :

- (1) Utility room (or bathroom in flats).
- (2) Working kitchen.
- (3) Utility room in outbuildings.

136. An extra sink (or wash-tub) should be supplied in arrangements (1) and (3), and a double sink is recommended for arrangement (2). The wash boiler should be conveniently placed near the sink or wash-tub, and a ceiling airer should be provided in the utility room (in alternative 2 it should be placed in the shed). Similar provision should be made in the bathroom of flats where clothes are to be washed in this room. We do not consider that drying cabinets are suitable for general use.

(f) More efficient plumbing and sanitary fittings

137. The principal defects in present plumbing practice are the inadequate lagging of pipes resulting in freezing during cold weather, the inaccessibility of water tanks, and the exposure of lengths of pipes in roofs or on external walls. We recommend that all pipes and tanks in exposed positions under the roof should be adequately insulated, that pipes should be kept so far as possible well within the dwelling, that more consideration should be given to the accessibility of fittings, and that every effort should be made to arrange pipes neatly and economically.

(g) More room for storage

138. The absence of cupboards was a marked defect in many inter-war houses. In addition to the store cupboard and broom cupboard mentioned above, we recommend the provision of built-in clothes cupboards in all bedrooms. There should also be in every dwelling a full length ventilated linen cupboard containing the hot water cylinder or, if there is no cylinder, a small heating unit.

(h) *More connections for light and power*

139. We recommend electricity for artificial lighting in all dwellings where the service is available. In rural areas where this is not yet the case, cottages should be so constructed that the service can be readily introduced. There should be one light in each room, including the dining recess, an additional point being provided in the living-room either for auxiliary lighting or for wireless. The Lighting Committee of the Building Research Station have suggested various methods of securing improvements in lighting installations, a short note on which is given in Appendix III, "Artificial Lighting."

140. The Electrical Installations Committee of the Institution of Electrical Engineers have recommended the use of a ring circuit for combined lighting and power, on which all socket outlets in the house would be connected. This method provides adequate and safe electrical facilities at a comparatively low cost. The ring circuit would supply ample socket outlets for lighting, heating, wireless sets and labour-saving appliances, but an additional power circuit is necessary for a cooker and water heater.

141. Cooking and heating can, of course, equally well be done by gas, and where this method is adopted gas points should be provided in the living-room and bedrooms for heating and in the kitchen for cooking and for hot water.

(i) *Better daylighting*

142. We find there is now a very general desire for larger windows. The change in public taste in this respect is already reflected in the houses built by private enterprise, which normally have much larger windows than municipal houses. In the interests of better light and ventilation and of economy in the use of artificial light, larger windows should in future be provided in municipal houses subject always to due regard to loss of heat. (Standards for Daylighting have been suggested by the Lighting Committee of the Building Research Station—see Appendix III, "Daylighting.")

ADVICE TO TENANTS ON USE OF EQUIPMENT

143. If tenants are to get the full advantage of the modern items of equipment which we recommend, it is essential that they should know how to use them. We have been impressed by the handbooks of advice on the use of equipment which have been prepared by some local authorities for their tenants, and we recommend that the Ministry of Health should consider whether more cannot be done in this way.

XIII. FINANCIAL CONSIDERATIONS

144. In the foregoing sections we have described the standards of space and equipment which we recommend for post-war housing.

145. We have been asked to assess the additional cost involved by these recommendations and to indicate the order of priority in which we should place them. Some of the improvements must be incorporated in the structure of the dwellings; others might be added at a later date. We have, therefore, considered the matter under these two heads.

146. Before the war, local authorities were building three-bedroom houses which ranged from a house with a total superficial area of 775 sq. ft. costing approximately £335, to a better type of dwelling with an area of 825 sq. ft. which cost about £400. For the comparison of standards and costs we have taken these two types of dwelling and set them against the three-bedroom house recommended in this Report with an average superficial area of 900 sq. ft.

147. As it is clearly impossible to assess the cost of our recommendations on post-war prices, we have based our assessment on the prices ruling at March, 1939.

148. We estimate that in March, 1939, the post-war house would have cost £467, an increase of $39\frac{1}{2}$ per cent. on the cost of the cheaper type of pre-war houses and $16\frac{3}{4}$ per cent. on the cost of the better type. A detailed statement showing how this estimate is made up is given in Appendix II. The cost of the items which could be added after the completion of the house amounts to between £15 and £25.

149. We are aware that there has been a considerable increase in building costs since 1939. We understand that precise estimates of the extent of this increase are not yet available, but that it may amount to as much as 100 per cent. The present cost of living index figure is 30 per cent. above the pre-war level and one of the disturbing features of the present position is that the rise in building costs is so much out of proportion to the rise in the cost of living. Extensive building is possible only if building costs bear a reasonable relationship to the general cost of living. There may be an inevitable interval before the present inflated costs can be brought into a workable relationship with the cost of living, but we are convinced that unless this is done the Government's programme of three to four million houses will never be completed. We therefore assume that whatever action may be necessary to bring this about will be taken and that building costs will eventually stabilise at about 30 per cent. above those prevailing before the war.

150. A table showing the economic rent for the two types of pre-war house and for the post-war house is given in Appendix II. Alternative rents are shown based on costs in 1939 and on the same costs increased by 30 per cent. The rents are calculated at the rate of interest prevailing to-day ($3\frac{1}{4}$ per cent.) and also at rates of 3 per cent. and $3\frac{1}{2}$ per cent. The rate of $3\frac{1}{4}$ per cent. is equal to the lowest rate during the inter-war years. It will be seen from this table that whereas in pre-war years local authorities built houses which could be let at an economic rent at 8s. 1d. per week plus rates, the economic rent of the post-war house embodying the suggestions put forward in this Report will amount to 13s. 1d. per week plus rates. This is an increase of 5s. per week, of which 2s. 7d. is due to the improvement of standards and the balance of 2s. 5d. to increased building costs (on the basis of a 30 per cent. increase over the 1939 level).

PART II

TECHNICAL NOTES

151. These notes are intended to explain in detail the standards of space and equipment that have been recommended in general terms in Part I of this Report.

I. SPACE REQUIREMENTS

152. ITEMS. Most of the items are dealt with in the Section headed "Two-storey Houses"; the necessary variations for other types of dwellings are described in the appropriate sections.

153. SUPERFICIAL AREAS. It will be noted that the recommended minimum areas for rooms are coupled with the aggregate area for each group of rooms. The aggregate area represents the necessary minimum total area, within which no single room shall be less than the minimum area prescribed for that room. The unallocated area by which the aggregate exceeds the sum of the minima, can be used to make any or all the rooms larger than the minimum. This method of prescribing room sizes is put forward to allow variety of arrangement. All superficial areas are measured within the containing walls.

154. GENERAL PRINCIPLES. The following principles should be observed :

- (a) All rooms should be of a simple and convenient shape.
- (b) There should be separate access to each of the principal rooms in the house from a common entrance hall or landing.
- (c) No room should be so arranged as to serve as a passage.
- (d) The living-room should have a sunny aspect ; the larder should be on the shady side.
- (e) In planning the bedrooms, account should be taken of the beds and other furniture they are to contain and the intended position of the beds should be shown on the plans.
- (f) The height from floor to ceiling should be 8 ft.

TWO-STOREY HOUSES

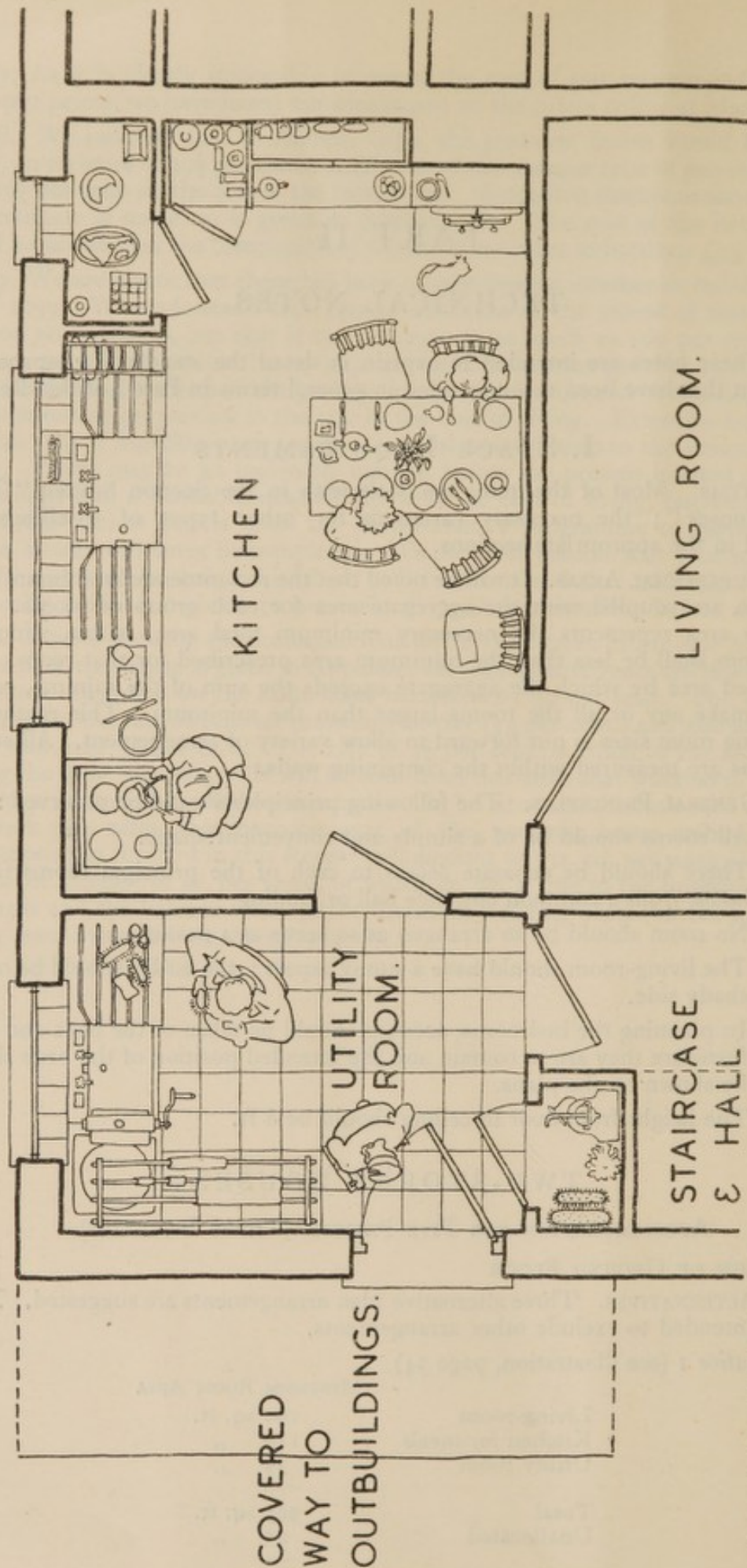
ACCOMMODATION FOR FIVE PERSONS (THREE BEDROOMS)

DIVISION OF GROUND FLOOR

155. ALTERNATIVES. Three alternative plan arrangements are suggested. These are not intended to exclude other arrangements.

Alternative 1 (see illustration, page 34)

	MINIMUM ROOM AREA
Living-room	160 sq. ft.
Kitchen for meals	110 "
Utility room	35 "
Total	305 sq. ft.
Unallocated	25 "
Minimum aggregate area	330 sq. ft.



ALTERNATIVE 1

ARRANGEMENT OF GROUND FLOOR
IN THREE-BEDROOMED HOUSE

The living-room should not be less than 10 ft. wide between the chimney breast (above the fireplace) and the opposite wall. The fireplace should not be built in the corner of the room.

The kitchen should contain all the kitchen equipment and fittings and a small table for meals. This last should, if possible, be placed near the window.

Direct access from the dining kitchen to the living-room is desirable.

The utility room might be between the kitchen and the back door. It should contain a deep sink and draining board and a wash boiler, hooks for coats, etc., and have space for the ceiling ailer. Good through ventilation is essential.

Alternative 2 (see illustration, page 36),

	MINIMUM AREA
Living-room with dining space	210 sq. ft.
Working kitchen	100 „
Total	310 sq. ft.
Unallocated	20 „
Minimum aggregate area	330 sq. ft.

The working kitchen should contain the normal kitchen equipment and fittings and, in addition, the wash boiler and a second sink for laundry.

There should be direct access from the kitchen to the dining space. If this space is in the form of a recess, it should not be less than 8 ft. wide.

Alternative 3 (see illustration, page 38)

	MINIMUM AREA
Kitchen living-room	160 sq. ft.
Scullery	50 „
Sitting-room	110 „
Total	320 sq. ft.
Unallocated	10 „
Minimum aggregate area	330 sq. ft.

The kitchen living-room should contain the solid fuel range and the storage fittings. There should be direct access from this room to the scullery.

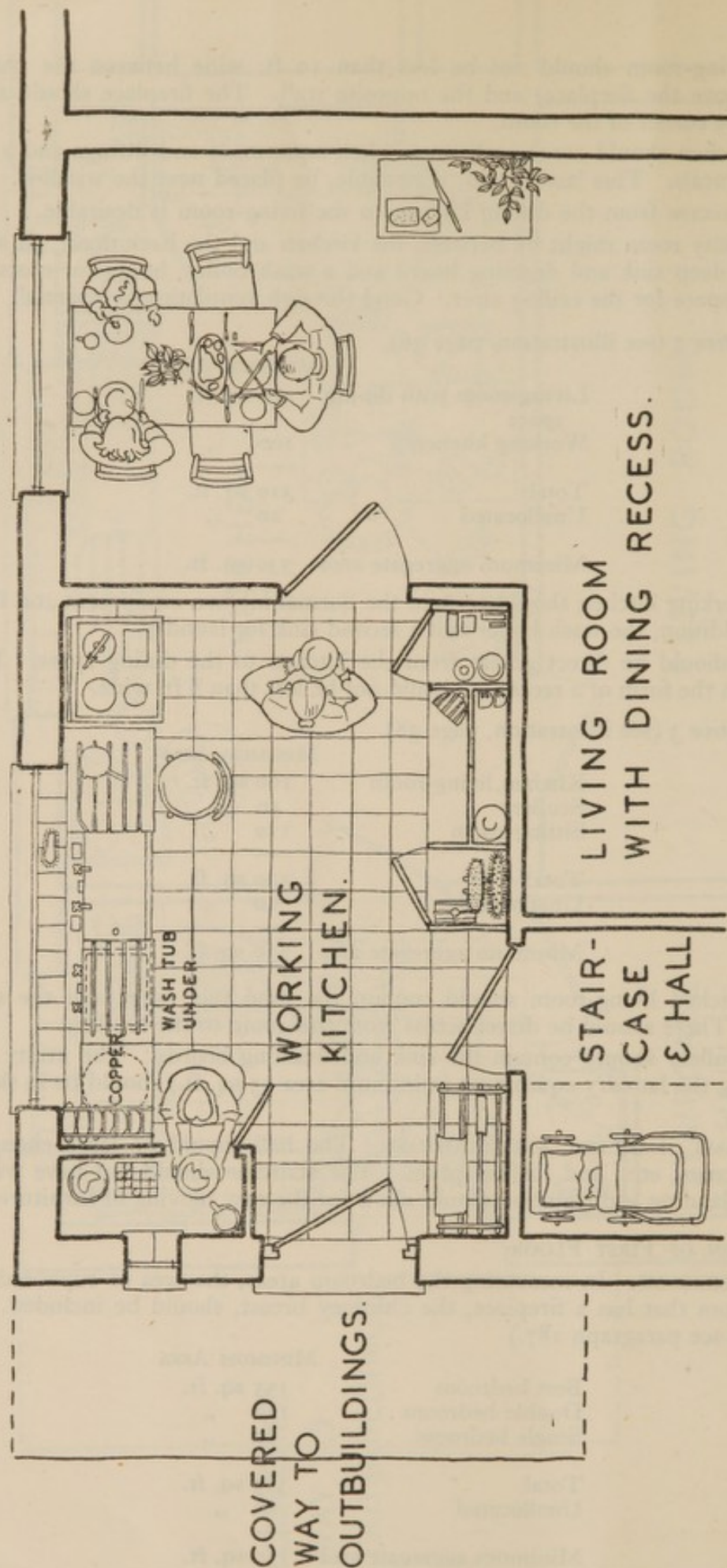
The scullery should contain the sink and draining boards. The utility room, containing the laundry equipment (minimum area 35 sq. ft.) should be in the out-buildings.

156. HALL, LANDING, AND STAIRCASE. The hall should be large enough for hanging coats, etc., and for the pram. The staircase should not have winders, and hall, landing and staircase should allow for the easy moving of furniture.

DIVISION OF FIRST FLOOR

157. BEDROOMS. In measuring the bedroom areas, the area of cupboards, and in the room that has a fireplace, the chimney breast, should be included. (For fireplaces see paragraph 187.)

	MINIMUM AREA
Best bedroom	135 sq. ft.
Double bedroom	110 „
Single bedroom	70 „
Total	315 sq. ft.
Unallocated	15 „
Minimum aggregate area	330 sq. ft.



While a desirable area for the best bedroom, which should be large enough to contain the baby's cot, is 150 sq. ft., some might prefer to improve the second bedroom at the expense of the best bedroom. There is no objection to this, subject to the above minimum.

158. BATHROOM AND W.C. The bathroom should not be less than 4 ft. 9 in. wide ; the bath should not be placed under the window, as this makes the window difficult to open and to clean.

If (owing, for example, to low water pressure) the bathroom and W.C. are placed on the ground floor, access from the bedrooms should not be through another room.

159. LINEN CUPBOARD. The linen cupboard should have a minimum depth of 1 ft. 6 in. and open preferably from the landing, though to shorten circulating pipes, it might be in a bedroom or in the bathroom.

160. OUTBUILDING. *Shed.* The area of the shed should be about 50 sq. ft.

Storage of Fuel. The area required for storing fuel is about 20 sq. ft.

Covered Way. Shed and fuel store should be accessible from the back door under cover.

Paving. A minimum area of 15 sq. yds. of flagged paving should be provided.

161. TOTAL AREAS. All the above minimum standards can be secured in houses of areas varying from 874-926 sq. ft., depending upon internal planning and siting. The area of 900 sq. ft. is recommended as the minimum average area, exclusive of outbuildings.

ACCOMMODATION FOR FOUR PERSONS (TWO BEDROOMS)

162. GROUND FLOOR. *Alternatives.* Subject to proportionate reduction in the size of the rooms, the same three alternative arrangements will suit accommodation for this number of persons.

163. FIRST FLOOR. *Bedrooms.* The minimum area of the bedrooms should be 110 and 135 sq. ft. with aggregate area of 260 sq. ft.

Bathroom and W.C. The bath and W.C. may be in one compartment.

164. OUTBUILDING. The same area as above.

165. TOTAL AREA. These standards can be achieved in a total area of 750 sq. ft.

ACCOMMODATION FOR SIX PERSONS (THREE BEDROOMS)

166. GROUND FLOOR. *Alternatives.* The sizes of the rooms need to be proportionately increased. Alternative 2 (the working kitchen and dining recess) is therefore not likely to be so practical as alternatives 1 and 3.

167. FIRST FLOOR. *Bedrooms.* The aggregate for bedrooms is 370 sq. ft.

Bathroom and W.C. should be separate compartments.

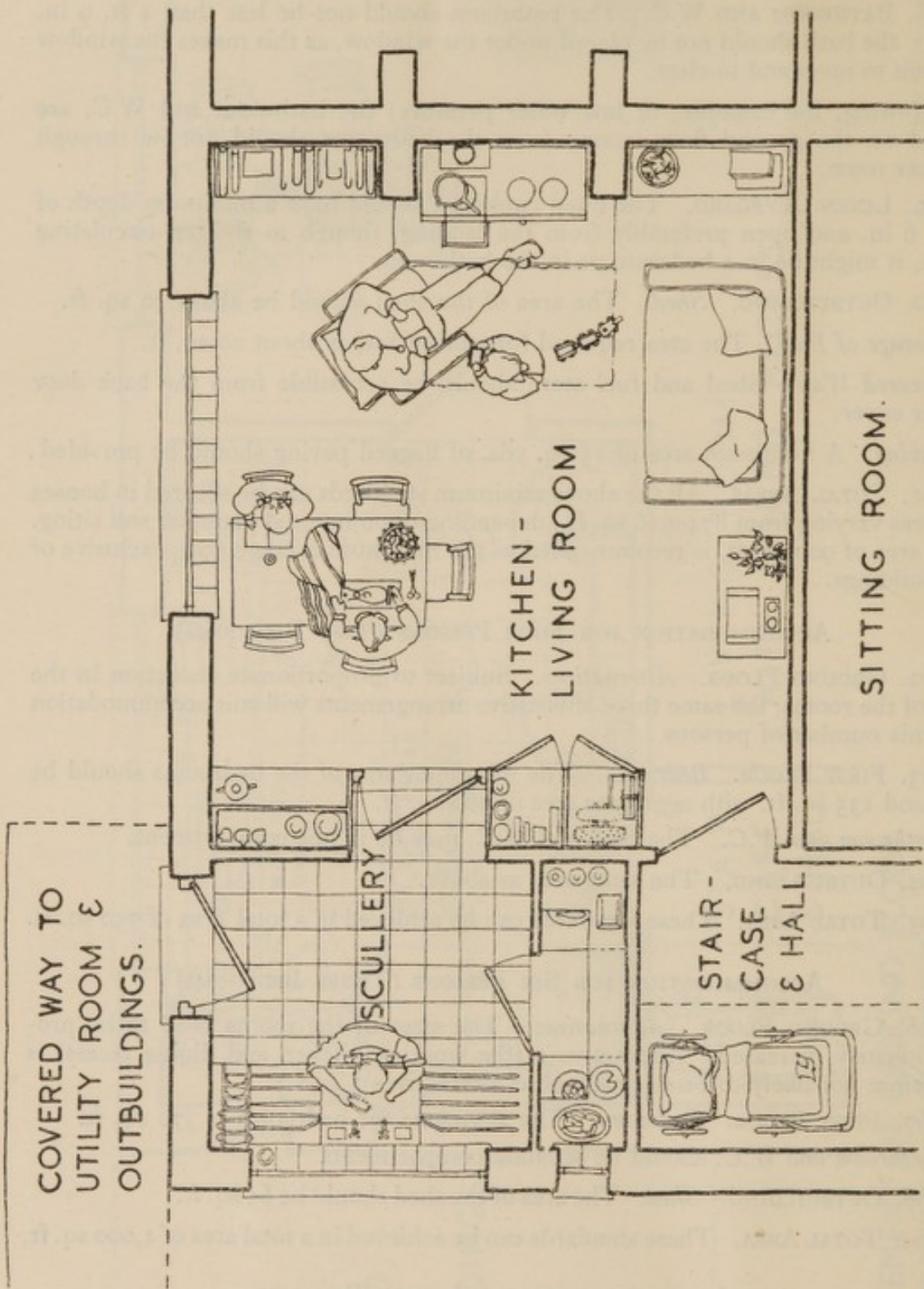
168. OUTBUILDING. *Shed.* The area of the shed should be 65 sq. ft.

169. TOTAL AREA. These standards can be achieved in a total area of 1,000 sq. ft.

ACCOMMODATION FOR LARGER FAMILIES

170. GROUND FLOOR. *Ground Floor Lavatory.* A ground floor W.C. with wash-basin is desirable.

171. FIRST FLOOR. *Bathroom and W.C.* Where an extra W.C. is provided on the ground floor the bathroom and W.C. on the first floor may be combined.



ARRANGEMENT OF GROUND FLOOR
IN THREE-BEDROOMED HOUSE

ALTERNATIVE 3

ACCOMMODATION FOR TWO PERSONS

172. Living-room, 160 sq. ft.
Bedroom, 135 sq. ft.
Working kitchen, 60 sq. ft.
Combined bathroom and W.C.
Fuel store and small shed or store.

ACCOMMODATION FOR ONE PERSON

173. Living-room, 150 sq. ft.
Bed recess, 50 sq. ft.
Kitchenette.
Combined bathroom and W.C.
Fuel store.

RURAL HOUSING

174. The standards for urban houses should be maintained for rural dwellings.

175. GROUND FLOOR. *Alternatives.* Alternative 3 is likely to be the most suitable.

176. OUTBUILDINGS. *Shed and Fuel Store.* The total area should be 100 sq. ft.

Wash-house. A wash-house or utility room, of about 35 sq. ft., should be provided for laundry and drying clothes. The wash-house can be arranged to form an addition to the scullery.

TERRACED HOUSING

177. The above standards hold good for terraced housing, but attention is called to the following points :

(1) *Secondary Access.* Secondary access should be obtained, in general, by a through passage between adjacent houses. The passage absorbs a certain amount of the ground floor area within the house, and care must be taken to maintain the recommended areas for this floor ; an excess of area on the first floor is preferred to a reduction in area on the ground floor. The passage way should not be less than 3 ft. 3 in. wide.

(2) *Staircase Lighting.* The staircase should have direct lighting from the garden or street frontage, or should have indirect light through fanlights over doors on the first floor.

(3) *Reduction of Noise.* The living-rooms in adjacent houses may be separated from each other by the staircase and hall, alternatively, living-rooms may be paired provided there is a cavity party wall.

FLATS

178. The recommended areas of individual rooms should be maintained in flat dwellings. The aggregate area will vary according to where the laundry is carried out.

179. *Living and Working Rooms.* Of the three arrangements suggested for two-storey houses, alternative 3 is not suitable for flats.

180. *Laundry.* If alternative 1 is adopted the equipment suggested for the utility room should be placed in the bathroom. In this case the W.C. should always be separate from the bathroom.

181. *Fuel.* Storage for at least 5 cwt. of fuel should be provided within the flat. It is desirable that this should be so planned that fuel can be delivered without entering the dwelling and that the tenant can have access from within.

182. *Hall.* The hall should be large enough for a pram.

183. *Reduction of Noise.* The living-rooms in a block of flats should be planned over each other, and preferably on the opposite side of the block to the bedrooms. This ensures quiet bedrooms throughout the whole block.

184. *Storage.* For storage see paragraph 92.

185. *Balcony.* A private balcony should open off the living-room in all but ground floor flats. It should be large enough to take a pram.

MAISONETTES

186. The standards will be similar to two-storey houses.

II. EQUIPMENT AND FITTINGS

187. *Heating.* An open fireplace is required

- (a) In houses, in the living-room, and, if desired, in one of the bedrooms.
- (b) In rural cottages, in the sitting-room, and in at least two of the bedrooms, the kitchen-living-room being heated by the cooking range.
- (c) In flats, in the living-room.

Auxiliary electric or gas points should be provided in all habitable rooms in houses or flats.

188. *Constant Hot Water.* The various methods of securing constant hot water are :

- (1) A back boiler behind the fireplace.
- (2) An independent boiler.
- (3) An electric or gas heater.

Where the first method is used, some auxiliary method will be necessary for summer use.

189. *Artificial Lighting and Power.* See paragraph 139.

190. *Windows.* Windows should be of the easy-cleaning type.

191. *Position of Window.* For good lighting the heads of windows should be as near to the ceiling as practicable. For good view from a chair in the living-room the lowest glass line should not be higher than 2 ft. 9 in. from the floor level. In bedrooms, the sill should not be higher than 3 ft. 3 in.

192. The fittings should be arranged in a sequence convenient for working. The following sequence is suggested :

- (i) Larder.
- (ii) Work table top.
- (iii) Draining board.
- (iv) Sink.
- (v) Draining board.
- (vi) Cooker.
- (vii) Storage fittings.

193. (i) *Larder.* The larder, protected from the sun and from any heating arrangement, should be 5 sq. ft. in towns and 10 sq. ft. in the country.

It should be divided at 3 ft. from the ground by a slate or smooth concrete or stone slab. The upper portion should be fitted with three tiers of shelving, the lower with one tier of shelving. For ventilation there should be a small window with wire mesh, and an air brick near the floor. The sill of the window should be tiled.

194. (ii) *Draining Boards*. As noted above, there should be a draining board on either side of the sink. Each should be of the same area as the sink.

195. (iii) *Work Table Top*. The work table top should form an extension at work top level of one of the draining boards, and be of the same area. It can be of the same material as the draining board or preferably be a cold, hard, smooth slab, for making pastry, etc.

196. (iv) *Sink*. Minimum size, $24 \times 18 \times 10$ in. Desirable size, $30 \times 18 \times 10$ in.

These are the dimensions of Belfast Clayware sinks, but we recommend a sink with an extended shelf at the back properly drained, for soaps, etc. This shelf will give a neat fixing for the taps; supply pipes being brought to the fitting from below. Exposed lengths of pipes over the sink are highly undesirable. The use of metal sink units in one piece with splash back, shelf and draining boards, to allow for easy cleaning and rapid fixing, is also recommended.

A double sink is recommended for both washing-up and laundry in the working kitchen.

The sink is best placed under a window, but could well be along the wall at right angles to the window provided it is not too far from the light. The window sill above should be tiled, or finished with an easily-cleaned surface. The space below the draining boards should be fitted with a rack for pots and pans, etc.

The height of the sink should be related to adjacent fittings, that is to the draining boards and work table top, which should be fixed at 3 ft. in height. This height is referred to as the work top level. The plate rack should be placed within close reach of the sink.

197. (vi) *Cooker*. If a horizontal type of cooker is used it will require a minimum floor space of 4 ft. \times 2 ft. It should be so placed that good daylighting will reach the hot plates and oven.

198. (vii) *Storage Fittings*. In addition to the larder for perishable goods, storage is required for dry goods, utensils, crockery, glass, cutlery, dusters, cleaning materials, ironing board, etc., in built-in cupboards properly fitted with shelves.

The fittings required are:

- (1) A cupboard or two half-height cupboards for storage of dry goods, etc.
- (2) A kitchen cabinet, having an upper section for storage of crockery, etc., and a lower section for the storage of table linen and utensils.
- (3) A cupboard for brooms.
- (4) Small cupboards above the others for the storage of things not in daily use.

There are a number of ways of designing this range of fittings. The illustration on page 42 shows a range of sizes which are suitable for standardization, but are not intended to exclude other arrangements. The minimum necessary fittings in a house for five persons is the lower range of sizes.

199. *Shelving*. A small amount of open shelving is necessary, either in the kitchen, scullery or utility room. Both open shelves and shelves in cupboards can with advantage be fixed with $\frac{1}{2}$ in. space between the shelves and walls. This allows air to circulate and facilitates cleaning.

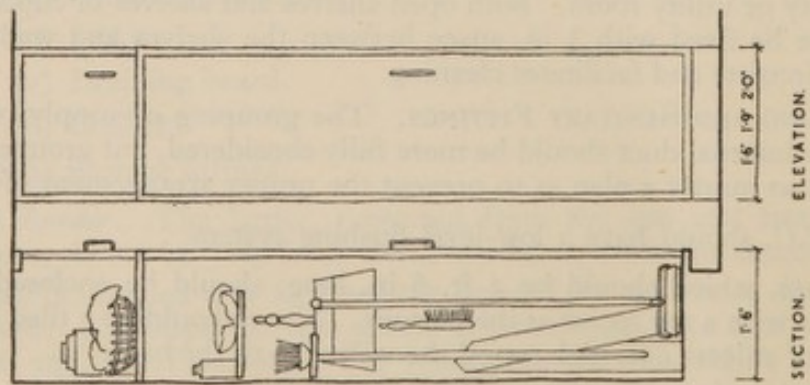
200. **PLUMBING AND SANITARY FITTINGS**. The grouping of supply, waste and soil pipes in an internal duct should be more fully considered, but grouped plumbing should not so master a plan as to prevent the proper arrangement of rooms.

201. *The W.C.* should have a low-level flushing system.

202. *The bath*, which should be 5 ft. 6 in. long, should be enclosed by hard surfaced panels with a toe recess at the bottom. There should be a tiled or impervious skirting of at least 1 ft. high round the wall edge of the bath.

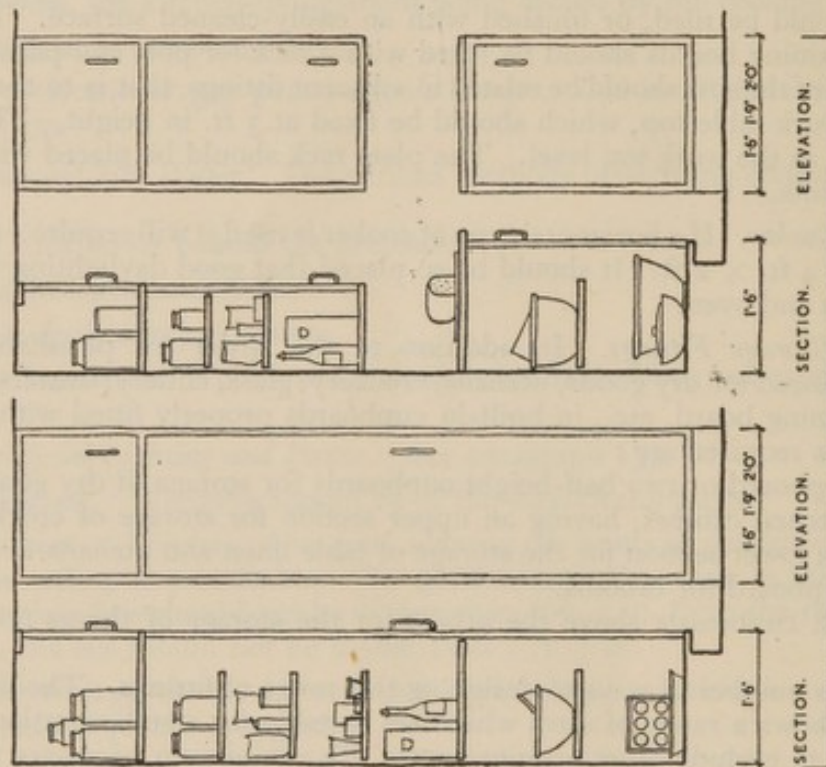
203. *The wash-basin* in the bathroom should incorporate a shelf.

SINGLE FULL SIZE UNIT.



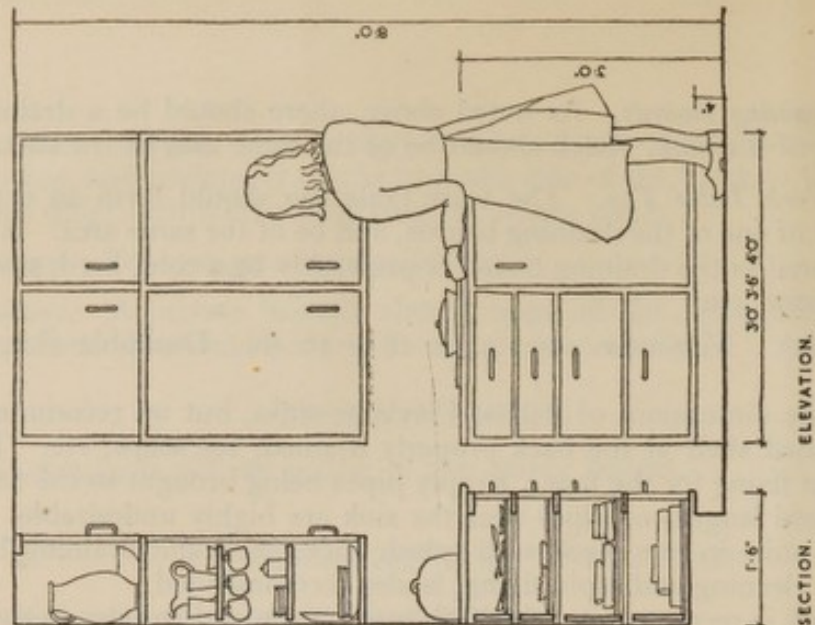
BROOM CUPBOARD.

SINGLE FULL SIZE UNIT. SINGLE UNIT 2. SECTIONS.



ALTERNATIVE DRY GOODS CUPBOARDS.

DOUBLE UNIT 2. SECTIONS.



DRESSER FITTING.

204. Taps should be easy to clean. The sill to bathroom and kitchen windows should be tiled or finished with an impervious surface. A towel rail, preferably heated, should be fixed in the bathroom.

205. LAUNDRY. The equipment required in the utility room or wash-house is a wash-boiler, deep sink, a draining board and a clothes airer. Similar provision should be made in the bathroom of flats, where clothes washing is done in this room. Where it is done in the working kitchen, a gas or electric wash-boiler should be provided under a movable draining board, close to the left side of the sink, so that washing can be transferred from the wash-boiler to sink through a wringer, which could not be regarded as a landlord's fixture.

206. CUPBOARDS. *Linen Cupboard.* The linen cupboard should be at least 18 in. deep. It should have four tiers of slatted shelves. Where there is a hot water tank, this should be at a low level in the cupboard. Where there is no tank, a small heater is desirable. The cupboard should be ventilated.

Clothes Cupboard. Cupboards placed on an outside wall are apt to be damp; they are best placed on an internal wall or on a partition wall between bedrooms. They should be fitted with a hat shelf and a rod for coat-hangers. The minimum depth of the cupboard should be 1 ft. 8 in.

207. MISCELLANEOUS. *Meters.* The Electrical and Gas Installation Committees draw attention to the need for compact arrangements of meters. These should be placed so that they are readily accessible and easily read.

Coat Rail. A rail with hat and coat hooks should be provided in a convenient place in the hall and in the utility room.

Delivery Hatch. A small delivery hatch attached to or adjacent to the back door of a house or the front door of a flat is a great convenience.

Refuse Disposal. A dust-bin should be provided and a convenient space should be allowed for it near the outhouse. We refer to refuse disposal in flats in Section VI.

SUMMARY OF GENERAL PRINCIPLES AND MAIN RECOMMENDATIONS

The numbers in parentheses refer to paragraphs in this Report

1. Design and construction of dwellings must keep abreast with progress in other fields. (12)
2. Local authorities should have greater regard to the views of housewives and should make greater use of their powers to co-opt suitable women to their Housing Committees. (14)
3. Good design is of paramount importance. Local authorities should plan their housing schemes with the intention of adding positively to the beauties of the town and countryside. (16, 21)
4. The Minister of Health in the absence of special circumstances should require all local authorities to employ trained architects for their housing schemes. (18)
5. A Manual of illustrative type plans should be prepared for the assistance of local authorities and their architects. (20)

TYPES OF DWELLING

6. Local authorities should continue in general to concentrate on the provision of three-bedroom houses, but should have latitude to determine other types needed in the light of local circumstances. (32)
7. Flats are open to many objections for families with children, but are less objectionable for other persons. (35)
8. A greater mixture of houses with flats is desirable. (35)

STANDARDS OF ACCOMMODATION

9. A three-bedroom house should contain :
 - (a) Two good rooms on the ground floor, one for meals and the second for other activities, or as a variant a dining recess off the living-room. (41)
 - (b) A separate place for laundry and other dirty household work which should not be done in a room in which meals are to be eaten. (42)
 - (c) A bathroom and W.C. in separate compartments upstairs. (46)No room should serve as a passage to other parts of the house. (49)
10. The minimum overall floor area necessary to give effect to the above recommendations is 900 sq. ft. subject to slight variations according to aspect and siting. (48)
11. The existing byelaws regulating the height of rooms should be maintained. (53)
12. Adequate outbuildings are essential for all houses. (55)

RURAL COTTAGES

13. Rural housing must not be of a lower standard than urban housing. (58)
14. Extra storage space and larger outbuildings are necessary in country districts. (62)
15. New Council cottages in rural districts should be situated in or adjoining existing villages or hamlets. (59)

16. There should be the widest possible extension to rural areas of public services, particularly piped water and electricity. (60)

17. The Ministry of Health should advise rural housing authorities on the various methods of providing drainage for small groups of houses. The Ministry should also prepare a model handbill to be issued to Council tenants in areas where earth closets are the only practicable solution. (61)

18. Design is of special importance in rural areas and particular attention should be paid to the designing of cottages which will conform with local traditions in building and with the landscape. (65)

19. Gardens should in general be as large as are likely to be cultivated. (66)

TERRACED HOUSING

20. Terraced houses should be planned to give greater privacy and freedom from noise. (69)

21. Secondary access should be provided by means of a through-passage on the ground floor. (71)

FLATS

22. Local authorities should take pains to make the appearance of blocks of flats and their surroundings more attractive. The mixture of flats with two-storey houses offers greater scope in this direction. (74)

23. Lifts should be provided in all blocks of flats with more than four storeys. (75)

24. Chutes should be provided for the removal of refuse in all high blocks. (82)

25. Rooms in flats should be no smaller than in houses. (86)

26. More communal facilities should be provided for blocks of flats. (96)

MAISONNETTES

27. Superimposed maisonettes are a suitable form of dwelling for central areas. (98)

ACCOMMODATION FOR OLD PEOPLE

28. More accommodation for old people should be provided in municipal housing schemes. This might take the form of separate small dwellings, grouped dwellings with some communal facilities or hostels. (103, 105)

ACCOMMODATION FOR SINGLE PERSONS

29. Better provision should be made for single persons either in separate small dwellings, lodgings or hostels. (107, 108)

DIFFICULT TENANTS

30. Difficult tenants should not be segregated in special accommodation. The solution to this problem is to be sought by an extension of trained housing management, combined with a system of filtering up. (110, 111)

STANDARDS OF CONSTRUCTION

31. Local authorities should have reasonable discretion to specify standards of construction. (113)

32. The results of research into standards of thermal and sound insulation should be incorporated into standards of construction. (113)

33. New methods of construction are to be welcomed, providing standards of construction are not prejudiced. (115)

34. Standardization of parts of dwellings will facilitate large scale building and effect economies. (118)

EQUIPMENT AND FITTINGS

35. There is a strong case for improvements in the following directions :

- (a) Better heating arrangements.
- (b) Constant hot water.
- (c) Better cooking facilities.
- (d) Better kitchen fittings.
- (e) Better arrangements for washing and drying clothes.
- (f) More efficient plumbing and sanitary fittings.
- (g) More room for storage.
- (h) More connections for light and power.
- (i) Better daylighting. (120)

36. All appliances consuming fuel or power should be fully tested to standards of performance to be established. (124)

37. So far as possible fittings and equipment of the standard recommended should be provided in reconditioned houses. (125)

* * *

We should like to record our appreciation of the very excellent work done by Miss Judith Ledebøer, A.R.I.B.A., our Secretary, who collected and summarized the voluminous mass of evidence on which our recommendations are based. Her dependability, resource, and application were of the greatest value to our inquiry. We have also to thank the other officers of the Ministry of Health who assisted us in preparing the Report.

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J. GREENWOOD WILSON

JUDITH G. LEDEBOER, *Secretary*.

8th February, 1944

APPENDIX I

EXTRACTS FROM OFFICIAL DOCUMENTS SHOWING VARIATIONS IN STANDARDS DURING THE INTER-WAR PERIOD

1919

Manual on the preparation of state-aided housing schemes (prepared on the basis of the recommendations of the Tudor Walters Committee and issued by the Local Government Board in 1919).

CLASS A

208. "The most general class of house should contain living-room, scullery, larder, fuel store, W.C., bath in separate chamber, and three bedrooms.

209. "The desirable size for the different rooms must depend to a certain extent on their arrangement, and on the exigencies of planning, owing to which it may not be possible to secure that every part of a house shall be of exactly the size mentioned. The following, however, may be taken as the minimum sizes which the Board consider desirable :—

Living-room : 180 sq. ft.

Scullery : 80 sq. ft. *Note* : This may be reduced slightly where the washing is provided for in the bathroom or in a wash-house.

Larder : According to circumstances and other provision that may be made for storage ; usually from 12 to 16 sq. ft. for urban or suburban areas.

Coal store : To hold at least one ton of coal. Not less than 15 sq. ft. is desirable for this purpose.

No. 1 bedroom : 150 sq. ft.

No. 2 bedroom : 100 sq. ft.

No. 3 bedroom : 65 sq. ft. (This should be increased wherever possible.)

210. "It is desirable to make provision for dresser, where customary, plate rack, draining board to sink, linen cupboard, wardrobe cupboards, and adequate shelving.

CLASS B

211. "This class comprises accommodation of approximately the same dimension as that provided in Class A, with the addition of a parlour of not less than 120 sq. ft. If only three bedrooms are provided, they should be increased in size proportionately over the dimensions specified in Class A. Where four bedrooms are provided, three may be as described for Class A, and the fourth should be from 70 to 100 sq. ft."

1923

Housing, etc., Act, 1923

212. "(1) The Minister of Health shall . . . make or undertake to make contributions out of moneys provided by Parliament.

(a) towards any expenses incurred by a local authority . . . in promoting . . . the construction of houses of such type and size as is specified in this section. . . .

"(2) The houses in respect of which contributions may be given under this section shall be either

(a) a two-storeyed house with a minimum of 620 and a maximum of 950 superficial feet, or

(b) a structurally separate and self-contained flat or a one-storeyed house with a minimum of 550 and a maximum of 880 superficial feet."

Annual Report of Ministry of Health, 1930-31

213. "Some variation in size is inevitable in view of the varying conditions and aspects of the site and to avoid a dull uniformity of design, but the Minister is advised, on the experience of the Local Authorities as a whole, that within the limits of variation shown in the following table completely sufficient accommodation can be provided in houses of the types named.

	SQUARE FEET SUPER
Homes for aged couples	380-400
Two-bedroom non-parlour houses	620-650
Three-bedroom non-parlour houses	730-760
Three-bedroom parlour or four-bedroom houses	880-920 "

1936

Circular 1539 issued by the Ministry of Health to Housing Authorities on 7th May, 1936

214. "The Minister would himself regard the following standards (in which by 'person' is meant any individual, whether adult or child) as being generally satisfactory :

"(a) The three-bedroom non-parlour type of house with a superficial area of 760 sq. ft. or thereabouts and containing bedrooms of about 150, 100 and 80 sq. ft. and a living-room of 180 sq. ft., affords adequate accommodation for a working-class family consisting of not more than five persons.

"(b) For a family of six persons a three-bedroom non-parlour type of house of rather larger size than that referred to under (a) would afford adequate accommodation. The third bedroom should be made larger, and this would give on the ground floor the necessary extra living-room accommodation. Suitable sizes recommended are bedrooms of 150, 120 and 100 sq. ft., and a living-room of 200 sq. ft., with a total superficial area of about 850 sq. ft.

"(c) For a family of seven persons appropriate accommodation could be provided in a four-bedroom non-parlour type of house containing bedrooms of approximately 150, 120, 100 and 80 sq. ft., and a living-room of about 220 sq. ft., with a total superficial area of about 1,050 sq. ft. In certain cases if the local authority consider that the circumstances call for it, one substantial living-room of, say, 180 sq. ft., together with a smaller parlour of, say, 100 sq. ft., might be substituted for the single large living-room.

"(d) For a family consisting of eight persons a four-bedroom house with a superficial area of approximately 1,130 sq. ft. would afford appropriate accommodation. The bedrooms might be approximately 150, 120, 120 and 100 sq. ft. in area. The living accommodation would normally take the form of a living-room and a parlour.

"(e) For families of more than eight persons the same general principle should be followed, that is, that a necessary increase of sleeping accommodation should be accompanied by a corresponding increase of living accommodation. Where there are nine persons in one family, appropriate accommodation might be provided in a four-bedroom house, on condition that the bedrooms were made large enough, e.g., so that the second bedroom had a minimum area of 130 sq. ft. In the case of very large families, it may be necessary to provide five or even six-bedroom houses."

APPENDIX II

ASSESSMENT OF COST AND RENTS

COMPARISON OF SUGGESTED THREE-BEDROOMED, FIVE-PERSON HOUSE WITH TYPICAL HOUSES BUILT BY LOCAL AUTHORITIES

IN 1939

(All costs based on those ruling at March 1939)

I. COMPARISON WITH MINIMUM STANDARD THREE-BEDROOMED HOUSE (AREA, 775 SQ. FT. ; COST, £335)

ORDER OF PRIORITY OF IMPROVE- MENTS	SUGGESTED STANDARD	STANDARD IN 1939 HOUSE	INCREASES OVER 1939 HOUSE		
			QUANTITY AND RATE	COST	PER- CENTAGE OVER £335
	(a) Items to be included in the structure				
1	Size of house, 900 sq. ft.	Size of house, 775 sq. ft.	125 sq. ft., 6s.	£ 37 10 0	11.19
2	Hot water and linen cupboard	C.W. tank only	—	18 0 0	5.37
3	Outbuilding	Nil	90 sq. ft., 6s.	27 0 0	8.06
4	Improved finish to kitchen floor	Granolithic kitchen floor	—	5 0 0	1.5
5	13 electric lights	7 electric lights	6 points, £1	6 0 0	1.79
6	2 gas or electric points	Nil	2 points, 30s.	3 0 0	.89
7	Larger windows	—	—	1 0 0	.30
	(b) Items which can be added later				
1	Dry goods cup- board	Nil	1, 45s.	2 5 0	.75
2	2 draining boards and work table top	1 draining board	15s.	0 15 0	.15
3	Extra shelving in kitchen	—	12 ft., 10d.	0 10 0	.15
4	Broom cupboard	Nil	1, 30s.	1 10 0	.45
5	3 bedroom cup- boards	1 bedroom cup- board	2, £3	6 0 0	1.79
6	Paint walls to bathroom	Distemper walls to bathroom	18 sq. yds., 3s.	2 15 0	.82
7	Paint walls to kitchen	Distemper walls to kitchen	30 sq. yds., 3s.	4 10 0	1.34
8	Towel rail and shelf in bathroom	Nil	—	0 10 0	.15
9	Paving to garden	Minimum	15 sq. yds., 5s.	3 15 0	1.12
	(c) Item not applicable to all Plans				
	Utility room sink, draining boards and airer	—	1, £12	12 0 0	3.58
Total additional cost				132 0 0	39.4
Add cost of 1939 house				335 0 0	100
Cost of house embodying suggested standards				£467 0 0	139.4 per cent.

II. COMPARISON WITH BETTER STANDARD THREE-BEDROOMED HOUSE (AREA, 825 SQ. FT.; COST, £400)

ORDER OF PRIORITY OF IMPROVE- MENTS	SUGGESTED STANDARD	STANDARD IN 1939 HOUSE (WHERE DIFFERENT)	INCREASES OVER 1939 HOUSE		
			QUANTITY AND RATE	COST	PER- CENTAGE OVER £400
	(a) <i>Items to be included in the structure</i>			£ s. d.	
1	Size of house, 900 sq. ft.	Size of house, 825 sq. ft.	75 sq. ft., 6s.	22 10 0	5.62
2	Outbuilding, 90 sq. ft.	Lower standard outbuilding, 80 sq. ft.	—	13 5 0	3.31
3	13 electric lights	8 electric lights	5 points, £1	5 0 0	1.25
4	Larger windows	—	—	1 0 0	.25
	(b) <i>Items which can be added later</i>				
1	Dry goods cup- board	Nil	1, 45s.	2 5 0	.62
2	Work table top	Nil	1, 5s.	0 5 0	—
3	3 bedroom cup- boards	2 bedroom cup- boards	1, £3	3 0 0	.75
4	Paint walls to bathroom	Distemper walls to bathroom	18 sq. yds., 3s.	2 15 0	.69
5	Paint walls to kitchen	Distemper walls to kitchen	30 sq. yds., 3s.	4 10 0	1.13
6	Towel rail and shelf in bathroom	Nil	—	0 10 0	.13
	(c) <i>Item not applicable to all Plans</i>				
	Utility room sink, draining board, and airer	—	1, £12	12 0 0	3.0
Total additional cost				67 0 0	16.75
Add cost of 1939 house				400 0 0	100.0
Cost of house embodying suggested standards				£467 0 0	116.75

III. ECONOMIC RENT

DESCRIPTION OF HOUSE	CAPITAL COST OF HOUSE AT PRICES RULING AT MARCH, 1939	ECONOMIC RENT BASED ON HALF-YEARLY LOAN CHARGES ON A 60-YEAR BASIS AT RATES OF INTEREST SHOWN, AND ALLOWING £75 FOR LAND, ROADS, SEWERS, ETC.					
		INTEREST AT 3 PER CENT.		INTEREST AT 3½ PER CENT.		INTEREST AT 4 PER CENT.	
		ON 1939 CAPITAL COST WITH £5 10s. P.A. FOR REPAIRS ETC.	IF CAPITAL AND MAINTENANCE COSTS INCREASE BY 30 PER CENT.	ON 1939 CAPITAL COST WITH £5 10s. P.A. FOR REPAIRS ETC.	IF CAPITAL AND MAINTENANCE COSTS INCREASE BY 30 PER CENT.	ON 1939 CAPITAL COST WITH £5 10s. P.A. FOR REPAIRS ETC.	IF CAPITAL AND MAINTENANCE COSTS INCREASE BY 30 PER CENT.
1. Minimum pre-war standard	£ 335	s. d. 7 10	s. d. 10 2	s. d. 8 1	s. d. 10 6	s. d. 8 5	s. d. 10 11
2. Better pre-war standard	400	8 8	11 4	9 1	11 9	9 5	12 3
3. Post-war house	467	9 8	12 6	10 0	13 1	10 5	13 7

APPENDIX III

Note by the Building Research Station based on work done for the Lighting of Buildings Committee of the Building Research Board (one of the group of Study Committees appointed at the instance of the Ministry of Works)

(A) DAYLIGHTING

215. To deal properly with the day lighting problem in dwellings calls for consideration of the obstruction to light, presented by, say, neighbouring buildings, the size of the window and agreement upon standards. The size of window and the degree of obstruction can always be balanced one against the other to obtain a given standard of lighting. The National Physical Laboratory of the Department of Scientific and Industrial Research has now in hand, as the result of the work of the Lighting Committee, the preparation of tables showing the amount of light provided by windows of varying sizes under different degrees of obstruction. It is intended that these tables will be published as a form of handbook and designers will then have a very convenient and accurate method of design at hand. This should greatly help to put daylighting on a more rational basis than hitherto.

216. At the same time the Lighting Committee has considered the difficult question of standards. The Building Research Station was asked by them to carry out a survey of daylighting in dwellings to determine what amounts of light appeared to satisfy the occupants. This was done with the help of the Ministry of Information Social Survey Department, and the data which was obtained proved very informative. Standards have now been suggested which it is believed represent acceptable lighting for dwellings.

217. The method of stating these standards requires a brief explanation. Daylight varies very greatly in intensity at different times of the year under different weather conditions, and with so variable a source it would be impracticable to design in terms of obtaining so many foot candles of daylight in a room. Instead it is usual to design to a given proportion or percentage of daylight at any chosen point in a room. This, in fact, corresponds much more closely to what the eye actually registers and the ratio is termed the daylight factor. Thus a daylight factor of 1 per cent. indicates that there is at the point concerned, 1 per cent. of the daylight which would be found outdoors under the whole sky at that moment. The Lighting Committee has stated its proposed standards in terms of penetration of a given daylight factor, and the area of working plane lighted (the "daylight area") to at least that intensity. The tables of window performance which are being prepared will refer to daylighting in a similar manner so that the tables can be used directly in design to the standards.

218. The Lighting Committee's proposals are as follows :—

SIZE OF ROOM, Sq. Ft.	DAYLIGHT FACTOR	PENETRATION, Ft.	DAYLIGHT AREA, Sq. Ft.
<i>Kitchens</i>			
Up to 100 sq. ft.	2 per cent.	6	50
100 to 120 "	2 "	7	60
<i>Living Rooms</i>			
Up to 150 sq. ft.	1 "	8	80
150-200 "	1 "	10	100
<i>Bedrooms</i>			
Up to 110 sq. ft.	0.5 "	8	60
110-150 "	0.5 "	10	90
150-200 "	0.5 "	12	120

219. For a detailed discussion of these standards the report of the Lighting Committee should be consulted.

220. In modern housing significant obstructions to light do not often occur, except perhaps in such cases as semi-detached houses with windows facing into a narrow area between houses. When these windows light kitchens, serious deficiencies can and do occur. But in the main the problem is simply one of adequate window size for houses, and here it is interesting to interpret the Lighting Committee's recommendations in terms of actual windows. Sizes will vary of course, depending largely on the height of window head; the following example dimensions are based on a lintel 7 ft. 6 in. above floor level, still height being assumed at working plane level, i.e., about 2 ft. 9 in. above the floor, and a 15 in. external obstruction representing the worst obstruction usually found in suburban housing at 12-16 houses per acre.

ROOM	WINDOW WIDTH *	GLASS AREA	PERCENTAGE OF FLOOR AREA
<i>Kitchens</i>			
Up to 100 sq. ft.	4 ft. 9 in.	19 sq. ft.	19 per cent.
100-120 "	6 ft. 0 in.	24 "	20 "
<i>Living Rooms</i>			
Up to 150 sq. ft.	4 ft. 3 in.	16 "	11 "
150-200 "	(lintel 7 ft. 3 in. 7 ft. 9 in.)	30 "	15 "
<i>Bedrooms</i>			
Up to 110 sq. ft.	2 ft. 9 in.	11 "	10 "
110-150 "	4 ft. 3 in.	16 "	11 "
150-200 "	(lintel 7 ft. 3 in. 7 ft. 9 in.)	30 "	15 "

* Approximate; allowance of 25 per cent. for glazing bars.

221. These sizes are for normal windows forming a straight run in one wall. The Lighting Committee has also considered how best to secure equitable lighting under various other conditions, with bay windows, dormers, balconies and so on, to which no reference need be made here in detail.

(B) ARTIFICIAL LIGHTING

222. In examining problems of natural lighting, the Lighting Committee has taken the line that the householder should not have to be dependent on artificial light during the normal hours of daylight, in reasonable weather, nevertheless they regard good artificial lighting as an important consideration in itself. A national survey of lighting in homes was carried out, again with the assistance of the Ministry of Information Survey Department, and the conditions which were disclosed suggested that certain general improvements were desirable both in the wattage used and in the types of fitting employed. For instance, the survey showed that the wattage used depended partly on the cost of electricity, and it is therefore clear that improvements in wattage depend in turn upon the lower cost of power for light. Again, most people apparently buy an extremely cheap fitting chosen more because of its low cost than its good design, for distributing the light in the room. An inadequate number of outlets was also evident. The Lighting Committee feels that the most reasonable way to rapid improvements after the war—apart from lowering the cost of fuel for light—is to require that all dwellings built for sale or to let should be equipped to a minimum standard at the time of building; that is to say, lighting would be considered on the same basis as, say, plumbing or heating, fittings being provided at certain lighting outlets just as radiators or taps are provided in the other cases. The Committee gives tables of wattages and gas mantles which should be used, and recommends the preparation of British Standards Specifications for fittings for these purposes. They also suggest the number and approximate location of a minimum number of lighting outlets. The policy would then be to start right in the hope that people would continue right.

APPENDIX IV

EVIDENCE

LIST OF ORGANIZATIONS AND INDIVIDUALS INTERESTED IN HOUSING
FROM WHOM INFORMATION HAS BEEN OBTAINED

LOCAL AUTHORITIES

Atcham Rural District	County of London
City of Birmingham	City of Manchester
City of Bristol	City of Newcastle-on-Tyne
Chipping Norton Rural District	City of Nottingham
City of Coventry	Stepney Metropolitan Borough
City of Leeds	Wellington Rural District
City of Liverpool	

LOCAL AUTHORITY ASSOCIATIONS

The Association of County Councils	The Association of Rural District Councils
The Association of Municipal Corporations	The Association of Urban District Councils
The Association of Non-County Boroughs	

ORGANIZATIONS

Association for Planning and Regional Reconstruction	National Federation of Women's Institutes
Bristol Rotary Club	Mothers' Union
British Electrical Development Association	Over Thirty Association
British Gas Federation	Royal College of Nursing
Building Societies Association	Royal College of Physicians
Chartered Surveyors Institution	Royal Institute of British Architects
Dartington Hall Trustees	Royal Sanitary Institute
Domestic Electric Refrigeration Association	Royal Society for the Prevention of Accidents
Ecclesiastical Commissioners	Sanitary Inspectors Association
Electrical Association for Women	Society for Improving the Conditions of the Labouring Classes
Gas Light and Coke Company	Society of Medical Officers of Health
Good Housekeeping Institute	Society of Women Housing Managers
Housing Centre	Standing Joint Committee Working Women's Organizations
Hundred New Towns Association	Stepney Reconstruction Group
Institute of Housing	Town and Country Planning Association
Institute of Landscape Architects	Transport and General Workers Union
Institute of Municipal and County Engineers	Union of Catholic Mothers
Kensington Housing Trust	Welsh Land Settlement Association
Kitchen Planning Centre	Welwyn Garden City Ltd.
Land Agents Society	West Midland Group for Post-War Reconstruction and Planning
Land Settlement Association	Westminster Housing Association
Mass Observation	Women's Advisory Housing Council
National Union of Agricultural Workers	Women's Co-operative Guild
National Board of Catholic Women	Women's Farm and Gardens Association
National House Builders Registration Council	Women's Gas Council
National Housing and Town Planning Council	Women's Group on Public Welfare
National Smoke Abatement Society	Women's Pioneer Housing, Ltd.
National Council of Social Service	
National Union of Townwomen's Guild	
National Council of Women of Great Britain	

INDIVIDUALS

Mr. H. E. AYRIS
 Mr. F. BENNETT, A.R.I.B.A.
 Mr. HOPE BAGENAL, A.R.I.B.A.
 Mr. HERBERT COLLINS, F.R.I.B.A.,
 M.T.P.I.
 Miss E. DENBY
 Mr. H. EVANS
 Mr. I. B. M. HAMILTON, A.R.I.B.A.
 Mrs. J. HAWKES
 Miss M. M. JEFFERY, O.B.E.
 Mr. G. A. JELICOE, F.R.I.B.A.
 Mr. A. R. KENNETH VAUGHAN
 Mr. A. KENYON, F.R.I.B.A.
 Mr. JOHN LAING
 Mr. ALWYN T. LLOYD, J.P., P.P.T.P.I.

Miss OLIVE MATTHEWS
 Mr. HENRY MORRIS
 Mr. C. W. NEEDHAM, F.R.I.B.A.,
 M.T.P.I.
 Mr. H. E. NEWMAN
 Mr. H. C. POWELL
 Mr. STANLEY C. RAMSEY, F.R.I.B.A.
 Miss M. REYNOLDS
 Mr. HOWARD ROBERTSON, F.R.I.B.A.
 Mr. RUPERT SAVAGE, F.R.I.B.A.
 Mr. M. F. TAYLOR, A.R.I.B.A.,
 A.M.P.T.I.
 Mr. C. WILLIAMS-ELLIS, F.R.I.B.A.,
 M.T.P.I.
 Mr. A. E. WISEMAN, F.R.I.B.A.

SITE PLANNING AND LAYOUT IN RELATION TO HOUSING

REPORT OF A STUDY GROUP OF THE MINISTRY OF TOWN AND COUNTRY PLANNING

I. RELATIONSHIP OF HOUSING AND TOWN PLANNING

INTRODUCTORY

1. It is now a commonplace to say that the solution of the housing problem does not lie wholly in the provision of the number of dwellings which may be required, however well-planned, well-designed, well-constructed and well-equipped every one of these dwellings may be. The satisfactory situation of individual new dwellings in relation to each other ; in relation to the mass of existing dwellings ; in relation to industry, transport and a whole host of other activities—that is as important as the provision of dwellings which are good in themselves. In other words, the subject of housing is allied very closely indeed to the subject of town and country planning.

2. Town planning itself secures the proper relationships between the elements of the town plan in regard to social uses, services, topography, architecture and landscape. Among those elements, housing is of first importance. The town planning and the housing authority are both concerned with the relation of different types of dwelling to each other, and to roads, open spaces, shops, factories and public buildings. The housing authority is concerned with housing accommodation in all its forms, as an essential public service ; the planning authority is concerned with its place in a plan which embraces many other forms of land use.

REGIONAL CONSIDERATIONS

3. Consideration of the various methods of meeting housing needs must clearly be given on a regional basis, and must arise out of an adequate survey, physical, social and economic. Regional, in this sense, is not meant to imply any particular set of administrative boundaries, but simply the inclusion of neighbouring areas in addition to the one under consideration. Regions vary in size and character, but will usually present one or more of the following planning problems :

- (a) The internal redevelopment of existing towns.
- (b) The extension of existing towns by suburban development.
- (c) The creation of new towns, which are bound to be in some degree satellite in character, in that certain facilities for work, higher education, and recreation can only be provided at present in the larger existing towns.

- (d) The planned addition or transference of housing which cannot be accommodated in the large towns, around—
 - (i) existing small towns,
 - (ii) suitable war-time establishments in country districts.

THE REDEVELOPMENT OF EXISTING TOWNS

4. Most old towns exhibit clearly defined historical periods of growth—e.g. :

- (a) The central areas, now no longer mainly residential.
- (b) The rings or sectors of high density residential development, which contain houses usually over 50 years old (and sometimes as much as 150 years old), and flats, as well as a few houses at a lower density.
- (c) The suburban areas of mixed private and subsidized housing, on cheaper land ; and the outer residential estates, mainly built during the inter-war period.

5. In the absence of comprehensive and careful planning, the tendency will be for congested areas to be redeveloped at too high a density in marked contrast to the outlying sectors at low densities. Where land is costly, open spaces rare, and congestion customary in the past, blocks of flats are likely to be accepted as the normal form of dwelling.

Unquestioned acceptance of the old pattern as the basis for the new will not effect any real improvement. It perpetuates the weakness of piecemeal redevelopment, and the mistake of determining the proportion of houses to flats, not on the needs of the community as a whole, but on the cost and availability of particular parcels of land. It is the overall density of a whole neighbourhood which should be borne in mind as well as the local densities of groups of houses or estates. For example, higher densities should be allowed adjacent to open spaces rather than in the centre of congested districts where open space is scarce. In a word, reconstruction schemes should be considered over areas big enough to make the best use both of natural advantages and of social groupings. It will then be possible to draw up a programme of rebuilding which will allow eventually for properly planned residential neighbourhoods, composed of the several different kinds of dwellings and related more closely to actual needs in so far as flats and houses are concerned. In general, the tendency towards a lower overall density for towns as a whole will no doubt continue. But even where this is not the case—and cities can offer compensations for lack of space in both compactness and variety—a more rational pattern of higher and lower density developments in relation to roads and open spaces will help to improve living conditions.

6. In all redevelopment schemes, the opportunity should be taken to redevelop as large an area as possible at the same time, or at least to some plan which will ensure the desired result in successive periods. Only thus will it be possible in central areas to give proper attention to neighbourhood planning, and to provide some urban open space where populations are concentrated, together with conveniently situated primary schools, shopping areas, parking for motor vehicles, and other communal facilities. In a large town the *programme*—and in particular the time-table—of redevelopment will require very careful consideration. A plan is bound to look well into the future, but a building programme which is not realisable in short and measurable periods of time is likely to lose not only its interest but its motive, as conditions change from year to year.

7. Most towns contain sporadic instances of vacant or bombed sites available for housing. Here also the principle of redevelopment should be towards a gradual shaping of the area into residential neighbourhoods with facilities for community life and some variety of housing accommodation.

THE EXTENSION OF EXISTING LARGE TOWNS

8. In planning for the housing needs of the larger towns and groups of towns, the necessity will arise of considering whether or not further suburban or "fringe" development is desirable. Improved communications and cheap travel facilities will do much to relieve congestion and to provide an occasional means of escape from the confinement of the large town. But a point is reached—and has been reached already in the case of the larger urban growths—at which improved transport facilities are no compensation for the loss of touch with country air and country life. To make this condition progressively worse, by continued expansion without an intervening belt of green or farm land, is to create an almost insoluble problem for the future. The preservation, in some cases of a green belt, in others of wedges or sectors of undeveloped land, in order to impose a complete or partial limit to the size of these towns, will need to be seriously considered.

The preparation of short-term housing programmes, without reference to a regional survey, will merely encourage continuous and unrelated growth, and will not help in reaching a solution to the urgent problem of securing a balanced distribution of population.

THE CREATION OF NEW TOWNS

9. The creation of new satellite towns, notwithstanding that statutory provision for this has been made for some time, has not been a frequent occurrence in the past. This has largely been because of financial difficulties in relation to the size of the operations involved. After the war the need for new building will be greater than before; and wherever there is at the same time a serious problem of overspill (i.e., one in which a numerous population cannot be housed adequately within the existing town), and a conviction on the part of the local and central authority that development on the outskirts of the large town is undesirable, there will exist a strong case for the establishment of new self-contained centres of settlement, planned at the outset for flexible growth but limited as to their eventual size. Nevertheless, the establishment of new settlements should not be undertaken without sound economic justification.

EXTENSION OF EXISTING SMALL TOWNS

10. Where a small town, or a war-time industrial development, justifies on social and economic grounds the addition of a considerable proportion of housing so as to form a permanent settlement of larger size, care should be taken to relate the old to the new development so that the sense of community which each engenders will not be exclusive, but will combine to form a wider civic entity. This will be aided by the provision of communal and municipal facilities, in proportion to the size of the town, at the same time as the additional houses are built.

GENERAL

11. There is a good deal of evidence in support of the principle that public authorities should have wider powers of land acquisition for housing and related purposes. It is also generally agreed that planning schemes should restrict the areas of land available for immediate residential development to an amount more in proportion to actual needs and reasonable freedom of choice. But within the areas so zoned it would clearly be an advantage that land should be acquired—if necessary by compulsory purchase—so as to ensure that the requisite housing may in fact be provided. It is for consideration elsewhere how such a system might be administered; and what would be the respective rôles of local authority and private enterprise.

12. Whatever may be the method used in developing and redeveloping residential areas, it is essential from the point of view of good planning, that the Local Authority should have detailed proposals for estate development, in addition to its broad scheme of residential zoning under the Town and Country Planning Acts.

These should aim at the eventual creation of residential neighbourhoods in accordance with the principles outlined below. This means that before housing begins, the Authority should have a general development plan for the future of the whole area, flexible enough to be altered as occasion demands; and in addition a provisional and fairly detailed plan showing the possibilities of site development for the areas in which building is immediately contemplated.

II. NEIGHBOURHOOD PLANNING

13. The conception of the urban "neighbourhood," in the sense in which the term is used here, is of very recent date. It is only during the last decade or so that the special meaning which now attaches to the term has been developed in any clear way.

The abstract conception of a town has generally been of a single, though complex social organism; the home of a single, though complex, community. So, ideally, it should be still. In smaller towns this conception still exists; and it existed in most towns until the era of rapid town growth which accompanied the industrialization of this country. During the past hundred years the larger towns have absorbed smaller communities and coalesced with other towns. The physical result has caused a partial breakdown of that feeling of neighbourhood or community which is one of the fundamentals of social well-being. In addition, and despite the benefits of continuous technical invention, the life of many town dwellers is filled with unnecessary difficulties created through an unorganized physical environment—difficulties such as traffic dangers (especially for children), the inconvenient situation of shops, workplaces and open spaces, drawbacks such as noise, polluted air, and so on. This is particularly true in the larger towns where traffic is canalized through the very centres of what one might define as neighbourhoods—vague though they often are. These neighbourhoods—and strong feeling for them still exists in some places—are now largely obsolete not only in the sense that their buildings are outworn, but also in their physical arrangement and use. The more disorderly town expansion is, the more they are mutilated. And it is a social as well as a physical mutilation, because community and recreational buildings, schools, shops and workplaces, do not take their place as components of a rational pattern.

14. Something like half the population of England and Wales lives in towns which have a population of over 50,000. In these larger towns especially a sense of neighbourhood has been lost to great numbers of the inhabitants. The town is generally too large to be fully understood as a social unit, and the neighbourhood, the immediate environment of the many inhabitants, has lost or never had a full identity. But it is not only in older parts of the towns that this has happened. Indeed the position is even worse on most of the large housing estates built both by the housing authorities and private enterprise in the period between the wars. There it often happens that all forms of community provision, even the pubs and the shops, are inadequate to induce any growth of neighbourhood feeling, and even the physical arrangement of the place presents as many obstacles to it as the older towns do.

15. For the proper social well-being of the large town, then, it is necessary to work out some organization of its physical form which will aid in every way the full development of community life and enable a proper measure of social amenities to be provided and arranged to advantage in each residential neighbourhood. The idea of the "neighbourhood unit" arises out of an acknowledgment of the necessity of doing this and offers the means of doing it.

16. In the past the existence of physical barriers was sometimes useful in preserving a sense of neighbourhood. In the future such features could be used to define them. The principle behind the idea of the urban neighbourhood must be not merely to break down the large town into units of a size which will allow a

full growth of community spirit and neighbourhood feeling, but to ensure that its redevelopment takes place in such a way that each unit, while still essentially but a single part of a greater whole, becomes a comprehensible entity in itself. It might, even, become a local government entity, for it would obviously be sensible if the ward boundaries of a town followed the boundaries of neighbourhood units, wherever these are strongly defined. The obvious way to delimit the neighbourhoods is by adapting their boundaries to barriers such as railway lines and main highways and by the creation of features such as open spaces of the parkway type. These would be sufficient to establish individuality and would not suggest too great a degree of separateness.

SIZE OF RESIDENTIAL NEIGHBOURHOOD

17. While the "sense of neighbourhood" is difficult to define, it is not so difficult to define the outside limits of the physical area within which it may be experienced. It has been suggested in evidence that the desirable social unit is a "neighbourhood" with a population not exceeding 10,000 persons, living in an area where every house is within about ten minutes' walk of the neighbourhood centre. Such a unit would be large enough (i) to embrace a wide variety of experiences and tastes, and yet small enough (ii) to possess easy accessibility between its parts, and (iii) to provide occasion for acquaintance. A unit of this size would contain most of the communal facilities required for the full development of the life of the neighbourhood.

These suggestions arise from a consideration of the neighbourhood as a social unit. It is possible to approach the problem in another way, namely, with the school system in mind. The Board of Education has considered this, and its conclusion is that "if the planning of the neighbourhood unit could be based upon a population constituted so as to be an exact reproduction, according to social class and income, of the population as a whole, the best size would be either 5,000 to contain one school for children aged 5-7 and one for children aged 8-11, or alternatively a population of 10,000 containing two of each such schools." The composition of the population is in practice not likely to be exactly like this, and it will probably be better to reckon with various sizes of unit within a town. It will be seen from the two sets of figures that what is considered the upper population limit for a neighbourhood as a social unit coincides with the larger school neighbourhood, that is to say one with a total population of 10,000. This neighbourhood would also contain a child population of the age groups 11-15 which would normally require one Secondary (Modern) School. If this were a mixed school for boys and girls it could be contained in the unit, but if, as is more likely, it were for boys or girls only it would be shared by two neighbourhoods, i.e., with a total population of 20,000. In this case there would be two Modern Schools to two neighbourhoods and both would best be placed between the units, so as to be equally convenient to either.

DENSITY

18. On the assumption that the upper limit of 10,000 population is practicable it is possible to make certain calculations in areas. A decisive factor would be density: but arriving at reasonable density figures is one of the most difficult problems in planning. It is comparatively simple to establish density zones on land which has not before been built on; but the problem becomes more complex in considering redevelopment of various sections from the outer to the inner built-up areas in towns. The higher cost of land, the concentration of workplaces, and existing housing and community facilities have, in the past, greatly affected the density of redevelopment. Certain important amenities, notably open space, are quite inadequate in central areas: they can be introduced only if a long-term planning policy is pursued, for the *scale* of redevelopment is a governing factor. An ultimate objective, say for a 50-year period, should be set, and that objective should

be attained by stages. Period planning would thus become part of comprehensive long-term planning.

19. Every housing scheme, whether it be part of new development or redevelopment, should be related to the general community planning scheme. If the neighbourhood is to be the basis of residential planning, minimum standards of net residential density and gross density per neighbourhood can be set. It can be assumed that, in the near future at least, densities will vary according to the location of the housing in the town; in general the nearer the centre, the higher the density. But it should never be so high that it is impossible to include houses for families with young children, open spaces, and a range of community buildings. The table below shows minimum standards of land areas which ought to be required in each neighbourhood of this size.

The standards are for self-contained residential neighbourhoods and not for general planning purposes. They do not include main shopping and business centres, industrial areas, main recreational and amusement centres and secondary educational buildings and playing fields. It may not always be possible in central areas to obtain all the land required for playing fields adjacent to the Secondary Schools (of which there may be two for every two neighbourhoods). Ideally the Secondary (Modern) School and its playing fields would occupy 16 acres.

It will be noted that the "housing area" acreages given in the table are the areas required to house 10,000 people at the net residential densities shown. These acreages would be translated into terms of accommodation in houses and flats. In actual practice this would be done after the particular population requirements had been assessed. At the highest density (120 persons per acre) it would be possible to accommodate 70-75 per cent. of the population in houses at a density of 20 houses per acre, or a little over. At the other densities it would be possible to include as high a proportion of houses as may be required.

A RESIDENTIAL NEIGHBOURHOOD OF 10,000 PERSONS

USE	OPEN DEVELOP- MENT	OUTER RING	INNER RING	CENTRAL	CENTRAL
	ACRES 333	ACRES 200	ACRES 133	ACRES 100	ACRES 83
Housing					
Primary schools (3-11 years of age) (School and playing field area)	17	17	17	17	17
Open space	70	70	60	50	40
Shops, offices, etc.	9	8	7	6	5
Community centre, churches, etc.	7	5	4	3	3
Public buildings	4	3	2	2	2
Service industry and workshops	7	6	5	4	4
Main roads including half bound- ary roads, up to a maximum of 20 ft., and parking	35	28	20	17	14
TOTALS	482	337	248	199	168
Average net residential density * (persons per acre)	30	50	75	100	120
Gross neighbourhood density † (persons per acre)	21	30	40	50	60

* *Net residential density* is the average number of persons per acre of housing area; which comprises the curtilages of the dwellings, access or internal roads and half the boundary main roads up to a maximum of 20 feet, where these are contiguous to residential property.

† *Gross density* is the average number of persons per acre of the whole neighbourhood, the acreage of which is shown by the totals.

The desirable standard for central redevelopment is shown in the fourth column, namely, 100 persons per acre. In very few cases, and then only in large concentrated urban areas, should it be necessary to rebuild at 120 persons per acre. Additional open space to make up an overall total equivalent to seven acres per 1,000 of population should always be an essential part of the general plan of development of the town as a whole. Some playing fields for the central areas might therefore be included in the green area which should surround the town. The standards suggested in the above table are "target" figures only. Other target figures could be inserted between the vertical columns, e.g., for intermediate densities of 40 or 60 persons to the acre, where local circumstances require variations. The important point is that there should be a balanced and proportionate relation between the various components of the neighbourhood plan.

It should also be borne in mind that the 10,000 population figure is a target only, and that local conditions might dictate a lower figure, though not generally one lower than 5,000.

ELEMENTS IN THE NEIGHBOURHOOD PLAN

20. Having arrived at an approximate size of a neighbourhood for 10,000 persons, i.e., from 168-482 acres and more, the elements of the neighbourhood plan and their disposition should be carefully considered. Within the neighbourhood it is strongly recommended that a variety of dwellings should be provided. A great deal of evidence has been submitted indicating that each neighbourhood should be "socially balanced," inhabited by families belonging to different ranges of income groups, or at least not so unbalanced as to be restricted to dwellings and families of one type or income level only, as the case may be.

21. The careful disposition of amenities such as parks, playgrounds, recreational facilities, community buildings and shopping centres would go a long way to solve the problem of "social balance," but the main key to a solution would lie in the grouping of the various types of dwellings in such a way that they satisfy the desires of the various social groups in the matter of immediate convenience and use, and yet at the same time are part of the neighbourhood. There are practical difficulties in the way of indiscriminately mixing the dwellings of the various income groups. The way to success would lie in studying the trends evidenced between the wars, and in so arranging the dwellings within the neighbourhood plan that it is made up of several minor groups of dwellings, each one of which would have its own distinctive character, largely dependent on the size of dwelling and arrangement of plot plans. The evidence suggests that, on social grounds, these minor groups should provide for 100-300 families.

22. The most important element is the total of dwellings sufficient to house up to 10,000 people. Within this total there would be variety in types of accommodation corresponding to variations in rents, income group requirements and size of family. As well as family dwellings there ought to be accommodation for both old people and single people: the proportion varies in different towns and districts, but should be estimated as closely as possible in each case. The siting of the various types of dwellings would not follow any set formula; but certain principles might be established which would generally apply. Flats for instance, if included, would best be placed immediately adjacent to public open space and near to the neighbourhood centre where communal facilities and shops would be most numerous. The accommodation for single and old people would be in a similar position.

23. The second most important element in the neighbourhood would be the open space required for different purposes. It should be systematized and closely related to the dwellings. If the nature of the site allows, it is preferable to have a continuous park and playground pattern which, besides incorporating topographical features, would be within easy reach of every house and so would offer opportunities for walks along a system of pedestrian ways. These walks could provide

safe routes for children travelling between home and school. Within such a continuous open space system children's playgrounds as well as some of the playing space for people of all ages could be provided. A substantial part of the open space may well be situated on the perimeter of the neighbourhood, where it would act as a buffer between the housing groups and the traffic arteries or railways which pass between neighbourhoods. Even in this position some open space need never be more than a quarter of a mile from any part of the neighbourhood.

24. The siting of the primary schools should receive early consideration in preparing the plan. When there is to be only one in the neighbourhood it should be as near to the centre of the residential area as possible. Where there are to be two each one should be centred on a half of the residential area. The schools would then be within easy walking distance of each home and access to them could be so arranged that children would not have to cross roads except those of minor or local character. If a system of nursery schools is established there would be two, three or four; and they could be located within very easy walking distance of all homes. The Secondary (Modern) Schools might very well be situated on the perimeter of the neighbourhood, as there would be one of each shared between two neighbourhoods, one for boys and one for girls. The sixteen acres required for each complete Secondary School unit would helpfully increase the "buffer" open space.

25. It is desirable that there should be some principal focal point, some definite "centre" in every neighbourhood: and so far as it can be achieved every centre should have its own individual character. Among neighbourhood buildings which may well be at the "centre" are places of worship, the branch-library, a cinema, public house, branch administrative buildings, the necessary clinics, smaller club buildings, and a group of shops. Ideally a neighbourhood of 10,000 people should contain a Community Centre and a Youth Centre, and these too should be at or near the focal point. It may not always be possible to provide separate buildings for the Community and Youth Centres, and in that case accommodation may perhaps be provided ancillary to school buildings, a main hall and gymnasium being common to the School, the Community Centre and the Youth Centre.

26. The local shopping centre should be an important element in a neighbourhood plan. One of the key factors in providing adequate facilities for shopping is a knowledge of the number of shops required for each neighbourhood. Unfortunately it is, for various reasons, impossible to establish accurate authoritative figures for this. Until more information is available, space reservation for shops must still to some extent be on an empirical basis.* An examination of such information as is available has, however, led us to the conclusion that there should be at least an allowance for shops in a neighbourhood (i.e., *local* shopping facilities, additional to those available in the central areas of a town) at a rate, in terms of individual shops, of 1 shop per 100-150 inhabitants; or somewhere between 100 and say, 70 shops per neighbourhood of 10,000 people. The presence of multiple and co-operative stores is apt to upset a simple approximate formula of this kind; and to allow for all types of shops it may be better to plan in terms of shopping areas rather than numbers of shops. Assuming a fairly low average of some 270 sq. yds. per shop, which would include service roads, delivery space, etc., this would mean, at the numbers suggested above, somewhere between 19,000 sq. yds. and 27,000 sq. yds. of shopping sites in all, for a neighbourhood of 10,000 people.

27. As to the situation of the shopping groups in relation to housing there is a fair measure of agreement that every house should have shops within a quarter of a mile walking distance. This may mean that besides the central neighbourhood shopping group there may be one or more subsidiary groups. These subsidiary

* It is anticipated that further information will be supplied in publications by the Ministry of Town and Country Planning.

groups where they exist, may contain anything up to a dozen shops ; and there should not be so many of them that the central group would be too much reduced by comparison. Except by reason of unusual topography or custom, it should rarely be necessary to have more than two groups (together with occasional single shops subsidiary groups might require up to 6,000 sq. yds.). The central group of the neighbourhood would then be between 15,000 sq. yds. and 21,000 sq. yds. in approximate area.

In all shopping groups the layout should be such that passing traffic is not obstructed by standing vehicles. In any case arterial roads are unsuitable situations for shopping centres. Rear access to the shops should be provided so that delivery vehicles may not cause obstruction in the public street.

III. SPACE ABOUT DWELLINGS

28. The necessity for space about dwellings arises from several main considerations—that of having adequate light and ventilation in the buildings, that of having adequate access, that of preventing the spread of fire, and that of having sufficient space to give adequate outdoor amenities for the inhabitants. The first three of these requirements can be assessed on a reasonably scientific basis, but the last can only be determined empirically, since it is influenced by many varying and sometimes contradictory individual preferences on the part of the mass of people.

29. There are two forms of lighting to be provided for, namely, sunlight and daylight. The securing of proper sunlight penetration is partly a matter of the orientation of the individual building, and partly a matter of space between adjacent buildings. There is no perfect orientation, the desirable orientation is determined in each case by the particular use-demands of the building ; but any of the aspects in the quarter between N.-W. and N.-E. is obviously undesirable for habitable rooms in dwellings.

30. It is now generally agreed that to ensure adequate daylight in rooms it is necessary to have a clear view of part of the sky from most normal positions within it, and not only from the immediate vicinity of the window. This view depends on the size and position of the window, and on the degree and nature of external obstructions to the view of the sky.

It is customary to make measurements of the angle of light from sill level, and so far as block layout is concerned, this is the most convenient method ; it being understood that to allow penetration of direct daylight well into the room is the main object of the calculation.* A reasonable working rule is that there should be no continuous external obstruction which would increase the angle at sill level to more than 15 or 18 degrees. Light which passes the sides of buildings or comes between them is also extremely useful because it comes at a low angle and therefore penetrates well into the room, so that where for one reason or another it is impossible to plan for an angle of obstruction less than 18 degrees, a broken skyline produced by gaps or breaks in a line of buildings will have advantages in daylighting not possessed by an unbroken one. This arrangement of maintaining a gap between adjacent buildings like blocks of flats can, of course, be systematized in an orderly way, and as such it has been used a good deal on the Continent. Several Danish and Swedish groups of flats, for example, show not only how gaps have been used to improve daylighting, but also to secure longer views from the room windows.

* Tables showing the performance of windows, in relation to obstructions to light, are being prepared by the Department of Scientific and Industrial Research. See also *Lighting* in the forthcoming Code of Practice to be issued by the Codes of Practice Committee of the Ministry of Works.

The arrangement will generally only be necessary in blocks of flats. In ordinary two-storey housing there should be no difficulty in limiting the angle of obstruction to 15 degrees.

31. The recognition of the gap as being of value in the daylighting of *flats* may be carried on to the establishment of building shapes designed to take special advantage of it.

For the purpose of comparing plan types it is necessary to have some means of stating density in terms of building bulk, and for this purpose what is called the floor-space-index is as valuable as any. The floor-space-index is the ratio of the total floor space of all floors of a building or group of buildings to the total site area (including roads and incidental open spaces). It can be shown that for a given floor-space-index for a given site, an increase in the height of buildings laid out in parallel blocks (giving a correspondingly wider spacing of the blocks) is accompanied by an increase in daylight and an increase also in the amount of open space available per flat. Assuming, for example, a floor-space-index of 1 for parallel blocks of flats five or ten storeys high on the same area of land, the decrease in the angle of obstruction is such that the depth of penetration of daylight into the average ground floor rooms is much greater in the ten-storey flats than in those of five storeys. By turning every second block through 90 degrees on plan, where this is possible having regard to other considerations, increases of light penetration of 50-70 per cent. may be obtained. Similarly it can be shown that the cruciform, the Y and the (broken) H shapes are very superior to the closed courtyard type of layout which has hitherto been a common form of layout for flats.

32. The application of the requirement of a 15-18-degree angle of obstruction to ordinary two-storey housing shows that higher densities than have hitherto been commonly accepted in housing and planning schemes, may, in certain conditions, be entirely satisfactory as regards daylighting. The degree of obstruction presented by the roof has a marked effect on the spacing necessary between blocks of houses. A 15-degree angle of obstruction subtended to table height at a depth of penetration of 15 ft. will require a distance of 73 ft. 6 in. between houses, 16 ft. 6 in. high to the eaves and with a 45-degree pitch of roof: with a 30-degree pitch of roof the distance between houses would be 52 ft. 6 in.: with a flat roof it would be 42 ft. 6 in. If we calculate densities on these distances (taking a house with a 20-ft. frontage and a depth of 25 ft.) we get net density figures of 22, 28, and 32 houses per acre. Though these figures may be satisfactory for lighting, they are not necessarily satisfactory for the provision of adequate outdoor amenities for persons inhabiting the buildings; and they show in this respect the unsoundness of basing any argument for housing at low densities purely on grounds of securing daylight or any other single amenity. But they also show that the densities which have been imposed in the past have sometimes been unnecessarily low in this respect; and that it is unreasonable to attempt to apply them in the redevelopment of central areas, where some reduction of suburban open space standards is reasonable on other grounds than those of daylighting.

33. As for housing densities generally, it has become obvious of recent years that the common practice of zoning for not more than a specific number of houses per acre over large areas has resulted in nearly every house within those areas having an amount of land attached to it which would make its individual density much the same as the average density. This, from many points of view, is unsatisfactory. We suggest that henceforth three separate measures of density planning and/or control may be necessary. First, there should be a population density planned for every neighbourhood, as we have indicated in Section III. Second, there should be a floor-space standard applied to defined areas (e.g., areas of 100-300 houses; on the lines of the land-units under which housing densities have been calculated in town-planning schemes in the past). Third, there should be a control safeguarding the lighting and amenity space for every building.

IV. ROAD LAYOUT AND PARKING

STREET PATTERN

34. Imaginative site planning, based on a thorough study of the characteristics of the site to be planned, and on an appreciation of the site requirements of the buildings to be erected, is the basis of all good housing development. Skilful use of the landscape setting, and the careful disposition of the various buildings in relation both to each other and to their landscape, will do much to produce lastingly satisfactory towns and villages. Few building sites are entirely lacking in features which can be turned to good account. Where a site has natural features such as good trees, hedges, a stream, ponds and perhaps a wood or a copse, full use should be made of them as elements in the design. Full use should also be made of irregularities of ground. It is strongly recommended that the preparation of every development plan should be preceded by a complete survey of the site, and that this should include the preparation, where necessary, of a contour plan and the noting of all features that are in any way worthy of retention.

35. The adaptation of the development plan to the landscape to which it is applied does not necessarily mean that that plan must be of the kind in which all streets curl in imitation of country by-ways. On hilly sites or on sites with an abundance of natural features which should be preserved, a markedly irregular layout may be desirable. But on most sites of ordinary character a layout of curling picturesque roads is open to objection in a number of ways. It lacks an easily apprehensible order and pattern, is apt to produce difficult-shaped building plots and blind and dangerous street junctions, and makes difficult the achievement of a satisfactory architectural character. On the other hand the layout which goes to the opposite extreme, and is comprised of rigidly geometric patterns, as were many of the layouts of the housing schemes built between 1920 and 1939, is equally unsatisfactory. Such planning is apt to sacrifice the sensible use of land to the creation of patterns which cannot be appreciated except on paper or from an aeroplane; and further these patterns are apt to be too pretentious for, and out of scale with, the small buildings, such as houses, which are generally placed upon them. They also add considerably to the cost of road and sewer works and other necessary services.

36. The road pattern should not run to either of the two extremes: formlessness, and over-rigidity of form. It is merely one of many elements which go to make up the plan of the town or the neighbourhood: so it must be designed in relation to the buildings and open spaces which it serves. The buildings and their approaches (which is all that ordinary residential streets are) must be thought of together. The pattern of domestic roads should generally be of a free and varied rectangular kind; for buildings are usually rectangular in their plan forms, and this is normal for road layout also.

37. This use of the rectangle does not in the least mean that the resultant large pattern must be of that "grid-iron" kind to which large parts of our present towns have been built, and the monotony of which caused the reaction towards the unsatisfactory "landscape" layout. Within a generally rectangular form it is possible to include a great deal of diversity. Features like the square, the quadrangle, the cul-de-sac, the loopway, and the branch; or the use of a curved road, well considered from the point of view of building possibilities, and making a satisfactory right-angled junction with other roads, will make interesting variations.

38. Besides being properly related to the buildings which it is intended to serve, the street pattern should be arranged with as much economy of land and paved surfaces and services as can be contrived. This is not merely a matter of economy in street widths (for a consideration of which see paras. 46-48), it is equally a matter of contriving the pattern of domestic streets so that there are no lengths of road

which are "dead" or unnecessary in their principal function of providing access to buildings. One of the most obvious and familiar examples of economy is that which occurs in planning a cul-de-sac to take the place of an unnecessary through-street.

39. There are two basic types of street—the through-street and the cul-de-sac, though there are, of course, various forms, such as the square and the quadrangle, to which either may be adapted. Little need be said here about the through-street, that is to say the street which connects with another at either end, for its characteristics are simple and are well known. The evidence shows that people generally feel that this is the most convenient and satisfactory type.

40. The possibilities and characteristics of the cul-de-sac, on the other hand, are more complex; and the balance of its advantages and disadvantages is less certain. It may be used as an occasional element in a plan, as it has generally been used in England (especially for developing pieces of land which cannot be satisfactorily developed by means of a through-street), or it may be made the principal motif in itself and a whole system of planning developed round it, as has been done in the well-known example of Radburn in the U.S.A. Here the basic principle of design has been the separation of vehicular and pedestrian traffic; and this has been achieved by limiting the through-passage of vehicles to a few "distributive" streets (akin to the neighbourhood roads mentioned below), the rest of the streets being culs-de-sac intended for vehicles only. Pedestrian movement about the town and access to the individual houses is provided for by a complete and separate system of footpaths running through open spaces independently of the street system. This arrangement has some striking advantages, particularly when the situation of the schools is linked to it, for it is then possible for every child to get to and from school without having to cross any street at all—though this may largely be achieved by careful planning on the Neighbourhood principle. In spite of the advantages which undoubtedly are associated with it, however, the cul-de-sac method of building has been subject to certain criticism, particularly where the cul-de-sac is narrow (in contrast to the more open, near-quadrangle type). Most of the criticisms could, however, be overcome if the cul-de-sac, while a dead-end for vehicular traffic, had good footpath communication with other streets lying beyond it.

41. In some housing schemes on the Continent both the through-street and the cul-de-sac are used in a freer way than has been customary with us in the recent past. In this arrangement the road has houses on one side only. The arrangement was recommended by the Tudor Walters Committee on Housing in 1918, for use on hilly sites, and it is now sometimes advocated for more normal use. Like most arrangements it has its advantages and disadvantages. It permits greater freedom on site-planning and gives a more open type of development. It also makes it somewhat easier to provide for the proper orientation of houses. But there are objections in detail that are raised against it; one is that the very fact of its openness destroys to some extent the highly desirable privacy of the garden space, and another is that street costs, and the cost of proper services are bound to be greater.

A variation of this arrangement, one sometimes known as the "Branch," is that the houses may be approached simply by footpath, the total length of each block being limited to the distance beyond which pedestrian access for the delivery of goods, and for services such as refuse collection, becomes laborious. This variation has sometimes been used in European and American housing, and its possibilities were pointed out in the Tudor Walters Report (again with particular reference to the difficulties of hilly sites); but it has only rarely been used in English towns. It is worthy of more consideration than has been given to it.

42. Among other variations of the two basic types of street are those features which are broadly classified as the Loopway and the Square. Loopways—and sometimes also Squares—have the advantage that although they provide for the

through-passage of vehicles, no other traffic than that serving the actual street itself has any reason to go there, since no other streets, even of the most minor character, run off them. In this way, they are quieter than the ordinary through-street, but are not such "backwaters" as culs-de-sac tend to be.

The quadrangle, which is set back from a through-street and is built on three sides only, is another variant of the cul-de-sac. Here there is the advantage of quietness and yet a sufficiency of outside interest for those who dislike the sense of being in a close.

The Square is a feature which has not been much used in recent domestic planning. When the square is made up of small houses it should not, of course, be in any way monumental: it should rather be intimate. Generally the effect within such a square will be happier if the roads entering it do not come opposite each other, but are staggered. In that way they will be roads *into* the square and not roads *through* it.

43. Another type of layout, different from the broad types mentioned above in paragraphs 39 and 40, must be mentioned. It has been attempted on a small scale in a few isolated instances in Sweden and the U.S.A. For purposes of identification it may be described as "modern informal" in contrast to the "romantic informal," as expressed in the picturesque type of layout. In this type building lines and the usual plotting systems are disregarded, and the aspect and prospect of the houses and their relation to the topography of the site are the over-riding considerations. Footpath access is used wherever possible, and roads are laid out to a pattern almost entirely independent of that of the houses. The principal idea behind this type of layout is that the houses should have the appearance of being set in a park even though individual gardens are cultivated.

The need for economy both in money and in land will generally preclude this form of layout from being used except at a low density and in special circumstances. The success of such a layout will largely depend on the collaboration of the landscape designer, architect and surveyor, all of whom will need to be highly imaginative in matters of landscape. Success may give inspiring and delightful results; but failure would generally be of a particularly unfortunate kind, giving an impression of complete disorder.

44. A variation of the hitherto almost universal arrangement, and one which might be more practised, is that the houses may have a much smaller individual garden which abuts on to a communal garden. The individual garden, though small, would nevertheless be private and would be sufficiently large to grow a few flowers and to serve, on occasion, as an outside room: it might have a depth of say 20-25 ft. This communal garden feature was used quite extensively and very pleasantly in the Ladbroke Grove area of West London more than seventy years ago.

45. As regards the layout of flats, further considerations of a different kind have to be borne in mind. The question of the privacy of the garden does not occur here, for the spaces between the blocks will generally be shared communally.

Before the war one of the commonest forms of layout for flats was the courtyard. Such planning, especially when the courtyards are small, causes overshadowing and accentuates noise. And noise both internal and external, is the greatest source of complaint by all who live in flats. While the remedies for these defects are mainly to be sought in improved methods of construction, there is no doubt whatever that flats designed with an open layout are quieter than those which overlook a resounding courtyard. We would therefore draw attention to various alternative forms of layout, as for example, those incorporating open-sided courtyards, T-shaped blocks and single blocks in parallel, and the other shapes mentioned in paragraph 31 above. Much of the evidence advocates parallel planning of separate blocks with their major axis running north and south, providing the flats themselves with an east and west aspect.

46. Some of the evidence we have received suggests that in the past the expenses incurred in road-making in residential neighbourhoods have been unnecessarily high. These complaints probably arise from instances where the expenses have been heavy because of an ill-devised layout rather than because actual street widths and specifications of construction have been excessive. Nevertheless it is obvious that the standards which are laid down for the widths and construction of streets should be as economical as is consistent with their practical functions.

47. There are three main types of urban road—(a) roads of an arterial or sub-arterial character; (b) distributive neighbourhood roads; and (c) access roads. We are not here concerned with the first, since no such road should normally pass through a neighbourhood or be adjoined by housing that has direct access to it.

Distributive neighbourhood roads will not all have exactly the same value or importance. But it is desirable that each of the various types of road should be clearly recognizable so that traffic may be properly canalized; the carriageway width of each type should be approximately the same. The essential feature for this type should be a carriageway capable of taking two lanes of moving traffic (each lane being between 9 ft. and 12 ft. wide according to the character of the traffic), together with additional bays (each 8 ft. wide) where these are necessary for accommodating standing vehicles. In addition to this, there should normally be two paved footways, each normally 8 ft. wide (again with variations where the road passes through open space). To these functional paved widths should be added such other widths as are desired for planting or for other purposes of amenity. At special places like local shopping centres, the different widths may, of course, need to be varied, or additional service roads added.

48. For *access roads* serving groups of houses a carriageway of 16 ft. will generally be sufficient. At least one, and generally two, footpaths will be required. A width of at least 6 ft. will be necessary for each path, extra width for planting or for verges again being added as may be thought desirable.

While 16 ft. should generally be the minimum width permitted for carriageways (and should be the *actual* minimum in all intercommunicating streets) a smaller width may be sufficient for certain special roads like short culs-de-sac (not more than 250 ft. in length), and minor loops.

In view of the increased use of private cars and of deliveries to houses by motor vehicle, turning spaces and parking bays should be provided at fairly frequent intervals on all access roads. Turning spaces in culs-de-sac and other streets should be 50 ft. across.

49. CAR PARKING

It is necessary that adequate car parking space should be provided in residential neighbourhoods, as well as in the central commercial areas of towns. The number of cars in use was increasing at a very rapid rate before the war, and that rate will be accelerated after the war. England has already more cars in relation to road mileage than any other country in the world, and this condition is likely to continue.

It is impossible at present to give any kind of formula to determine the amount of public parking space required. All that can be said is that reservation of space for the purpose should be on a generous scale. Not all the land reserved will need to be brought into immediate use in the intermediate period; until it is required for parking it might well be used as gardens, and the planting of trees and hedges in it might be undertaken in such a way that they could ultimately assist the parking arrangements and act as decorative screening.

V. ARCHITECTURAL FORM

50. The evidence shows a marked desire, on the part of most authorities, that in the future far more attention should be given to the general architectural form of housing estates, and indeed of all new building in town and village, than has been given in the past. In particular it has been suggested that more attention should be paid to the satisfactory grouping of buildings in relation to each other.

51. "It is not primarily in the design of the cottages themselves, but in the relation of the cottages to each other, that the modern layout is so fatally wrong. Duplicated houses a few feet apart, strung along a road in endless ranks, have shown how irritating and monotonous this treatment can be. The solution lies very largely in designing with terraces and squares"—that is one very downright authoritative statement made on behalf of a great municipality which itself has undertaken the erection of many thousands of houses. "Although the siting of cottages in open formation in small detached blocks of from two to eight dwellings in each might appear to be a natural reaction, and on suitable sites has been found satisfactory, it is felt that a closer and more architectural grouping of dwellings in terrace formation into streets, squares and crescents is preferable"—that is the evidence of another experienced local authority. An important professional body gave this evidence: "The prevailing tendency to monotony of development has been emphasized by the repetition of standardized semi-detached house types, varied by an occasional block of four. A close grouping of dwellings in terrace formation, in streets, squares and crescents, may, without sacrificing the low density, not only allow of more effective provision of communal facilities in the form of greens, gardens and open spaces, but may also be more conducive to the creation of a stronger civic pride than can a scattered form of development." Other equally emphatic and authoritative evidence of the same kind could be quoted. Only one body of all those which mentioned this question in evidence had anything to say specifically in defence of building in semi-detached formation, and even this body introduced a very considerable qualification into its defence: "The introduction into every scheme, at suitable points, of a few semi-detached houses not only relieves the monotony of terraces, but will give extreme satisfaction to many tenants. But a scheme wholly composed of detached or semi-detached houses tends to be monotonous. The best results can be achieved by a mixture of these with terraces of varying length, even up to ten or twelve houses."

52. The latter quotation is from evidence presented by what may be called a "consumer" society, that is, by a body representing the opinion of a number of people who are not themselves engaged in building houses. The other quotations are from "producer" evidence, that is to say, they represent the opinions of bodies which are actively engaged in supplying housing demands. There is a considerable difference of opinion in this matter between those producing agencies which have interest in the collective architectural effect of the houses they build and the consumers generally, who are principally concerned with the convenience of the individual house. There is no doubt at all that most people to-day, if they were asked to state their preferences between a house in a terrace, a semi-detached house, or a completely detached house, would declare first (though not very hopefully) for a detached house, and second for a semi-detached house, and would view the offer of a terrace house with a good deal of disfavour. But while it is beyond question a matter of the utmost importance that everything possible should be done to satisfy individual preferences, the decision as to the type of housing to be provided cannot be founded on such an over-simplification of the problem as is involved in the asking of the question "what do you prefer?" The answers to it are bound to be conditioned by the limitations of experience—and few terraces have been built, in this country, which embody the best principles of modern terrace design. For another thing, individual requirements have to be balanced with those of the community.

53. Some of the advantages popularly associated with the semi-detached house as contrasted with the terrace house are largely illusory. There is little to choose between the two in the matter of privacy, for instance, if the possibilities of each are fully realised in design; for the space between adjoining semi-detached blocks is generally small, and overlooking from neighbouring windows, particularly from upper-floor windows, occurs equally in both cases. Much has been made of the alleged superiority of the semi-detached house in the matter of sound transmission, but where, as is very generally the case, the living-room of the two semi-detached houses in a block adjoin and share a common wall (so as to have a common chimney stack), there is no difference at all between those rooms and the rooms of a house in a terrace. And equally, if the rooms of semi-detached houses do not adjoin, but have hall-and-staircase space between (thus having a sound buffer), so may the rooms in terrace houses. The avoidance of internal sound transmission is equally in both cases a matter of building construction and of planning.

54. There is one advantage that is claimed for the semi-detached house which is more real than those just mentioned—the ease with which an approach to the back (which facilitates gardening and the handling of dustbins, etc.), can be provided. For terrace houses backing on to one another, this approach has to be made either by a passage running along the end of the rear gardens (which is neither entirely satisfactory nor economical) or by ground floor passages between the houses.

55. We have quoted above, one important body of opinion, given in evidence, that “A close grouping of dwellings . . . may be more conducive to the creation of a stronger civic pride than can a scattered form of development.” That view is held by many people who are concerned with social studies. The matter is one of great social importance, but in the absence of a wider volume of evidence than is available to us, we are not in a position to comment further on it here.

56. On the matter of achieving a satisfying architectural effect in streets of small houses, however, there can be no doubt that building in semi-detached formation presents a more difficult problem in design and landscape treatment. It may not be true to say that such building makes large-scale architectural coherence impossible, but it certainly makes it unlikely, as many of the housing schemes built between the wars amply prove. A street which is made up of a repetition of similar small scale units with equal gaps between them, is almost bound to be restless and wearisome in itself, and yet at the same time identical with every other street built on the same principle. A whole town or suburb which is made up of such streets is bound to be monotonous as a whole. On the other hand, there are wide possibilities both of architectural order and of the right scale of diversification in terrace building. Of itself the longer block, of say ten or more houses, has some degree of natural architectural repose merely by virtue of its continuity (whatever may be the quality of its architectural detail); and this is an invaluable initial advantage—though it is not, of course, sufficient in itself. The avoidance of monotony in a street, as elsewhere, lies in repeating the component of design only for so long as it can maintain the interest of the beholder. From this it follows that the normal street should be kept comparatively short. The height of the buildings and their distance apart are, of course, important considerations in determining its length.

57. It has been argued in the past that one of the principal advantages of building houses in semi-detached formation is that the spaces between houses are available for garages. The lack of such space is a criticism advanced against the building of terraces: but garages can, of course, be equally well provided in terrace housing, for they may be incorporated in the house block, bedrooms being provided above them.

The provision of garages will need to be given far more attention in future housing, especially in state-aided housing, than it has been given in the past.

Whether the garages be incorporated in the house-blocks, as indicated above, or be grouped in blocks of "lock-ups," situated conveniently about the neighbourhood, will no doubt be decided according to local preferences, though provision by means of lock-ups is certainly the more flexible arrangement, particularly where it is difficult to make a reliable estimate of the number of future garages that will be required. Whichever method of provision may be adopted, the necessity for provision on a very considerable scale will need to be borne in mind.

58. One of the most important requirements for good street architecture is either a harmony, or a carefully designed contrast, of form and materials in the associated building. Though close attention to other matters, such as a unified scheme of fenestration, may add immensely to the appearance of the terrace or block, this requirement should be regarded as basic.

In view of all that has been said we strongly hope that in future large scale grouping may be more generally practised. This does not mean uniformity; in fact the search for variety in town and neighbourhood is not only legitimate, it is necessary. It has failed in recent years because it has been misdirected. Variety for its own sake, and between building and building, can only in the end produce monotony. But variety between street and street, and between neighbourhoods, is readily possible, and is the true kind of variety for urban design.

VI. PLANTING IN STREETS AND PUBLIC PLACES

59. The necessity of always having a close regard to the topography of the site in designing any building layout has already been mentioned. There is almost bound to be an initial rawness about new building development, and especially about development such as housing, which consists of an extensive repetition of similar small-scale building units. The retention of as many of the existing copses, single-standing or grouped trees, and even hedges, as can be incorporated into the layout without serious inconvenience will generally do a great deal to overcome this initial rawness. But even that will not be enough. Many sites, indeed by far the great majority, while they may be as fully furnished with trees as their agricultural use will permit, are quite inadequately furnished to meet the requirements of the building use to which they are diverted.

60. It is not only necessary that suitable additional tree-planting should be undertaken in connection with new housing and other urban development, but it is highly desirable that expert advice should be obtained in the initial stages of preparing any design. And more than that: it is recommended that the actual planting and subsequent maintenance be in skilled hands, for no satisfactory horticultural effects can be obtained, even when a landscape plan is skilfully designed, and executed with the best possible materials, unless provision is made for adequate care and maintenance.

61. Even a well-designed and well-executed scheme of planting may fall short of proper success if the basic element of good soil is lacking. The best soil of a neighbourhood should be conserved, and not, as has so often been the case in the past, carelessly buried under subsoil and wasted in other ways. The value of good top-soil has not been sufficiently appreciated; and local authorities and private builders could perform a useful service by securing that all top-soil from roads, buildings and other works under construction be set aside and made available for use for planting and general gardening on the same site when the works are completed, or on other sites which may be deficient in good soil.

62. In choosing trees for any particular purpose, habit, rate of growth, duration of life, and cultural requirements, as well as conditions of site and soil and climate, must be taken into consideration. It is not possible, because of varying conditions of soil and site and climate in different parts of the country, to draw up, in any

way that is worth while, the lists of recommended trees which have sometimes been asked for by local authorities and others who require guidance in their landscaping and planting projects. That guidance should, as we have suggested above, be obtained in every instance from a competent specialist. The most that we can do here is to set out certain general principles which need to be observed.

63. Heavy foliage is out of place in a town when it screens the buildings and robs them of light: and, although correct pruning and maintenance can offset these effects to a great extent, it is wise to choose trees of slender and delicate foliage unless the street is of exceptional width.

64. Squares and very wide streets and wide spaces at corners—provided that a proper line of vision is maintained—can accommodate trees of proportionately large and spreading habit, and spacing may be closer than in streets of medium width. If continuity and unity of outline are sought, spacing may, in the case of wide streets, be such as to allow contact between the foliage of fully developed trees. On parkways there will, of course, be opportunities for freer planting. On the other hand, streets of medium width should have upright rather than spreading trees.

65. Pruning and care of trees and shrubs have a far-reaching effect on their value in design. Unintelligent lopping of deciduous trees often results in shapeless masses of foliage which destroy the character of the tree, whereas skilled treatment would preserve the habit of the species and at the same time induce the open slender growth so often called for in trees which are close to buildings. The very occasional use of formal pleaching may give a striking and pleasant effect, which is, in itself, architectural in character.

66. The occasional use of suitable shrubs, either singly on wide grass margins (where they may serve the purpose of preventing the establishment of "unofficial" paths) or in small masses (as on the spaces between carriageway and footpath at street junctions or corners), may do much to enliven domestic streets. So may the occasional planting of flowers, either informally in verges, or (for rather special use) more formally in the space between dual carriageways, on the wide pavements of a shopping neighbourhood, and at other suitable places. On paved spaces the use of large movable tubs or boxes in wood, earthenware, or concrete, is recommended as a pleasant variant. It is a feature of the much-admired planting of the Municipal Parks Administration of Stockholm.

67. The question as to whether grass should be grown or some other kind of treatment applied to the "verges" of pavements is one of some difficulty. Experience has shown that the narrow grass verge is very difficult to maintain, though the important factor is the usable width of path, rather than the width of the verge, for if the path is too narrow the verge will inevitably be subject to trampling. It is doubtful whether it is ever worth while to try to maintain in grass a verge which is under 5 ft. wide, and in any case the local authority should be prepared to take responsibility for the necessary maintenance. (It has been suggested in evidence that where there are grass verges "it should be a condition of tenancy or sale that the occupier of the house undertakes to keep in good order the verge contiguous to the frontage of his house"; but we do not consider such a condition to be capable of proper enforcement.) While a well-kept grass verge can be an extremely pleasant feature in a street, it should be remembered that grass is not the only material which can be appropriately used in this way, and that in any case its universal use would over-standardize the character of our streets. Gravel, setts, cobbles and other similar materials can be used with very pleasant effect alongside a flagged footpath, and they are particularly suitable where the verging is narrow, for they can be used as a supplementary part of the path, which a grass verge cannot be without suffering serious damage. Similarly, it should be remembered that grassing is not the only possible, nor necessarily the most attractive, treatment for squares and other incidental small open spaces. We have probably been over

conservative in our treatment of these. People who are familiar with Continental towns will be aware how attractive a paved square can be. We might do well occasionally to pave our smaller squares in England, rather than plant them with grass.

68. Probably the greatest individual obstacle to the creation of successful urban landscape effects in domestic streets is the ubiquitous front garden wall or fence. We in England are especially prone to assert our rights of property, and to do so aggressively if necessary; but the high wall, the spiky railing and the tall privet hedge are over-elaborate defences for the small front garden, and certainly their presence hinders that marriage between building and landscape setting which could make our towns very much more beautiful than they are. Some of the evidence we have received makes definite recommendations on this. "Wherever possible, front fencing should be omitted, gardens extending down to the pavement line," says one representative body: and others support that contention. We ourselves regard it as highly desirable that this should be done where development is at all continuous—it is not so necessary in the more open development. The removal of railings in many of our streets during the war has shown us how the appearance of those streets has been quite transformed by that simple operation. We hope that there will be no return to the practice of building high walls and fences to front gardens, and particularly that the erection of the concrete-post-and-a-few-strands-of-wire fence which so disfigures so many of the inter-war housing schemes will be avoided. If some division between pavement and front garden, and between adjoining front gardens, is felt to be necessary, this should be provided by a low hedge or a simple low wall or fence, probably not more than 18 in. or 2 ft. high, as has already been done in a number of places, such as Speke, Welwyn and Chesterfield. For *interior* fencing, on the other hand, that is to say for the divisions between rear gardens, a much higher fence, and a solid one, is necessary if the privacy which should be an essential characteristic of the private garden is to be maintained. For this a garden wall some 5 ft. high may be the ideal solution (it has been suggested in evidence that wooden fences are unsuitable because of maintenance costs). The cost of such garden walls is, however, very considerable, and the most practical proposition may be to build a wall for such distance, say 7 ft. or 8 ft., as will assure the privacy of windows, and beyond that to plant a substantial hedge. But it is quite unsatisfactory to leave the provision of the hedge to the tenants of the houses. It should be undertaken wherever possible by the developer, for it is as much a part of the amenity of the house as any other essential equipment.

VII. SUMMARY OF MAIN PRINCIPLES SUGGESTED

(The references in brackets are to paragraphs)

I. RELATIONSHIP OF HOUSING AND TOWN PLANNING

(i) Consideration of various methods of meeting housing needs must take account of neighbouring development, and should be founded on an adequate regional survey. (3)

(ii) In redeveloping existing towns the overall density of wide areas should be borne in mind as well as the existing local densities in groups of houses or in estates. (4)

(iii) In all redevelopment schemes the opportunity should be taken to redevelop as large an area as possible at the same time, or at least to a comprehensive plan which will bring about the desired result in successive periods. (6)

(iv) Serious consideration needs to be given to limitation of the size of existing large towns and conurbations, by the preservation of green belts and other areas of undeveloped land, and by more rational development within the town limits. (8)

(v) A policy of preparing purely short-term housing programmes encourages the practice of continuous growth without relating it to a proper plan. (8)

(vi) In planning for the expansion of existing small towns care should be taken to relate the new to the old development. (10)

(vii) Planning schemes should restrict the area of land immediately available for housing to a total more proportionate to need ; and should aim at promoting housing of *all* types where it is required. (11)

II. NEIGHBOURHOOD PLANNING

(i) The establishment of residential neighbourhoods is essential for the proper social functioning of towns. (15)

(ii) The most usual existing limits of neighbourhoods are barriers, such as railway lines and main highways, to which should be added those formed by belts of open space. (16)

(iii) The desirable size for a neighbourhood unit is a population not exceeding 10,000 persons living in an area where every house is easily accessible to the neighbourhood centre. (17)

(iv) In replanning central areas, certain important amenities can be introduced only if a long-term planning policy is pursued. Period planning is part of comprehensive long-term planning. (18)

(v) Approximate figures for desirable net residential densities in neighbourhoods of 10,000 persons are :

(a) In open development areas	30 persons per acre			
(b) In outer ring areas	50	"	"	"
(c) In inner ring areas	75	"	"	"
(d) In central areas of large cities	100	"	"	"
(e) In the central areas of large cities (special cases)	120	"	"	" (19)

(vi) Within the neighbourhood a variety of dwellings should be provided (20), so that the neighbourhood is made up of several minor groups of development and kinds of dwellings. A desirable size for the minor group is of 100-300 families. (21)

(vii) Flats may be best placed immediately adjacent to public open space and near to the neighbourhood centre. Accommodation for single and old people should be in a similar position. (22)

(viii) A neighbourhood open space system should be closely related to the dwellings. There should be a park pattern which would also provide a system of safe pedestrian ways. Some open space should be sited on the perimeter of the neighbourhood, thus acting as a buffer. (23)

(ix) Primary schools and nursery schools should be near to the centre of the residential area they serve. Secondary (Modern) Schools may be sited on the perimeter of the neighbourhood. (24)

(x) Every house should have shops within a quarter-of-a-mile's walking distance. (27)

III. SPACE ABOUT BUILDINGS

(i) The desirable orientation of buildings for proper sunlight penetration is determined in each case by the particular use-demands of the building. Aspects in the quarter between north-west and north-east are undesirable for habitable rooms. (29)

(ii) For adequate daylight an unobstructed angle of between 15 and 18 degrees is necessary. (30)

(iii) Where a minimum 18 degree unobstructed angle is unobtainable a broken skyline produces improved lighting. (30)

(iv) For higher buildings the cruciform, the Y and the H shapes are superior to the courtyard type of layout. (31)

(v) Three measures of density planning and/or control may be necessary in the future :

(a) A planned population density for every neighbourhood, varying according to the degree of developments.

(b) A floor-space-index over defined areas.

(c) An unobstructed angle of light of 15-18 degrees ; this last referring principally to flats. (33)

IV. ROADS AND CAR PARKING

(i) The plan should be preceded by a complete survey of the site ; and use made of its characteristics. (34)

(ii) It is unsatisfactory to design a road pattern and then fit the necessary buildings to it. The buildings and their approaches must be thought of together. (36)

(iii) Various methods of layout other than the traditional " hollow-square " type are worthy of more consideration than they have had in the past. (41-43)

(iv) Standards of street widths should be as economical as is consistent with functional requirements. (46)

(v) A 16-ft. wide carriageway will generally be sufficient for access roads. (48)

(vi) A narrower width may be satisfactory for certain special roads like short culs-de-sac. (48)

(vii) Adequate space should be reserved for car parking. (49)

V. ARCHITECTURAL FORM

(i) There are greater architectural opportunities in the arrangement of houses in terraces than in semi-detached blocks. (56)

(ii) The provision of garages for *all* types of houses must be considered. (57)

(iii) Large-scale grouping of houses should be practised in the future. (58)

VI. PLANTING IN STREETS AND PUBLIC PLACES

(i) Existing trees should be retained and incorporated in layouts. (59)

(ii) Suitable new tree planting should be undertaken ; and for this competent expert advice should be obtained. (60)

(iii) The top soil from roads, buildings and other works under construction should be set aside and saved. (61)

(iv) It is difficult to maintain grass verges of a width less than 5 ft. (67)

(v) There are advantages in the occasional use of gravel, setts, cobbles and similar materials for street verges, and for the central areas of squares. (67)

(vi) Wherever possible, front fencing in streets should be omitted. (68)



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