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WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES

No. 225

EXPERT COMMITTEE ON
THE PUBLIC HEALTH ASPECTS
OF HOUSING

First Report

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WORLD HEALTH ORGANIZATION

GENEVA

1961
EXPERT COMMITTEE ON
THE PUBLIC HEALTH ASPECTS OF HOUSING
Geneva, 19-26 June 1961

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EXPERT COMMITTEE ON
THE PUBLIC HEALTH ASPECTS
OF HOUSING

First Report

The WHO Expert Committee on the Public Health Aspects of Housing met in Geneva from 19 to 26 June 1961. The meeting was opened by Dr P. Dorolle, Deputy Director-General, with a brief statement defining the purposes for which the meeting was called and the functions of an Expert Committee. He referred to the historical development of international co-operation in housing and town planning and to the great concern shown by the United Nations and the specialized agencies for problems involving housing and town planning. He also reviewed the interest of WHO in these matters. Dr P. M. Kaul, Assistant Director-General, also attended the opening meeting.

Dr J. M. Mackintosh was elected Chairman; Mr G. Blachère, Vice-Chairman, and Dr C. Woodbury, Rapporteur.

INTRODUCTION

From its formation, the World Health Organization has had an interest in the problems of housing as related to health. The International Health Conference, held in New York from 19 June to 22 July 1946, in adopting the Constitution of the World Health Organization recognized that "attainment by all people of the highest possible level of health" could be achieved only by fulfilling several objectives, one of which is "to promote, in cooperation with other specialized agencies where necessary, the improvement of . . . housing . . . and other aspects of environmental hygiene," 1

The First World Health Assembly, held in July 1948, resolved to give top priority to environmental sanitation and suggested that future programmes include housing and town planning (Resolution WHA1.38). 2 They also passed the following additional resolution:

missions of the United Nations with special reference to the hygiene of housing, in an endeavour to obtain adequate representation in any international scheme for town and country planning or for the improvement of housing.” (Resolution WHA1.39) ¹

The WHO Executive Board, at its second session in November 1948, also passed a resolution to facilitate the execution of a WHO programme in the field of housing, as follows:

“The Executive Board

AUTHORIZES the establishment of a small panel of expert correspondents in the hygiene of housing, to give advice on WHO participation in the United Nations programme on housing and town and country planning;

AUTHORIZES the Director-General to establish relations with appropriate international and regional authorities, including the national housing committees which are to be set up at the request of the Social Commission of the United Nations; and

APPROVES the establishment of relations with the Committee on the Hygiene of Housing of the American Public Health Association.” (Resolution EB2.7) ²

The Fourth World Health Assembly, in 1951, adopted a resolution wherein recognition was given to “the supreme importance of providing, as an essential part of the public health programme, for the improvement of environmental hygiene and sanitation, including the development on sound lines of urban and rural planning and of housing schemes.” (Resolution WHA4.19) ³

The World Health Organization’s interest in housing is not limited to those elements which are important in preventing death and disease, but rather it encompasses a broader sphere including mental health and social well-being, since the WHO definition of health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” ⁴ This aspect was stressed by Dr P. M. Kaul, Assistant Director-General, in a brief statement to the Expert Committee at its opening meeting. The Expert Committee on Environmental Sanitation which met in 1949 defined housing as a part of environmental sanitation as follows:

“Environmental sanitation... means the control of all those factors in man’s physical environment which exercise or may exercise a deleterious effect on his physical development, health, and survival. In particular it refers to the control of...

(c) housing, to ensure that it is of a character likely to

(i) provide as few opportunities as possible for the direct transmission of
disease, especially respiratory infections; and

(ii) encourage healthful habits in the occupants.\(^1\)

While this is the first meeting of a WHO Expert Committee to consider
solely the public health aspects of housing, the Health Organization of
the League of Nations, which in many ways was the forerunner of the
World Health Organization, was active in the field of housing and health
and organized as one of its commissions the Housing Commission. This
group was formed in 1936 with an initial membership of six persons repre-
senting six European countries.\(^2\) The Housing Commission held three
meetings, in 1937, 1938 and 1939 respectively, and published reports and
proceedings of these meetings.\(^3, 4, 5\) These reports dealt with the thermal
environment of housing, noise, natural and artificial lighting, town plan-
ing, air pollution, water supply, sewage treatment and the collection
and treatment of domestic refuse.

Under the auspices of the Housing Commission, national committees
of housing and health were formed in many countries to assist the Commiss-
ion in carrying out its proposed programme, to afford a means of obtaining
co-ordination and co-operation between the various technical and
health activities within each country, and to utilize and disseminate the
results of joint international work by adapting them logically to regional
characteristics, needs and desires.\(^6, 5\) In the USA, the American Public
Health Association organized a Committee on the Hygiene of Housing
which served as an unofficial national committee. The reports and publi-
cations of this committee have been circulated extensively in many areas
of the world. In France, the French Housing Committee was established
by the Ministry of Public Health and in turn formed nine sub-committees
which examined nine separate problems of housing and health. Similar
committees were formed in other countries of Europe.

At the international level several governmental agencies have shown an
interest in the problems of housing and health. The United Nations Bureau
of Social Affairs, Housing, Building and Planning Branch, is concerned
with many problems of housing and planning and has conducted seminars
in many different geographic areas. The International Labour Organisa-
tion is interested in housing accommodation for workers. The Economic Com-
misions of the United Nations, especially the Economic Commission

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\(^3\) *Bull. Hlth Org. L. o. N.*, 1937, 6, 505.


for Europe, have created special Housing Units which are very active in assisting governments in studying ways and means of solving their housing problems, with special emphasis on the economic, financial, administrative and statistical aspects.

The Food and Agriculture Organization is placing increased emphasis on subjects directly related to housing, including research studies on the development and use of forest products in building. School building research is one of the programmes in which the United Nations Educational, Scientific and Cultural Organization is co-operating with the Regional Housing Centre, established by the United Nations Technical Assistance Programme in Bandung, Indonesia. A similar Regional Housing Centre has been established in New Delhi, India. The Pan-American Union, an agency of the Organization of American States, supports the activities of the Inter-American Housing Centre (Centro-Interamericano de Vivienda—CINVA) in Bogotá, Colombia.

As a means of co-ordinating at the Secretariat level the activities of the many specialized agencies of the United Nations, the Inter-Agency Working Group on Housing and Related Community Facilities was created in 1956. This Group has been effective in developing an over-all plan of action for bettering the residential environment.

Several non-governmental agencies are active in studying problems of housing and health. One of these, formed at the suggestion of the United Nations, is the Conseil International du Bâtiment pour la Recherche, l'Etude et la Documentation (CIB—International Council for Building Research, Studies and Documentation), with headquarters in Rotterdam, Netherlands.

1. GENERAL CONSIDERATIONS

1.1 The scope of the public health aspects of housing

One of the primary concerns of man for ages past has been the provision of shelter and protection against the elements and the creation of an enclosed environment in which he will be safe and secure from hostile forces and can function with greater vigour, more efficiency, with increased comfort and satisfaction, and in which he can safeguard his possessions, and be assured of privacy for himself and his family. This shelter is commonly called housing, but in its present-day concept, housing is more than the physical structure providing shelter. A more descriptive term is "residential environment", which is defined as the physical structure that man uses for shelter and the environs of that structure including all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and the social well-being of the family and individual.
These immediate surroundings of residential buildings are often referred to as the neighbourhood or micro-district, as distinct from the houses themselves. Attention to them undoubtedly adds to the complexities of housing analyses and discussion, but is essential to any adequate consideration of housing as related to WHO's conception of health as "... a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".

The Committee identifies housing as a complex process involving phases of public health, planning, architecture and engineering, economics and finance, cultural and social traditions, government and the behavioural sciences, so intertwined with one another that it is difficult to isolate a single element for study, analysis and discussion. Housing is part of the total environment and any programme of public health concerning this must consider problems of housing and their implications.

The scope of the public health aspects of housing involves town and country planning, the design and arrangement of the dwelling-unit, the materials and methods of construction, the use of space by the occupants, the maintenance of the structures and dwelling areas, the availability of community facilities and services, including those for local circulation and transport. These aspects of housing concern not only public health personnel, such as the public health officer and the sanitary engineer, but also the town, country and regional planner, the architect, the building engineer, the home builder, the physiologist, the sociologist, and many others whose talents and services are needed in the great tasks of housing betterment.

In approaching these crucial aspects of housing, the Committee is aware that one of the more powerful trends among peoples of the world is the rapid urbanization of larger and larger proportions of populations. More and more of mankind are moving from essentially rural societies based on agrarian pursuits to urban societies grounded in industrial and commercial activities. Without in any way neglecting or minimizing the need for or the problems of housing for rural dwellers, it is well to recognize clearly this basic shift in the essential character of most human societies as well as the greater complexities in housing that accompany that shift.

The Committee recognizes that some of the less developed countries may wish to guide or control their industrial development in such ways that either urbanization would take place slowly or, possibly, might take forms materially different, physically and socially, from those of urbanization in other parts of the world. Quite clearly, this is a policy issue on which these nations have every right to reach their own conclusions and to govern themselves accordingly. This issue involves considerations and measures well beyond the scope of the public health aspects of housing. For this reason, the Committee makes no recommendation in respect
of it. Certain special aspects of rural housing are discussed in sections 3.1-3.4.

The balance between urban and rural population will be reached at different times in various countries. From the point of view of this Committee, the important objectives are:

(1) that dwellers in both rural and urban areas should have available healthful housing within their financial reach and suited to their family and individual needs; and,

(2) that in no country should the balance between the rural and urban sectors of the society be upset by the prevalence of substandard housing in either sector.

In those countries where the move to urbanization by population is great, the Committee suggests that special studies should be initiated of the social, economic and other forces that are contributing to this trend. While the in-migration into urban areas has no identifiable public health significance, per se, the housing problems that are created by this shift are of grave concern to public health authorities in many cities and countries, as these people find their way into dwellings lacking fundamental facilities for health and sanitation and crowd themselves into small spaces and thus make living unhygienic and socially undesirable. To this end, the Committee believes that health agencies should be concerned with the urbanization trend of population and seek methods of providing healthful housing in both the urban and non-urban areas.

Also without making recommendations, the Committee wishes to call attention to two important aspects of housing that are beyond the Committee's terms of reference but that may be considered by units of the United Nations or of its specialized agencies: (1) the place of housing production in many national economies, and (2) the character of the house-building industries of various countries.

(1) The place of housing production in national economies, both of the more fully developed and of the less well-developed nations, has often been neglected. It does not seem to fall readily within the province of either regional or national planning agencies. The seriousness of this omission may be indicated by one fact: in many of the less developed countries the investment in housing runs from 12% to 25% of total annual outlays for all durable and capital goods. This represents a considerable investment which seems to justify more serious consideration. Too often, moreover, this outlay for housing is made in a rather hit-or-miss fashion. A large proportion of it may go for luxury housing and relatively little for housing for low-income families and households. The Committee believes that the

1 United Nations (1957) *Financing of housing and community development improvement programmes* (UN Sales No. 1957. IV. 1), New York, p. 4, para. 8.
contribution of housing to public health might be considerably augmented if the existing substantial outlays were more rationally allocated.

(2) The building industry—the economic entity responsible for housing production—also is often neglected in planning and developing housing programmes—at least relatively. This seems most unfortunate.

In the more fully developed countries one of the crucial housing issues turns on the ability of the building industry to construct houses of reasonable standard within the economic reach, either by rental or by sale, of lower-income families. Although a close comparison is difficult, many persons in these countries feel that they receive less from their expenditures on housing than from those on automobiles or household appliances. Possibly the explanation lies in the fact that, strictly speaking, the housing industry is hardly an industry. In many respects it is a collection of crafts and specialized activities loosely tied together. Many knowledgeable persons are convinced that substantial savings could be achieved in housing costs if the industry were more effectively integrated, or if housing construction were undertaken on a mass scale.

In many of the less developed countries the situation has two primary aspects:

(a) Much rural housing is built not by special craftsmen but by its prospective occupants. The chief problem here seems to be to improve these indigenous processes of production and often to improve the standards without materially increasing costs.

(b) In urban areas no really organized building industry exists. Here, it is believed that the objective should be not to improve existing methods, but rather to make one long leap forward—to create a modern, highly productive housing industry.

One of the useful and most firmly established concepts among public health officials concerned with housing is that of standards. Like many other well-accepted concepts, this one, if used uncritically, holds certain dangers. Three of these deserve special notice:

(a) Sometimes discussions of housing standards seem to be based on the assumption that experience, research and insight, if made use of diligently, can produce a set of detailed standards applicable to housing the world over—regardless of differences in climate, ways of life, cultural and social traditions, economic conditions or other factors. This, the Committee believes, is a dangerous over-simplification. Instead, it proposes to suggest, later in this report, the essential features of housing for which standards should be created and the guiding principles that might be followed by appropriate agencies in establishing not one, but several, sets of standards suitable to the varying conditions, physical and social, under which men live.
(b) Also quite common and related to the foregoing is the implied limitation of standards to minimum standards—those rock-bottom conditions below which no housing should be allowed to exist. That such sets of standards are needed is beyond dispute, but to limit the concept of standards to them is, again, a dangerous error. Some standards are minimal; others are those of desirability or of human comfort. Some are immediately enforceable; others are target standards towards the attainment of which in the short-range future every reasonable effort should be bent.

(c) Finally, standards are too often treated as if they possessed some kind of separate and independent status or viability. They seem to exist more or less indefinitely—long after their origins and rationale have been lost in the mists of time and the words of countless reports and debates. They are compared, averaged, raised or lowered in this or that respect. The Committee suggests that housing standards are not of this order; they are means to the ends of public health—the physical, mental and social well-being of man. They should be examined and periodically re-examined to determine whether or not they are fulfilling their objective.

Having pointed out these dangers, the Committee wishes to emphasize the conviction that certain human requirements with respect to healthful housing can be identified, and that they have a high degree of generality. These requirements are physiological, psychological and social. Some of them may now be stated quite precisely; others, pending further research, must be put in less exact terms. When, however, the basic human requirements are clearly defined, such items as ceiling heights, size of rooms, means of ventilation, etc., are seen in their true light—i.e., as essentially means for meeting or satisfying the human requirements. Thus, the needs are relatively fixed or stable; the detailed standards often vary substantially from country to country or from region to region owing to such matters as climate, social traditions and customs, the nature of available building materials, and the productivity of the economy.

It is this orientation in respect of requirements and standards that the Committee has followed in this report, and that it recommends to others concerned with housing. It believes that the general adoption of this approach would lessen considerably several common sources of confusion in housing analysis and discussion.

One of the most troublesome questions in the whole area of housing standards is: What minimum standards can the less rich and developing economies of the world afford? Should peoples in this stage of their socio-economic evolution adopt reasonably high minima and thus reduce the immediately attainable volume of new or improved housing and sharpen the competition of these needs with those for other forms of investment?
Should the minima be set fairly low at the risk that housing produced over the next few years may shortly thereafter be considered seriously inadequate? Although these questions confront the developing economies in particularly sharp form, in some degree they are shared by the more fully developed nations as well.

These questions admit of no easy or general answers. No formula can do away with the necessity for thorough analysis and difficult and often thankless judgements—area by area and from time to time. The Committee, however, urges those responsible for these judgements not to be so concerned with the initial costs of new housing or housing improvements that they lose sight of its benefits and returns, in terms both of money (e.g., in savings in the costs of treating certain communicable diseases) and of human satisfaction. Consideration should also be given to the fact that housing, if properly and adequately built, is a durable commodity capable of lasting and being used for several generations. Costs of construction or renovation should be proportioned over the useful life of the structure permitting the value of service and convenience of housing to be considered on an economically sound and rational basis. Also, careful consideration should be given, in certain parts of housing production, to full utilization of the potentialities of self-help and mutual aid among those to be housed.

The Committee would point out also that crucial questions as to space standards are by no means limited to housing in the less developed countries. In some of the most economically highly developed nations, the size of dwelling-units being produced for families in the lower- and middle-income groups is a matter of serious concern. It is suggested that all housing agencies, public and private, in all countries might well examine their current product in light of the basic human requirements set forth in this report. In addition, much housing in the more developed countries is seriously deficient in other respects—for example, in over-crowding of both living and sleeping space and the conditions of maintenance and repair.

1.2 The relationship of housing and health

1.2.1. It is a recognized and accepted fact that the total environment of man is a dominant force in determining the level of his physical and mental health and his social well-being. Housing is a part of the total environment and, being a part, it is to some extent responsible for the status of man's health and well-being. It is difficult, however, to delineate clearly and concisely the magnitude of this influence. One of the reasons is the difficulty of demonstrating specific cause-and-effect relationships. Many studies in many countries have shown the relationship of some of the more simple matters of housing and health, and have demonstrated
that a reduced incidence of illness or death occurs when the health hazard has been removed from the residential environment or its death- or disease-producing potential reduced (e.g., a reduction of enteric disease when a sanitary water supply is provided).

1.2.2. Many reasons account for the difficulty in measuring the relationship of housing and health. One is the lack of understanding of the unit of population that should be used as the basis for measurement. It may be the individual, or the household, or the community or any other unit of enumerating the population affected by defective housing. Coupled with this reason is the absence of a comprehensive measurement of health as related to housing quality. Commonly used indices of health are usually related to impairment. Attempts have been made to put forward a measurement of health level which should be used objectively in studies of this kind. Swaroop & Uemura\(^1\) developed an indicator of "health, including demographic conditions" based upon proportional mortality of 50 years of age and above for population groups at the national level. However, this measure is not applicable for studying the relationship of housing and health, except in a very general manner.

1.2.3. Another reason why the relationship between housing and health is less than clear is that there is no unified measurement of the hygienic quality of housing or the residential environment. Measurements have been developed and used in several countries, but these lack universal acceptability. One of the better-known methods is the Appraisal Technique for Measuring the Quality of Housing (American Public Health Association).\(^2\) This method is based upon the assessment of penalties for deviations from a predetermined set of minimum conditions. While measurements are made of individual dwelling-units, the end result is related to groups of houses, usually the block. Its validity for universal use is limited in that the minimum standards are arbitrarily and empirically established. The Netherlands Congress for Public Health and the Netherlands Institute for Housing and Town Planning are studying jointly a total housing evaluation scheme in an attempt to develop a single measurement of the sanitary quality of housing.\(^3\) In Belgium a "méthodologie d'enquête sur la qualité des logements" has been developed by the Conseil supérieur de l'Institut national du Logement. In several countries, including Czechoslovakia, the Federal Republic of Germany and France, studies are being


\(^2\) American Public Health Association (1945-50) *An appraisal method for measuring the quality of housing—A yardstick for health officers, housing officials and planners*, New York, Parts I-III.

conducted to create a valid method of appraising the hygienic quality of dwellings.¹

1.2.4. Still another reason that makes the establishment of a cause-and-effect relationship between housing and health difficult is that housing (the residential environment) embraces many facets of the total environment, each influencing health in a separate and sometimes different manner—e.g., bad sanitary conditions may cause disease, while inadequate illumina-

tion affects vision and may foster an increase in home accidents.

1.2.5. Poor housing conditions usually accompany other socio-economic factors, such as poverty, ignorance, poor nutrition and lack of medical care, that may influence the status of health. The inability to separate these contributing elements in the analyses of housing and health makes the establishment of concise relationships difficult.

1.2.6. Another important consideration concerns those indirect and intangible effects of housing upon health, especially those of a positive nature which tend to raise health above a norm or which promote the well-being of man by increasing his efficiency and comfort.

1.2.7. The lack of definite measurements does not denote the absence of a relationship between housing and health. By deductive reasoning, a strong relationship between housing and health can be established. Since the residential environment consists of many elements of the over-all environ-

ment, with each element capable of exerting individual detrimental effects upon health and well-being, it can be deduced that the effect of the residential environment upon health is the sum of the individual factors.

1.2.8. The residential environment may affect man’s physical health in one of three ways:

   (1) It may concern the transmission of communicable diseases.

   (2) It may not fulfil his physiological needs and/or it may place undue stress upon physiological responses.

   (3) It may cause injury.

Many studies have shown that insanitary housing fosters the spread of communicable disease. It is notorious that a contaminated water supply or defective sewage disposal is closely associated with infections of the intestinal tract, and may lead to serious and widespread epidemics or create endemic patterns of disease. Further, the crowding of persons into a small space promotes the rapid extension of infection, especially with children. Among adults the respiratory diseases are more frequent

and severe when ventilation is poor, even where the total space is enough for ordinary use.

These faults are troublesome enough when the home is well built and in good repair; but they become much more marked when the buildings are defective in structure or in a state of dilapidation. Rat-infested dwellings may serve as a focus for the more dangerous epidemics such as plague, and the vectors especially connected with typhus fever are common enough. Even the nuisance of minor infestations gives rise to much discomfort, if not to actual sickness. Again, houses without screening in the warmer climates may help to spread insect-borne infections—e.g., malaria—in addition to the other discomforts of the biting insect.

These are merely a few random examples of the baneful influence of the defective dwelling. There are many others. Good physical health implies the absence of disease and its dangers, but it goes far more deeply into the realm of positive well-being. A healthful environment must do more than merely limit the occurrence and spread of the graver infections.

Housing of good sanitary quality must provide for fulfilment of the physiological needs of man, which include: a thermal environment that not only is conducive to good health, but is comfortable and promotes the efficiency of living; air that is chemically pure and free from objectionable odours; humidity that is healthful and comfortable; and air movement that will assist in maintaining the desired thermal conditions and air purity and will provide for the necessary air changes. Housing must be free of noise that may impair health. To meet the physiological needs of man, the residential environment must have lighting that is quantitatively and qualitatively adequate. This includes both natural and artificial sources. Healthful housing must permit individuals of all ages to conduct usual household activities without undue fatigue and without putting an excessive burden upon any organ of the body. On the other hand, provision should be made for active and passive recreation and exercise.

The requirements of a healthy residential environment are incompatible with accident hazards. At the present time, in many countries accidents in the home are a leading cause of death for the younger and the older age groups, and yet most of them are strictly preventable. All countries have to suffer considerable financial burdens on account of accidents, and the loss in crippling, temporary or permanent, is a matter of grave human concern. Admittedly, many of these home accidents are due to carelessness and even gross negligence; nevertheless, the fact remains that a substantial proportion are caused by some defect in the home and its environment. Broken steps and ill-paved yards take their toll of both children and the aged, and awkwardly placed entrances or passages are a constant danger. In many cases there is an obvious fire hazard, and the simplest precautions are neglected. In many countries faults in structure are only too common, even in recently built houses and apartments. In addition to this, many
authorities permit, or fail to check by legislation, improperly constructed electric or gas fittings and unprotected fires and stoves. Far too many accidents have been due to carelessly fitted heating apparatus, resulting in slow poisoning by gas fumes. In this respect it is of great importance that tenants of houses should be instructed in the use of apparatus which is unfamiliar to them, and that all potentially dangerous fittings should be rigorously inspected, especially radio and television, which often suffer from amateur handling.

The subject of mental illness in relation to housing raises many difficulties which deserve expert consideration. A considerable number of studies have been already made, but there is great need for further research. The association of mental difficulties with repeated accident involvement, for example, appears to be positive in a number of cases, but the whole matter requires elucidation. Many psychiatrists believe that an unsatisfactory home environment, giving rise to persistent irritations, is one of the contributing factors in mental illness; and, certainly, some forms of neurosis are associated with want of privacy and other frustrations. Under conditions of overcrowding all have to share in what each one does, and there are often conflicts between adults and children. As often as not, children suffer from lack of sleep, owing to the adults' different hours of activity, and the converse may be equally true. The troubles which affect any one member of an ill-housed family have to affect all. The results of such difficulties are often serious and prolonged in the mental field, and may be hard to trace. Lack of sleep, for example, may cause a child to be regarded as backward and incompetent in school, and have an adverse effect on the whole range of his education. It is clear, therefore, that good housing should be directed to providing opportunities for self-expression, and at the same time for social standards in line with the local community.

The social well-being of man is influenced by his residential environment. Housing is the locale of most family functions; it is the background to family life. Special attention was given to some of the main social problems of housing in two seminars on Social Aspects of Housing which were held in Sèvres, France, and Lepolampi, Finland, in October 1957 and August 1959, respectively, under the sponsorship of the United Nations. ¹, ² These seminars identified some of the sociological principles of housing and the need to provide dwellings in such quantities that the total housing supply will be in accord with the family composition of the population. In planning houses that will provide for the social well-being of man, it must be remembered that most inter- and intra-family activities

are centred in the home. Therefore, housing must afford privacy to the individual and to the family to the extent that is necessary and desirable according to the social and cultural standards of that society. The Sèvres and Lepolampi seminars declared that in modern housing one of the elemental units of social planning is the residential neighbourhood. The social aspects of the residential environment should include facilities for the meaningful use of leisure time not only for an individual's development and enjoyment but also as a counter-influence to the tensions of non-leisure time. Sound family and individual growth and development cannot occur in an insanitary, disorderly and unsafe residential environment.

1.3 World housing conditions

1.3.1. The Committee is aware of the great diversification of housing conditions and problems in the various areas of the world. In many of the developing countries, the greater proportion of housing is very primitive and is hardly more than shelter. In some of the older countries, people are trying to live in conformity with social and cultural patterns of the twentieth century in a residential environment created several centuries earlier.

1.3.2. However, in spite of differences of local and regional problems, there exist some identifiable housing conditions that have a degree of uniformity the world over. Many nations are experiencing the phenomenon of the "population explosion". This is resulting in an increasing demand for more housing units. The Committee recognizes this universal problem of the lack of a sufficient housing supply to meet current needs and recommends that all governments undertake or intensify programmes to alleviate this urgent need. Recognition is given by the Committee to the economic difficulties which often impede rapid progress in fulfilling these housing requirements.

1.3.3. Another world-wide housing problem concerns the hygienic qualities of the existing housing stock. In every nation of the world a large proportion of structures now being occupied as residences fail to satisfy the human requirements for a healthful residential environment. The Committee notes with satisfaction programmes undertaken by some nations to provide more and better housing for their citizens and suggests that these efforts be continued with enlargement of the scope and magnitude when economically possible.

1.3.4. Since the provision of a healthful residential environment is so necessary to the benefit and welfare of mankind—in fact to the establishment and maintenance of world peace—the Committee recommends an extension of assistance by the more developed countries, individually and collectively, to the developing nations in creating more and better housing in healthful, well-planned environments with the required services and facilities.
2. FUNDAMENTALS OF A HEALTHFUL RESIDENTIAL ENVIRONMENT

2.1 Human requirements

To be universally acceptable by both the developing and the more developed nations and to be free of the special demands created by local factors of climate, geography, social practice, custom and tradition, the fundamentals of a healthful residential environment, the Committee believes, can be expressed most effectively with reference to the human requirements, rather than as "standards"; since these, at best, are expressions of some authority's judgment as to the goals to be aimed at, or are limited to observations made under the conditions with which that authority is concerned.

In the field of environmental sanitation, there are four levels of health to which programmes may be directed:

(1) The prevention of premature death
(2) The prevention of disease, illness and injury
(3) The attainment of efficiency of living
(4) The provision of comfort.

Ultimately, the fourth level will be a goal of all programmes of health, but in many areas of the world, public health programmes are as yet striving to attain the level of preventing disease and injury. Standards can be imposed to ensure, in most cases, the achievement of the two lower levels of environmental health. Until more knowledge is acquired about the physiological and psychological responses of the human body to the physical and social environment of the world today which will permit man to live efficiently and comfortably, standards of housing have a value limited to that region in which they are adopted and for the physical, social and economic conditions of that time.

2.2 Definition of a healthful residential environment

The Committee therefore proposes that the fundamentals of a healthful residential environment should consist of:

(1) A safe and structurally sound, adequately maintained, separate, self-contained dwelling-unit for each household, if so desired, with each dwelling-unit providing at least:

(2) a sufficient number of rooms, usable floor area and volume of enclosed space to satisfy human requirements for health and for family life consistent with the prevailing cultural and social pattern of that
region, and so utilized that there is neither overcrowding of living or sleeping rooms;

(b) at least a minimum degree of desired privacy, both:
   (i) as between individual persons within the household; and
   (ii) for the members of the household against undue disturbance by external factors;

(c) suitable separation of rooms as used for:
   (i) sleeping by adolescent and adult members of the opposite sex except husband and wife; and
   (ii) housing of domestic animals apart from the living area of the dwelling unit;

(d) a potable and palatable water supply, piped by sanitary plumbing into the dwelling-unit or in the courtyard, in quantities ample enough to provide for all the personal and household uses essential for sanitation, comfort and cleanliness;

(e) a safe and sanitary means for the disposal of sewage, garbage and other wastes;

(f) sufficient facilities for washing and bathing;

(g) appropriate facilities for cooking, dining and the storage of food, household goods and personal belongings;

(h) appropriate protection against excess heat, cold, noise and dampness;

(i) adequate ventilation and internal air free of toxic or noxious agents;

(j) sufficient natural and artificial illumination.

(2) A neighbourhood or micro-district setting for the dwelling which conforms with sound town, country and regional planning practice and consists of:

(a) when economically feasible, a community water supply, sewage collection and treatment, collection and disposal of garbage and other wastes, and storm-water drainage;

(b) an atmosphere which is free of toxic or noxious gases, odours, fumes or dusts;

(c) protective facilities of police and fire services;

(d) industrial, commercial, cultural, social, religious, educational, recreational and health and welfare facilities connected to the residential structures by a network of roads and public transportation and a system of footpaths;

(e) freedom from hazards to health, welfare and public morals.
2.3 Design requirements of dwelling-units

The Committee recognizes the difficulty in recommending minimum standards related to the design and requirements of dwelling-units. Conditions affecting housing in the various areas of the world are so different that efforts to obtain precise information are not practicable and only the general framework of the desired results can be suggested.

The human requirements for space are likely to differ depending upon the climatic conditions of the region in which the dwelling is located and upon the socio-economic and cultural standards of the population. Patterns of living are usually the outgrowth of practices and customs followed by people for many years, and change in these patterns is frequently very slow.

2.3.1 Space requirements

The Committee believes that each household and each member of the household has a right to an adequate amount of floor space within the dwelling according to the needs of the household and of the individual. The amount of space required varies with many conditions, some of which are dictated by the cultural, social and economic status of the population involved. In the more developed nations of the world, the Committee suggests that space standards promulgated by the Committee on the Hygiene of Housing of the American Public Health Association,¹ or the joint conclusions of the International Union of Family Organizations and the International Federation for Housing and Planning, which met in Cologne in 1957,² be used as minimum. In the developing countries, less ample space standards may be necessary as the immediate minima; the aforementioned standards are suggested as desirable levels of space.

Space is measured not only by area, but also by volume. The cubic air space needed per occupant in a dwelling will vary with such factors as the floor area, the height of the ceiling, the rate and means of ventilation, the thermal and illumination requirements, structural standards, etc.

The number of rooms required by each household depends on many factors. As a minimum, the Committee recommends that a separate room or rooms be provided, apart from the sleeping rooms, for cooking, eating and leisure activities, except for families with only one or two adults, where these functions can be performed adequately in one room without undue stress upon the occupants.

¹ American Public Health Association, Committee on the Hygiene of Housing (1950) Standards for healthful housing: planning the home for occupancy, Chicago, Public Administration Service.
2.3.2 Provision of privacy

The Committee recognizes that the human needs for privacy vary considerably with different cultures and patterns of living in the world. However, the Committee believes that there is a certain uniformity in the desires of all people for privacy of one type or another. There are many degrees of privacy. There is the privacy of seclusion in individual rooms. There is the privacy of vision, of restricting the possibility of looking into a dwelling-unit through the door and windows, and there is the privacy of sound. Different societies vary concerning the degrees of privacy they desire, but it may be generally stated that the variations are related to the state of a society and to the social allegiance of the individual family.

One of the fundamentals of privacy is a self-contained dwelling-unit, satisfactorily enclosed for each household unit. In some of the more developed countries the desire for privacy is such that ideally each member of a family, except husband and wife, should have a separate room which can be regarded as a private possession and in which personal belongings can be stored. The Committee recognizes that this standard is not a minimal standard and hence does not propose it as such. The Committee recommends the provision of a room or space, separate from the sleeping rooms, which may be used for leisure activities and for intra- and inter-family social contacts. In some countries this space is called a living room or parlour. On the basis of moral issues, adolescent and adult persons of opposite sex, except husband and wife, should not share bedrooms. Further, the location and arrangement of bedrooms should be that preferably no bedroom should be the sole access to another room, or bathroom or water-closet compartment.

Toilet facilities, or water-closets, should be in a separate room from the other rooms in the house, not only for reasons of privacy but for hygienic reasons. It is highly desirable that the facilities for body bathing be in a separate room or installed with the toilet facilities.

In order to provide the household against undue disturbance by external factors, special consideration should be given to the location of windows to provide the privacy of vision. Windows are important and need to be provided for light and ventilation, but their design and placement must ensure the protection of privacy of the family. Much research is being done to provide dwellings with the privacy of sound, as well as light.

2.3.3 Functional use of rooms

To maintain a healthful environment, particularly in rural or semi-rural areas, the Committee recommends that there be a distinct separation of that portion of the structure housing domestic animals from
that part used as a living area. Further, those portions of the house used for the storage of tools, equipment, etc., used for occupational pursuits should likewise be apart from the living areas.

2.4 Household services and facilities

To meet minimum health standards certain services and facilities are required. These include a water supply, either piped into the dwelling or readily available to the dwelling, a sanitary means for the disposal of household wastes and used water, facilities for the washing of clothes and household utensils and for the bathing of the body to maintain personal hygiene. In addition, it is necessary to provide facilities for the storage, preparation, cooking and consumption of food and for the storage and safeguarding of personal property. These services and facilities are required universally, irrespective of climatic or local environmental factors.

2.4.1 Water supply

Consistent with the decisions of the Twelfth World Health Assembly,¹ and recognizing that water is one of the more vital natural resources and one of the basic elements for life, the Committee recommends that special attention be given to the provision of a potable and palatable water supply into each dwelling-unit or into each courtyard where it is easily accessible. Water intended for human consumption should be free of chemical substances and micro-organisms in amounts which would constitute a hazard to health. It is recommended that domestic water supply meet at least the standards specified in *International Standards for Drinking-Water.*² Drinking-water should be not only free from dangers to health but as aesthetically acceptable as possible. Since water is required for cleanliness it should be piped into the dwelling-unit by sanitary plumbing or made available in a courtyard near the dwelling-unit and within a range as will facilitate easy transport of water into the dwelling. The water supply should be available at all times and in such quantities as will provide for all the personal and household uses and for the removal of waste substances from the dwelling-unit.

While water is necessary for life it may become a hazard to life if it becomes contaminated with pathogenic organisms or toxic chemicals. Special care should be exercised to keep water free from pollutants and contamination. In built-up areas it is recommended that community water supplies be introduced. In rural areas and those places where it

is not economically feasible or practicable to develop community supplies, individual supplies installed in a sanitary manner are suggested. The Committee calls attention to the WHO publications on this subject.²

The amount of water required to maintain a desirable level of sanitation, comfort and cleanliness depends on many factors, such as climate, the socio-economic conditions, customs and the requirements of industry. In large urbanized areas 270 litres (60 imperial gallons) per person per day is suggested as the minimum amount of water that needs to be supplied for domestic purposes only, with the figure scaling down to 120 litres (26 imp. gallons) per person per day for small communities or villages in developing countries. In rural houses with private supplies the amount of water required may be as little as 45 litres (10 imp. gallons) per person per day.

In the developing countries it may be economically feasible to supply the water only to a tap located in the courtyard or other similar area serving a group of houses. While this standard will permit the attainment of at least a minimum level of sanitation and cleanliness, the Committee suggests that the long-range objective in developing countries be the installation of piped water into each dwelling-unit.

If only communal water outlets are provided in the initial phase of community water supply development programmes, these taps should be so located and constructed as to minimize the distance and difficulty of carrying water into the dwelling-units.

The Committee recognizes that in many instances there exist two water supplies, the one potable and the other non-potable. The Committee deprecates this practice and recommends that where these conditions exist early steps be taken to abandon the non-potable supply that serves the residential environment.

2.4.2 The disposal of sewage and liquid and solid wastes

The Committee considers the collection and disposal of sewage and liquid and solid wastes as a major public health problem. It is important not only from the aesthetic viewpoint, but also because sewage and waste materials may contain pathogenic organisms which are easily transmitted by direct contamination or by water, food, insects or rodents.

The type of sewage disposal system that is used and that fulfils human requirements depends largely upon whether the dwelling is equipped with running water under pressure and whether it is located in an urbanized area or organized community. In the more developed areas of the world

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The majority of dwelling-units are equipped with water carriage systems to remove sewage from the dwelling-units. If the dwelling is in a community setting the Committee recommends community collection and treatment of the sewage as being the most desirable and satisfactory way of dealing with these wastes. Much is known about satisfactory methods for collecting and treating sewage in communities.

When conditions exist that prohibit the sewage from being collected and treated communally, individual sewage disposal systems of good engineering design, properly installed and adequately maintained are minimum. Reference is made to a WHO publication\(^1\) which discusses this subject in detail.

Garbage is one of the solid wastes that results from food preparation and which requires special consideration for public health reasons. If these substances are not collected and disposed of in a sanitary manner, they may give rise to an insect and/or rodent infestation (see section 2.6.4).

Garbage and rubbish should be removed from the dwelling at least daily, and unless disposed of with sewage should be stored in well-closed metal containers which can be easily cleaned and carried to the transport vehicle. The container should have a tight-fitting cover.

Refuse can be treated in many ways to render it harmless. It can be buried, burned or treated by a biochemical process. If refuse is buried, the operation should be by the "sanitary land-fill method" in which the material is compacted and covered by clean soil daily. Incineration has many advantages and disadvantages. Primary of the advantages is the ability to locate the plant close to the centre of collection. The chief disadvantages are high initial costs, possible air pollution, and the requirement of having to dispose of the ashes or residue.

In many areas of the world, there is great interest in the biochemical processes that yield a product which has agricultural value as a fertilizer and soil conditioner. These processes require further development. Reference is made to the WHO publication on composting.\(^2\)

2.4.3 Washing and bathing facilities

Ideally each household or family should be provided with some means of washing clothes and body bathing. The socio-economic conditions of the region will indicate the type of facilities which will fulfil human requirements. It is desirable to have a basin separate from the kitchen.


sink for bathing, but the Committee recognizes that in the immediate future this may not be attainable in the developing countries. In order to perform body bathing efficiently it is desirable to have the wash basin equipped with warm water, although the Committee recognizes that in many areas of the world this must be considered a luxury item for some years to come.

Personal cleanliness is closely linked with the ability to keep clothing clean. A healthful residential environment should contain a facility for the washing of clothes with sanitary disposal of the used water. The Committee recognizes that in developing countries private clothes-washing facilities may not be attainable and it commends the use of common wash-places where water of good sanitary quality is available and where suitable disposal of the used water is possible.

2.4.4 Cooking, dining areas and storage facilities

Special attention should be paid to the minimum requirements concerning the provision in dwelling-units of hygienic facilities for the storage, preparation, serving and consumption of food. The need here is to keep foodstuffs wholesome and free from contamination, to permit them to be prepared properly in a sanitary fashion and without causing undue fatigue to the person performing the task. Also, there should be a pleasant arrangement in the home for the service of meals.

The Committee does not find any special reason to suggest that the storage, preparation and consumption of food should take place in separate rooms. The design of the housing-unit to fulfil these needs depends upon local custom and tradition.

Each household should have its own cooking facilities, although cooking spaces shared by several families are still widely used in some countries and are acceptable in certain societies. The Committee does not consider this to be recommended generally for new housing except under emergency conditions.

In most areas of the world that portion of the dwelling-unit in which food is prepared should consist of the following equipment:

(1) A device for cooking food. The character of this facility will depend upon the type of fuel locally available. Smokeless fuel is preferable but the Committee recognizes that this commodity is not readily accessible in all countries. If the fuel is of such a character that a reserve supply must be stored in the dwelling-unit, provision should be made for the safe storage of this material within easy reach. If the fuel has an open flame, special arrangements should be provided for venting the flame to prevent smoke fumes and toxic gases from accumulating within the dwelling-unit. Attention should be given to the location of the fuel-burning equip-
ment to prevent a fire hazard or to block a particular means of egress from
the dwelling in case of fire.

(2) A kitchen sink. Ideally there should be a kitchen sink, separate
from the lavatory basin, in which foodstuffs are washed and prepared
prior to consumption and in which cooking, eating and drinking utensils
are cleansed after use.

(3) Food storage facilities. Two types of food storage need to be
provided. Dry storage for non-perishable foodstuffs should be so designed
and located as to keep the food in its natural wholesome state, free from
the deteriorating effects of temperature and moisture and to protect it
from vermin. The second type of facility is that required to preserve
perishable foods. In all but the arctic and sub-arctic regions this requires
a cooling system either by ice or by mechanical means. If refrigerated
food-storage facilities are not available the household must purchase
foodstuffs in small quantities, usually daily, in order to prevent deterio-
ration and contamination of the food. This procedure is more expensive.

In addition to the above, food preparation areas should have containers
for kitchen refuse and for the storage of cooking and eating and drinking
utensils. Toxic or hazardous chemicals and substances should be stored
outside the kitchen or the food preparation area.

The arrangement for the consumption of food will depend upon local
tradition and custom. In the temperate and cooler climates the food is
usually consumed indoors and around a dining table. In some of the
warmer climates it is taken outside the dwelling-unit, thereby eliminating
the question of special dining space and dining facilities.

In addition to the storage required for foodstuffs, cooking, and service
utensils, cleaning materials and compounds, storage space is required
for personal belongings and clothing. These are normally installed in
or near the sleeping and dressing areas. Adequate space should be provided
for these articles in such a way as to prevent fire and to preserve and main-
tain the product.

In certain regions of the world special arrangements need to be
provided in or near the dwelling-unit for the storage of such items as
bicycles and other household commodities—e.g., garden tools, baby car-
riages, etc.

2.5 Physiological requirements

One group of human requirements for a healthful residential environment
has a physiological basis. The human being is a biological organism and
as such has several fundamental needs that must be provided in his envi-
ronment for survival, and healthful growth and development. There
must be the right thermal conditions, a minimum amount of noise, the proper amount of moisture in the air, a reasonably pure air supply and sufficient light to see by.

2.5.1 Heating and cooling

There are four environmental factors affecting the thermal equilibrium of the body which are applicable to the residential environment. They are:

1. Air temperature (dry-bulb temperature of the air)
2. Mean radiant temperature
3. Humidity of the air
4. Movement of the air.

Between them they determine the opportunity presented to the body of maintaining a thermal equilibrium which will prevent undue heating or cooling of the body temperature. Except when engaged in strenuous exercise or work each individual will normally liberate from 100 to 200 kcal (400-800 B.Th.U.) of heat per hour, depending upon the extent of physical exertion. In temperate zones, especially in cold climates, some of this thermal energy is used to maintain normal body temperature. In warmer climates some of the heat of body metabolism must be dissipated and some must be utilized to cool the body by perspiration.

The most basic thermal requirement is to keep the deep body temperature close to its normal diurnal range. It is undesirable that it go outside the limits 36°-38°C (96.8°-100.4°F), except for fairly heavy activity in hot weather, when it may rise temporarily by another 0.5°C (0.9°F). If the deep body temperature exceeds the upper limit of this range, the individual will become markedly uncomfortable, the physiological processes of heat regulation will be impaired and in extreme conditions death may result. If undue over-cooling of the body occurs, discomfort will also be felt. If extreme over-cooling occurs, cold injury, such as frost bite, may result.

Under normal conditions of relative humidity and with minimal air movement, the thermal environment may be expressed as the “operative temperature”, which is the approximate mean of the air temperature and the radiant temperature as measured by the black-bulb thermometer or similar measuring device.

A healthful residential environment is one in which an individual is “comfortable”. Individuals differ as to the thermal conditions for minimum and maximum comfort, and it is difficult to establish universally applicable standards for the optimum environmental thermal condition. Comfort standards are affected by many factors including the type of occupation.
that the person is engaged in, the national or local heating methods, type of clothing, age, race, season and climate. As an example of these comfort standards, the Centre scientifique et technique du Bâtiment recommends that during the winter the operative temperature be between 18° and 22°C (about 65°-70°F), with a relative humidity greater than 30%, and an air movement not exceeding 0.1 metres (0.3 feet) per second. In the USSR the recommendation is 18°-22°C, and in the USA the Committee on the Hygiene of Housing of the American Public Health Association recommends 65°F (18°C) as the minimum operative temperature for normally vigorous persons wearing normal clothing and at rest. Higher temperatures are recommended for rooms occupied by persons of subnormal vitality.

To prevent the operative temperature from falling below the recommended minimum, heating devices are required. The Committee does not recommend any single method over others, provided the principles of safety, ease and efficiency of operation as well as performance level are met.

It is recognized that central-heating systems have several advantages over unit or space heating, such as easier operation, greater degree of safety and more uniform heating of the dwelling-units, but that the high cost of installation and the difficulty of equipping older buildings with the apparatus prevents the making of any but generalized statements about the methods of heating.

Dwelling-units may be heated either by warming the air and circulating it throughout the occupied areas of the house by gravity or mechanical ventilation, by radiant energy from heated panels or other devices, or by a combination of methods. The common source of heat is from the combustion of solid, liquid or gaseous fuels; other methods, such as electricity, solar heat, heat exchange of ground water, etc., are being used in some areas.

For a comfortable thermal environment in summertime, the Centre scientifique et technique du Bâtiment recommends that the operative temperature should not exceed 26°C (79°F) when the relative humidity is 30%, or 24°C (75°F) at 60% relative humidity. In the USSR the recommended maximum operative temperature is 25°C (77°F), with 50% relative humidity and air movement not exceeding 0.2 metres (0.6 feet) per second, while the standard in the USA is that the operative temperature should not exceed 75°F (24°C) within the zone of occupancy. When it is warm, excesses of relative humidity will decrease the tolerance of the human body to the operative temperature, and air movement will increase it.

In warm climates it may be desirable to introduce some mechanism of cooling the dwelling to maintain the proper thermal environment. In some areas buildings can be usefully cooled by introducing cool air at night and thereby lowering the temperature of the structure of the building. This process may be effected by natural means, taking advantage of pre-
vailing breezes and of micro-climatology. In other circumstances mechanical ventilation may be the only effective method.

In areas where cooling is desirable, buildings should be oriented at the planning stage to reduce the unpleasant effects of a high temperature aggravated by intense solar radiation. For those portions of the building exposed to the heating rays of the sun, many devices may be used to protect from solar radiation. Windows may be equipped with sun shades, and trees and bushes can be planted so that their shade falls upon the building. In tropical and subtropical areas, where flat roof construction is common, provision may be made to maintain a layer of water on the roof for insulation, but if this is done special precautions must be taken to prevent the creation of a breeding-place for mosquitoes.

In the hot areas of the more developed countries, cooling may be secured by mechanical devices. In warm humid climates some effect of cooling can be obtained by dehumidification of the air in the dwelling. These methods are costly and are restricted to the more affluent societies.

2.5.2 Protection from excessive noise

The problems of excessive noise in the residential environment are becoming more complex and of increasing public health significance as our civilization becomes more mechanized. The complexities not only concern methods of preventing or reducing noise once it has been created, but involve the physiological and psychological responses of human beings who are exposed. In fact, there are very few precise data as to what constitutes excessive noise.

Sound is identified by two characteristics: frequency, expressed in cycles per second, and energy or loudness, usually stated as decibels. The human ear cannot hear all sound and not all human ears can hear sounds of a given frequency, irrespective of the energy of the sound. The average normal adult of 25-30 years of age can hear sounds ranging from 20 to 20,000 cycles per second. As a person grows older the range over which sound is identifiable decreases, and this decrease may be accompanied by perceptible hearing losses within the limits of the range. Apart from those caused by actual disease, some hearing losses may be due to acute exposures to excessive noise or prolonged exposure to noises of less intensity.

Noise of 130 decibels is considered the maximum limit a human being can withstand without permanent damage to the auditory system. Prolonged exposure to sounds of 110 decibels is known to cause hearing damage. Less is known about the physiological responses to noise of less energy.

Response to sound is usually relative, inasmuch as in most areas of the world, if not all, there is a certain amount of background noise created
by nature itself. The human ear responds to sounds of certain frequencies and energy that are greater than the background noise. A healthful residential environment is one in which the background noise level is kept below 40-50 decibels A. This permits ordinary conversation to be carried on, which normally occurs at an energy level of 60 decibels A. Since noise is a factor in resting, sleeping and studying, the quietest rooms in a dwelling should be used for these purposes and preferably have a noise level of less than 30 decibels A.

In every dwelling there are two general sources of noise: internal and external. Noise may be further classified as being either “air-borne” or “structure-borne”. The latter is often referred to as “impact” noise, as the sound energy is created in the structure by that means.

Good public health practice dictates a need to prevent excessive noise at its source, as sound-reducing methods are expensive, impracticable or too complex for normal usage. Noise within the structure can be prevented or reduced by proper design of the structure and the installed equipment, by the use of sound-absorbing materials in construction, and by the judicious control of noise-generating equipment or processes. External noise control is often a function of community planning, as many industrial processes and means of transportation are noisy by their very nature. Community planning should restrict noisy operations from residential areas.

2.5.3 Dampness

The Committee considered the problem of dampness within the dwelling-unit and concluded that little is known as to how much moisture should be in the air to fulfil human requirements and under what conditions and circumstances dampness becomes excessive and creates a health problem. The Committee recommends that this question be studied by research institutions and by engineers, architects and physiologists, to determine methods of attaining and maintaining the proper degree of moisture in the air.

In many areas the method of constructing buildings, location, design and layout give rise to the accumulation of large quantities of moisture within dwelling-units. Steps should be taken to reduce the dampness in these dwellings to a lower level. However, as the moisture content of the air is closely related to the thermal environment, no standards can be suggested at this time owing to the lack of precise information about human requirements.

2.5.4 Ventilation

The quantity and quality of air needed for comfortable living within an enclosed dwelling or building is a complex problem involving physiological and psychological considerations. The rate of ventilation should
be sufficient to remove by dilution toxic or obnoxious air pollutants created within the dwelling-unit, to control the amount of water vapour in the air and to provide for body cooling in warm climates. The primary objective of ventilation is therefore to keep concentrations of potentially harmful substances in the air to levels at which they will not produce ill effects upon the human body, either by immediate dosage or by accumulation alone or in conjunction with other substances or conditions. The second aim is to keep to a minimum concentrations of substances in the air which are not actually toxic but which may evoke undesirable physiological reactions, such as coughing, sneezing, lacrimation, etc. The third objective is to create a comfortable environment free from unpleasant odours, fumes, dirt, etc. While the immediate effect of odours may be psychological, they may have undesirable physiological reactions by producing decreased appetite and, in the long run, reduced vitality. Good ventilation of occupied space will provide approximately 0.3 cubic metres (10 cubic feet) of air change per minute per person within the occupied space in temperate climates.

2.5.5 Illumination

The fundamental human requirement concerning illumination is that there should be light in sufficient quantity and quality for a person to see what he is doing. How this requirement can be fulfilled varies with many factors, such as the task, the size of critical components, the visual acuity of the person and the availability of optical aids. The phenomena of lighting concern not only the quantity of light—namely, the intensity—but also the wave-lengths involved from ultra-violet to infra-red, the contrast in intensity or colour between simultaneous or successive fields and the geometric relationship of the various parts of the field to the observer. Fundamentally, the problem of illumination, both artificial and natural, reduces itself to the requirement of providing light in sufficient quantity and quality to accomplish the task involved and in accordance with the limitations of the visual acuity of the person concerned. The setting of standards should not be concerned simply with fulfilling these requirements, as such standards would have to cover a range of variables and would almost certainly be set well above the means of the individual requirements. Many sets of standards have been promulgated in the various countries by illumination engineers. The Committee suggests that those who are desirous of obtaining minimal illumination standards consult the recommendations put forward by illumination engineers for that particular region.

2.6 Protective requirements

Much can be done to reduce the incidence of accidental injury and death by fulfilling the human requirements for protection in the residential
environment, and the Committee recommends that more attention be given to home safety and accident prevention. Many protective measures need to be undertaken to fulfil this objective of the creation of a safe residence. It is necessary to reduce fire hazards, and make compensations for the possible destruction or damage of the structure by natural hazards such as lightning, earthquakes and so forth. The residential environment should protect the family from insect and rodent vectors of disease and shield them from pests and dangerous animals. Further, housing should afford the occupant a haven from undesired human intrusions.

2.6.1 Structural failure

Houses must be built with such materials and in such a manner as to minimize the danger to the occupant or anyone in the vicinity of accident due to collapse of any part of the structure, and maintained in such manner that all services and facilities function safely. This can be done by compliance with building and housing regulations that have been developed scientifically. In areas where termites are a problem and where wood is used as a material of construction, special attention should be given to the preparation of the soil against termites before construction and to the treatment of wooden structural members with chemicals that will retard or prevent termite infestation.

2.6.2 Fire and other hazards in the home

The Committee is aware of the great loss of life and of the amount of human suffering that is caused by fire, and recommends the strict adherence to fire safety standards to remove the cause of fires and to reduce their spread if they break out. Particular attention should be given to the method of installation and utilization of heating equipment and fuel and to electricity and gas.

Every dwelling-unit should have at least two means of egress, located as remotely as possible from one another and leading from the dwelling-unit to an open area outside. In multi-storeyed structures special fire-resistant exit-ways should be installed. In regions where adequate fire escapes are lacking in multi-storey buildings generally, special attention should be given by the authorities to their installation.

If buildings are equipped with gas for light or heating, particular attention should be given to the methods of preventing gas poisoning in case of incomplete combustion of the fuel or by inadequate ventilation of the fuel-burning equipment.

Slippery floors and illogically placed changes of elevation are major causes of home accidents. Floor surfaces should have smooth, easily cleanable finishes, but should not be slippery, particularly when wet. Floors
should also be free of obstacles that may cause falls. Changes of elevation should be logically placed, well illuminated and have conveniently located, strong hand-rails.

Many children and adults are injured in falls in the yard as the result of rough or badly paved surfaces. Areas where children play and persons walk should be free of hazards conducive to stumbling and falling. Balconies and low window-sills are very dangerous. Strong guard-rails, 75-90 centimetres (30-36 inches), from the floor surface should be installed.

2.6.3 Natural hazards

In those areas where natural hazards are prevalent protective devices or methods of construction should be used to minimize the danger; for example, where lightning is frequent buildings should be equipped with lightning rods. In those areas where there is danger of earthquakes, the residence should be specially constructed to reduce the possibility of collapse.

In the site planning of dwelling-units, particular care should be given to the location so as to provide freedom from such hazards as streams that overflow their banks intermittently and flood the residential area. In areas where landslides or avalanches are prevalent and where there is danger of the earth's becoming unsettled because of underground excavations, special precautions must be exercised.

2.6.4 Insect and rodent vectors of disease

Much work has been done in many areas of the world to reduce the potential of insect and rodent vectors of disease. This is particularly true of the achievements gained by the use of residual insecticides to control malaria and other mosquito-borne diseases. The Committee warns against complacency that may result from the success that has been achieved in the control of some insect-borne diseases. All residences should be constructed in such a manner as will prevent the entrance of insect and rodent vectors of disease. Where insects are prevalent, doors and windows should be screened and other openings to the exterior protected so as to prevent the entrance of insects into the dwelling. Reference is made to some of the publications of WHO on this subject.¹

Rodent-proof construction is recommended in all areas and care should be taken with the immediate surroundings of the dwelling to ensure that there are no harbourages or sources of food for rodents in the vicinity.

2.6.5 Pests and hazardous animals

In some parts of the world there exists a danger of man being bitten or annoyed by pests or hazardous animals. The Committee recommends that in these areas attention be paid to the construction, characteristics and maintenance of the dwelling to prevent the admittance into the dwelling of the pest or animal. The Committee uses the term "hazardous animal" loosely and intends it to mean not only mammals but also birds, snakes, etc.

2.6.6 Human intrusion

The residential environment should be constructed of such materials and in such a manner as will make the intrusion into the dwelling by undesired persons difficult. The means of doing this is not only by sound construction methods but also by the installation of hardwear on doors, windows and other openings which will permit them to be locked by the resident.

2.7 Town, village and regional planning considerations

Within the past generation, technological, economic and social inventions and innovations have opened up exciting new possibilities in man's ability to change and control his environment, to meet the full range of human requirements outlined previously. Proper planning will help to ensure for those who are responsible for designing, building and managing housing more effective means of achieving the aims sought. In many respects, the old stereotypes of urban and rural communities, both physical and social, are on the way out. It may be possible to achieve in the next generation types of communities that combine the best of past urban and rural development without their worst weaknesses and drawbacks, and that are more kindly to the bodies, minds and spirits of men who live in them.

The Committee believes that these possibilities can be realized only if they are planned for, carefully and consistently. They simply will not happen by accident or chance. Much of the planning needed will be the responsibility of persons in various planning agencies, local and regional. Alone, however, they cannot do the whole job. Their efforts must be supported and supplemented by the thought and action of many others. Prominent in this latter group should be public health officers and all those concerned with the production, maintenance and use of healthful housing.

More specifically, town, village and regional planning are of vital importance to housing in several respects:

(1) They can help to ensure that residential neighbourhoods or micro-districts are so located within the larger areas of which they are parts that
those responsible for designing, building and managing housing can more effectively meet the full range of human requirements. Where housing is located in relation to topographic features, to centres of employment, to major recreational and other open areas, to shopping districts and to places for medical care, educational, religious and cultural activities outside the neighbourhood are significant factors in its quality. Regardless of the form of the housing provided, the question of location is of central significance. Wise decisions in respect of it will be made most often and most readily when they reflect the perspective on the larger areas that only sound planning can provide.

(2) Although planning cannot completely protect all neighbourhoods from loss of quality as time goes on, it can substantially reduce the chances that good neighbourhoods may be harmed by forces operating from the outside. For example, noise, pollution or heavy traffic generated by industrial operations established adjacent to a residential district after it is in use can seriously damage its healthful qualities, no matter how carefully they have been incorporated into the houses and the site layout. In districts and cities growing rapidly in population and economic activity this is a particularly important consideration. Without some measure of protection, a large part of the substantial investment in housing may soon be impaired or even lost.

(3) Planning can also help in apportioning scarce resources of manpower, time and money, so that they produce something approaching the optimum degree of human benefits and satisfactions. Otherwise, investment in facilities for circulation, for example (i.e., for the movement of people and goods into, out of and within an urban or other area), may become disproportionate to the outlays for housing or schools or recreational facilities.

(4) Similarly, planning can guide those responsible for the difficult decision as to what proportion of available resources should be devoted to additional housing construction and to replacing old, deteriorated or slum dwellings.

(5) Where land uses are changing rapidly, as in the environs of many cities and villages throughout the world, planning and the implementation devices, such as zoning, can help to make this process of change more orderly, more economical, and less disruptive of human values in these areas. For example, if a developing district is clearly designated for residential use at low or moderate densities, significant savings may be made in the capital investment in water supply and sewerage systems as against the capital costs that would be incurred if these systems had to be designed to accommodate possible industrial or other large, non-housing uses that might be located in or near it at some future time.
(6) Although the danger of disproportionate emphasis on circulation is a real one in many countries, the provision of carefully planned facilities for this purpose is an urgent need in many areas now. The Committee calls particular attention to the desirability, in the interests of safety and residential amenity, of separating vehicular and foot traffic in many districts. It is equally important to avoid locating major highways and other circulation facilities so that they cut through neighbourhoods or disrupt other normal community units.

(7) In the site planning of neighbourhood units themselves, careful attention should be given to such features as the neighbourhood store, places for informal meeting and conversation, and open areas, both those similar to village greens and those for possible future cultural and other community purposes. Space should be allocated and made available to religious groups for the building of churches and other places of worship. At first glance these may not seem directly related to health objectives, but when they are thoughtfully and skillfully provided they may enhance those intangible qualities of amenity and neighbourhood character that, it is reasonable to believe, are related to mental and social well-being. In some countries, too many recent housing estates or developments, although decent, safe and sanitary, are also cold, monotonous and characterless.

(8) Because in the last analysis housing, water supply systems and other aspects of urban and rural community development are constructed to serve the needs of people, they are directly affected both by the number of persons involved and by the density of population in various parts of an area. In most countries, zoning and other measures for implementing planning can influence markedly both the numbers and the densities. Zoning is crucially important in providing adequate facilities for schooling, recreation and transport.

Town, village and regional planners should never lose sight of their responsibilities, which include:

(a) Furthering the co-ordination or integration of the various programmes for the improvement of their areas.

(b) Anticipating, as far as is humanly possible, the by-products of specific courses of action and, where necessary, proposing ways and means of ameliorating hardships that may be entailed by activities in the public interest.

Thus, for example, programmes of slum clearance and urban redevelopment may displace many lower-income families and individuals, disrupt church, school, larger family and friendship groupings, and destroy the immediate means of livelihood of small shopkeepers and even of some professional men.
In co-ordinating or integrating programmes for local community improvement, planning for urban and other regions, intermediate in size between the nation, on the one hand, and the individual city and village, on the other, has a most important part to play. In most national planning, these matters can be dealt with only in the most general and often statistical terms. At the level of the individual city or village, planning for these ends is frequently ineffective, largely because the programmes needed are by no means limited to one jurisdiction or population unit.

Recent town, village and regional planning has demonstrated the need for new and improved legal and administrative tools for carrying through the plans effectively and economically. The Committee is not now in a position to do much more than call attention to this need. It would suggest, however, that particular attention should be paid to several possibilities:

(a) Public acquisition of development rights in land in and near areas of changing land use.

(b) "Performance zoning"—i.e., the separation of land uses on the basis of their measurable characteristics such as generation of noise, fumes and traffic instead of by broad categories of residential, business and industrial use.

(c) The gradual elimination of non-conforming uses by means other than purchase.

(d) Reserves of publicly owned land.

(e) Methods of reducing the price of land to prospective developers, public and private.

(f) The development of effective governmental and administrative agencies with region-wide jurisdiction and adequate powers to plan for residential, industrial, transport, utility, and recreational development on a regional scale.

A beginning has been made with the introduction of all these measures in various countries, but much more remains to be done.

In the view of the Committee, town, village or regional planning is by no means all the public planning that has to be done in assuring the proper development and redevelopment of local communities. Operating or functional departments of local and regional governments, such as those concerned with public health, recreation and schools, do, in fact, plan for their own objectives. Quite possibly many of them should do even more planning. There need be no conflict, however, between this kind of functional planning and urban or regional planning. On the contrary, they are essentially complementary and mutually reinforcing. The Committee believes that steps should be taken in all countries to ensure that public health officers may make their full contribution to town, village
and regional planning in the areas they serve. In so doing they would be furthering the cause of public health by positive action. Physical planning for tomorrow is important for today, to ensure the creation of a healthful environment.

2.8 Public health requirements in town, village and regional planning

The Committee recognizes that there exist many public health requirements in town, village and regional planning to create the ideal environs for dwellings. Of great importance is the generalized need for a master plan which is frequently reviewed and revised to meet changing conditions and circumstances. The Committee cannot visualize the logical growth and development of any area—village, town, city or region—without a "blueprint" to follow, and therefore recommends that master plans be developed and reviewed periodically by all governmental agencies which are engaged in community improvement programmes, and suggests that public health officers and other public health personnel participate in these activities.

The principles to be observed in the provision of water, in waste-water and sewage disposal, and in storm-water drainage, are outlined elsewhere in this report. Planning requirements in respect of these services can be stated quite simply. Of course, they are additional to and not substitutes for these other basic requirements:

1. In areas where non-housing uses of water are or are likely to be substantial, sound practice calls for consideration of both types of needs in planning water supply and waste disposal systems.

2. The integrating or co-ordinating function of town and regional planning is well illustrated in the provision of an adequate water supply and waste-water and sewage disposal. Particularly in some climates the increased use of water following the installation of a piped system has led to difficult problems in the absence of a comparably efficient disposal system.

3. Industries vary greatly in the volume of water used in their processes as well as in the volume and nature of their wastes. In water shortage areas, urban and rural zoning should be employed to limit or, in some circumstances, to exclude industries that are high volume users of water—e.g., paper production and steel manufacture.

4. In areas where local customs are not firmly set against payment for water, it has been found that the payments by consumers for limited amounts of water supplied by means other than piped systems are, in fact, at rates substantially higher than those needed for a piped system. In allocating capital resources or, as it is sometimes called, capital programming as a part of town or regional planning, this fact has considerable significance.
(5) Where supply systems bring water considerable distances to sizeable urban centres, and in the converse circumstances in which central city water supplies are distributed throughout a large suburban or even larger fringe area, it is highly important that the water system be designed to conform with regional planning encompassing population and industrial growth, open spaces and recreational facilities for the whole area affected.

(6) Site layout for residential neighbourhoods or micro-districts should not interfere unnecessarily with effective natural storm-water drainage unless alternative drainage can be provided at minimum costs.

In the provision of circulation facilities, planning requirements include:

(1) The development of methods of estimating, within reasonable margins of error, the traffic-generating capacities of the major use districts, particularly central business districts, major industrial areas, shopping districts and tourist attractions.

(2) Before major highway or other transport facilities are begun, sufficient study of existing and prospective traffic patterns and needs should be undertaken to make sure that the facilities will eventually and do at present operate as a system. Otherwise the elimination of existing bottlenecks may simply divert the congestion to other streets or areas but not reduce it throughout. In estimating the effectiveness of a proposed traffic system, the studies of traffic generators mentioned earlier are of crucial importance.

(3) The desirable separation of vehicular and foot traffic mentioned above may be of two kinds: provision of (a) sidewalks bordering or adjacent to streets and highways, and (b) footpaths departing substantially from vehicular arteries—e.g., through park and other open areas or through park strips in the interior of super blocks in residential neighbourhoods. Both of these arrangements may often be included quite easily and inexpensively in the early stages of residential development, but only with difficulty and high costs later on.

In protecting the atmosphere of residential micro-districts from toxic or noxious gases, fumes or dusts, the principal contribution of town or regional planning is in the broad pattern of land use that it provides for and that is accomplished chiefly through zoning. The topography of the area and the direction and strength of prevailing winds should be taken into careful account in establishing these land use patterns. The Committee calls attention to the recent WHO publication on the subject of air pollution.\(^1\)

The more direct bearing of town or regional planning on public safety, welfare and morals is four-fold:

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(1) To ensure adequate areas for schools, recreational activities for all major age-groups of the population and for other cultural activities. Both the desirable extent of these spaces and their distribution throughout an urban or regional area are so closely dependent on local customs and usages that no precise standards of general applicability can be suggested. In general, however, it should be noted that convenience of access is essential to their maximum usefulness. The Committee would also call attention to the strong probability that the trend towards more and more widely distributed leisure time, particularly in urbanized areas, seems likely to continue. The significance of this trend for the planning of recreational areas and facilities is obvious.

(2) To protect children in their usual daily movements outside the home from contact with adult activities of doubtful legality or morality, or worse. The principal planning means to this end is in residential neighbourhood layout, particularly in providing proper, safe and ready access from dwellings to schools, play areas and minor store areas.

(3) To provide, also, adequate and conveniently located sites for district headquarters of the police and fire services. Particularly where much residential building is of readily combustible materials, additional fire protection should be given by limiting densities of population, arranging local circulation facilities so that fire-fighting apparatus can easily reach any building, and by providing open areas so planned that they are both recreational areas and fire-breaks.

(4) To provide for adequately and conveniently located neighbourhood health centres or sanitary-epidemiological stations, as a means of affording a more effective application of preventive medical services. These facilities must be planned and designed to provide the needed health services of that area. In addition to these “first line” medical centres, provision should be made for regional, special and general hospitals serving several smaller communities, individual towns or parts of large cities.

3. SPECIAL CONSIDERATIONS
FOR HOUSING IN RURAL AREAS

3.1 Housing needs

In 1931, the Health Organization of the League of Nations convened the European Conference on Rural Hygiene. In discussing the problems of housing in rural districts, the Conference adopted the following resolution:

"There is urgent need for improvement in the housing conditions of rural districts. Progress in this respect is hindered by the lack of cheap credit and the fact that education in hygiene in rural districts has not reached a sufficiently high level."
The housing shortage in cities has led in most countries to concentration on the housing problem in industrial areas, and the needs of rural districts have not always received the attention they deserved.

Good housing is a fundamental requirement for rural hygiene. It is influenced by social and economic conditions and in its turn exerts a strong influence on these conditions, resulting in better health and a general elevation of the standard of life."¹

The Committee notes that this statement, made 30 years ago, is still valid and accurately describes rural housing problems in most nations today, not only in Europe, for which the statement was intended, but also in all other areas of the world.

The Committee suggests that substandard housing conditions in rural areas may be one of the causes for the movement of the rural population to urban areas, where they move into housing which is overcrowded and in slum areas but which is superior to the defective rural habitation formerly occupied.

3.2 General housing needs for rural residents

In general, housing in rural areas should fulfill the same human requirements as in non-rural areas; the method of achievement is usually the difference. A healthful rural residential environment contains the fundamental needs of a non-rural area, such as a hygienic water supply, a sanitary method for the disposal of sewage and other wastes, adequate dwelling space with proper facilities installed and with a good thermal environment. A specific difference is the provision of communal services and facilities and, usually, a community setting of the dwelling. Frequently, rural housing is free of some of the health hazards of an urban environment—e.g., industrial air pollution and traffic noise.

3.3 Specific housing needs for rural residents

The basic setting of the purpose for rural housing creates some special housing needs. The presence of farm animals makes it mandatory that animal excrement be disposed of in a sanitary manner. Storage of crops must not attract and harbour vermin. Special arrangements are needed to store and safeguard tools and equipment used in occupational pursuits outside the dwelling. A distinct separation between the dwelling area and animal accommodation is needed to minimize the health hazards that livestock may create.

3.4 Special considerations for rural housing

The Committee recognizes the intimate link between housing problems in rural areas and the economic condition of the region, and is aware that improvement in housing in rural areas cannot be achieved without a general improvement in agricultural economics. The Committee commends to governments which have large segments of their population in rural areas a generalized programme of economic improvement intended to raise the status of these people and thereby create more favourable financial conditions for improved housing. It suggests, also, that techniques of self-help or mutual aid be developed to a higher degree in those countries with large rural populations, as these methods seem to provide a means whereby the rural resident can help himself and his neighbour to obtain better housing, without incurring great debt, through the use of materials and methods he can employ easily, safely and economically.

4. HOUSING FOR SPECIAL GROUPS

4.1 Housing for the elderly

The Committee recognizes the increasing importance of the problems of providing adequate housing for the aging population, in both the more developed and the less developed nations of the world. The modern practice of medicine and public health is lengthening the life-span of people everywhere. In most countries the proportion of population of 65 years of age or older is growing rapidly. The WHO Regional Office for Europe convened a meeting in July-August 1958 in Oslo to consider extensively the public health aspects of aging population. This meeting considered some of the housing needs of the elderly, and its findings were summarized in the sixth report of the WHO Expert Committee on Mental Health, as follows:

"Experience tends to show that accommodation which places the aged in the same establishments as their children, in one household, does not always meet with success. Still more does it seem a hardship and source of distress for old people when they are housed in some setting far from their usual environment and away from the hustle of activity which formerly surrounded them. Old people's dwellings should be close to the community and the centres at which it gathers for ordinary activities and recreation, particularly in the case of those who have previously inhabited urban areas; they should be near shops, churches and places of entertainment. The accommodation of old people may be interspersed with family houses, so as to avoid the sequestration of the aged. In designing this accommodation, account must be taken of the physical deficiencies of aged people, their difficulties in moving about without support, their problems in negotiating stairs, their forgetfulness and the dangers this creates."  

The Committee reaffirms these observations and endorses the suggested plans of action.

In addition, the Committee desires to place additional emphasis on some other pertinent factors related to housing the elderly. Definition of the differences in housing required by elderly persons in contrast to that required by younger persons is difficult, as the former cannot be identified easily by general characteristics. Elderly persons may be completely healthy and independent, or afflicted by a variety of ailments and highly dependent upon others. Housing for the elderly must accommodate the healthy, and in this respect it is no different from any other housing, but it must also accommodate the infirm. Fundamentally, housing for the elderly is housing that fulfils all basic requirements.

4.1.1 Critical needs

The elderly have more critical needs to fulfil certain physiological and psychological requirements which are the result of the aging process. Older persons tend to need higher indoor temperatures than young healthy adults, to compensate for poor circulation and less efficient heat-regulating mechanisms. Generally speaking, they need a room temperature which is about 2°-3°C (5°-F) warmer. Also, elderly persons require a more uniform distribution of heating from floor to ceiling to avoid chilling of the legs and feet. It is preferable that heating systems in housing-units occupied by the elderly be designed to use fuel which requires the least possible physical effort to operate.

Older persons, particularly those with cardiac disease, cannot endure high temperatures, or moderately high temperatures accompanied by high humidity. This is again because of their less efficient heat-regulating mechanisms. Special attention should be paid to cooling by mechanical ventilation or other means in the dwellings of these persons, not only just for comfort, but to prevent the excess heat stress on their physiological responses.

The Committee recommends that lighting in dwelling-units for the elderly be quantitatively and qualitatively adequate, since the elderly need more and better light than the younger person to do the same task. Glare from either artificial or natural sources should be avoided and special consideration should be given to locating light switches for electric lights within easy reach and so placed that the way ahead can always be lighted.

Housing, irrespective of the type of occupant, should be located away from sources of excessive noise, but this is particularly important for the aging, because as a group they are less capable of adjusting to the continual stress of loud noises. Buildings in which elderly persons reside should be constructed of materials which reduce airborne sounds and impact noises, not only to protect the older person but, since many of them have hearing deficiencies, to protect their younger neighbours from the loud conversation and playing of radios that is characteristic of some of these persons.
The elderly—like younger persons—require physical exercise, not only for the psychological value but also for the physiological benefits that are derived by improved circulation and appetite through physical exercise. Facilities should be provided for exercise of a gentle type, and may include small garden plots and park areas for walking.

Privacy is important to all persons, but it is more important to older persons, not only during periods of acute or chronic illness, but to permit sedentary recreation and meditation.

Since elderly persons are more susceptible to fatigue and have decreased ability to perform the physical tasks of home-making, the design, layout and installed facilities should be of such a nature and character that will make routine tasks easier. The design should reduce the need for walking excessively during normal home-making functions and should provide easy access to storage spaces without excessive bending or reaching. Furniture that needs to be moved should be equipped with castors, and those items not easily moved should be arranged to permit easy cleaning. Special consideration should be given to the placement of beds which will make bed-making less difficult and the care of an ill person in bed less tedious.

Since elderly persons frequently have difficulty in climbing stairs, consideration should be given to the placement of dwelling-units at the ground level and with all rooms at the same level. In some densely populated areas this is not practicable. In these cases, dwelling-units occupied by the elderly above the ground floor should be served by a lift. If changes of elevation are unavoidable, ramps with a gradual incline are suggested. Under any circumstances anywhere, steps and ramps must be equipped with hand-rails.

Dwelling-units to be occupied by the elderly must be designed and contain devices to reduce the hazard of fire to an absolute minimum. This is essential, as older persons with impaired ability to see and to smell may not be aware of a fire, and may be unable to move rapidly and to escape from it. Fire hazards can be reduced by the proper choice of building materials, careful planning of circulation and the location of facilities. It is necessary that heating facilities using an open flame be properly installed with adequate vents and safeguards.

Dwelling-units for the elderly should not be isolated from the rest of the community. It is preferable that these housing accommodations be integrated with those occupied by younger persons, in order to create a more heterogeneous neighbourhood or micro-district. Since many elderly persons are not physically capable of operating motor-propelled vehicles, it is necessary that these residential units be located near public transportation and close to community facilities such as stores and churches.

The Committee recommends that special consideration be given to the provision of auxiliary services by the community to permit elderly persons to live independently for as long as possible. In some nations the system
of "meals-on-wheels" has been developed for elderly persons who are not capable of preparing adequate and nutritious meals for themselves. Another residential pattern that has been developed in many countries is accommodation for the aged in service apartments ("collective houses"). In these structures additional services are provided for the occupants consisting of some of the following facilities: a service desk with a person on duty twenty-four hours to assist residents coming and going, to receive and distribute mail, parcels, packages, etc., and to perform small errands; a restaurant; cleaning and infirmary functions; and in some cases occupational and physical therapy services.

4.2 Housing for the handicapped

Housing for the handicapped is similar in many respects to housing for the elderly. However, there are some differences which demand special consideration. Unlike the elderly, the handicapped are not identifiable by the characteristic of age: they are persons of all ages. As with the elderly, there is no single set of characteristics that distinguishes the handicapped from the rest of the population except that they are unable to function in the same fashion or to the same degree as a normal healthy individual. The fact that they are handicapped indicates that they are dependent upon others for some assistance.

4.2.1 Critical needs

There are certain critical housing needs of handicapped persons. Primary among these is the requirement that housing accommodations for living independently or in the family unit be modified to the degree of ability to which the handicapped person can live independently or in harmony with his family. Special devices are required to assist the handicapped in his everyday activities. The Committee feels that additional study concerning the design of these houses merits consideration by architects, engineers, and physicians and other medical specialists.

5. ROLE OF PUBLIC HEALTH AGENCIES IN THE FIELD OF HOUSING

5.1 The responsibilities of public health agencies

5.1.1 In addition to their statutory responsibilities in the fields of preventive and curative medicine, public health agencies are legally and morally obliged to establish and conduct programmes which will create and maintain a level of environmental sanitation consistent with the health objectives
of the nation. In order to fulfil this obligation, health agencies must be concerned with the problems of the residential environment, as it is within this environment that many persons receive the greatest exposure to hazards to health and safety. In the past some public health agencies have concerned themselves with only certain aspects of the residential environment—for example, water supply or mosquito control—and have failed to consider the total potential of an unhealthy residential environment for causing illness, injury and death.

5.1.2 It may be stated that public health agencies should, first, evaluate the sanitary quality of the residential environment; secondly, initiate a programme for removing or remedying these hazardous conditions; and, thirdly, measure the effectiveness of the remedial programme. Health agencies should also conduct programmes directed at educating the public in how to create and maintain a healthful residential environment. Further, they should advise other governmental agencies of their responsibilities in creating and maintaining hygienic conditions in the residential environment—for example, advising those agencies under whose jurisdiction the operation of industry falls concerning problems of industrial air pollution.

5.1.3 With specific reference to the provision of safe, sanitary and decent housing, health agencies have a four-fold obligation:

(1) To assist the physical and social planners in the development of plans for new or improved housing

In these activities, public health personnel become planners and assist in the creation or revision of the master plan of the area concerned. The special competencies possessed by physicians, sanitary engineers and other health personnel are of particular value in identifying environmental hazards to health, including substandard housing. In order to participate to the maximum of their abilities, the professional staff of health agencies must have accurate data readily available for use in planning. Therefore, prior to these activities must come surveys and evaluations of the environment. These data must be collected carefully and completely, analysed introspectively and judiciously interpreted and evaluated.

(2) To assist in obtaining compliance with performance standards based upon human requirements and public health needs in the construction and reconstruction of development stages of building

To fulfil this obligation, which in many areas is statutory requirement, health agencies' staff function as inspectors, reviewing plans and specifications of proposed work and conducting field visits and checks of work in progress. In these activities sanitary engineers can frequently give sound advice on how to do the same task better, more easily and sometimes more economically.
(3) To ensure that housing, once it has been created, is adequately, safely and hygienically maintained, and is occupied in accordance with the legal requirements of the area.

These functions assume the existence of legal requirements that establish criteria concerning these aspects of housing. Such a legal instrument, if comprehensive in character, is usually called a “housing code.” The Committee strongly recommends that every level of government which is concerned with the conditions of housing should ensure that the legislative body enact a housing code, if none is in existence. The maintenance of hygienic, safe and decent housing is of great importance in fulfilling human requirements, and assurance of compliance with minimum housing standards is of special importance to health agencies.

(4) To review and evaluate housing conditions continually by collecting, maintaining and analysing data on housing quality.

The Committee believes that no health agency can efficiently and effectively operate a housing improvement programme without a continuing appraisal of conditions. The forces that affect housing are not static, but dynamic and of varying character, as has been previously discussed. Health agencies must change their programme with changing conditions and must always be able to define their objectives in housing improvement so as to indicate clearly the programme to follow.

5.1.4 In the field of education, health agencies are morally, if not legally, obligated to educate and advise people on what is required to maintain a hygienic residence and a sanitary residential environment. Only an informed public can do that which is required of it. Health functions should not be approached solely by telling people what they must do, but also why they should do it.

5.2 Legal functions and moral obligations of public agencies in the field of housing.

The Committee recognizes that in order to create and maintain a healthful residential environment there must be a legal basis for the programme. In some nations of the world there is a highly developed code of administrative and criminal law which sets forth the legal principles for housing control. In other countries there is very little law and no appreciation of the law that does exist. The Committee calls attention to the three legal principles that underlie housing law:

1) Laws should be something to guide and help people, and to establish a trend of acceptance. They should not be considered exclusively as restrictive or punitive.
(2) Laws must be reasonable.
(3) Laws must be enforced and obeyed.

Good law is something that spells out both the obligation of the national and local governing agencies to the individual, and the obligation of the individual to governmental units.

There are two fundamental types of legal control that are applicable to housing. The first is basic law, which should be general and enabling in nature. It should establish the level of performance to be obtained and in general terms. The second is regulation, which is more detailed and more specific. The Committee suggests that all governmental agencies examine the character of current housing laws and if the basic law is too specific and too rigid, then it should be revised to make it of a more general nature and to provide for the specific control of housing by regulation under statute.

In order to obtain some uniformity of legal standards within a nation or within a regional area, model by-laws or ordinances are frequently promulgated by the national governmental agency for adoption by local government. The Committee recognizes that there exists great variation of local law within regional areas, and these legal variations frequently lead to more costly construction of houses without providing the occupant with additional benefit or establishing a higher standard of health, welfare and safety. The Committee condemns legislation which is restrictive without scientific basis, and laws which favour certain building practices or certain elements of the building industry and which are not based upon human requirements for health, safety and welfare.

In making a recommendation that the legal control of building and housing be by enabling legislation of the performance type in contrast to specification codes, the Committee recommends that governments establish building and research stations where there are none, in order to develop compliance standards for performance codes.

Housing legislation should be positive in nature and should encourage the development of a healthful residential environment. In the developing countries of the world the law of planning, building and housing should be essentially preventive in nature to provide for the establishment of a minimum which is acceptable at that time for the socio-economic conditions of that nation. It should provide for the legal basis of a master plan of development for that country or region which has the characteristics of a healthful residential and physical environment.

The law which governs housing and building should also include the administrative procedures for enforcing the provisions established by the law. This is often secured by the issue of "model by-laws" under government supervision, which have all the force of law within the areas of local jurisdiction. It is essential, of course, that the governmental authority
should approve all draft by-laws, in order to provide reasonable uniformity, without interfering unduly with local tradition and custom.

Many of the building requirements do not necessitate the rigid form of a by-law, and should be dealt with by simple regulation and, where necessary, by specific tests of performance which can be checked on the spot. It is important in modern building that considerable flexibility should be permitted in construction, so long as the fundamental requirements are observed—e.g., for safety or for the avoidance of obstruction. In this way out-of-date demands are reduced to a minimum, and the right amount of attention is paid to essential human needs.

In spite of this permission of variation there are certain requirements which must be admitted in all cases. The chief of these is the need for safety, in relation to accessibility in case of fire, the provision of proper exits which can be used at all times, and the use of building materials which meet proper standards of strength, safety and protection from weather and pests.

There are, of course, occasions when the sanction of enforcement is unavoidable, especially when warnings have gone unheeded. In spite of this, the operation of the law should be held as far as possible in the background, and replaced by skilled and understanding housing management. Many of the housing requirements can be met by persuasion rather than by force, and by minor restraint through statutory notices rather than by legal proceedings.

Finally, it should be observed that in many of the developing countries education is more effective than enforcement (which sometimes operates unfairly), when minimum standards of healthful living are themselves a novelty. In some cases members of a community can readily be instructed in good practices, and helped to understand the reasons for legal restrictions; in others the members of the community may be encouraged to take part in a few actual building operations, and in this way play an active role in the enterprise. Even when the work is too complicated for the layman, much can be done by demonstration and simple practical exhibit. By such means the law becomes not only less onerous in general, but popular and favouring obedience rather than resistance.

6. COMMUNITY ACTION IN HOUSING ACTIVITIES

6.1 Public health personnel as community developers

Inasmuch as housing concerns people and is designed to be occupied by people, successful housing programmes involve community action. Public health personnel, as community developers, have the responsibility to assist in planning, developing and executing programmes of action which interpret the wants and needs of the people to the governmental
agencies, and to assist governmental agencies in fulfilling the needs and desires of the people. This programme involves the principles of health education and motivation. Health agencies should assist in the development of leadership within the community for the community to improve its health status and to raise the level of sanitation in its residential environment.

6.2 Community action programmes

In some of the developing countries health agencies have participated in community action programmes through the media of mass education. They have organized programmes of teaching the people about public health, personal hygiene and the desirability of maintaining hygienic residential facilities. The raising of general public health standards in a given community is a vital component in community development. The work in this field is closely related to the general, social and economic development and it is essential for all authorities concerned with raising socio-economic standards to co-ordinate their efforts in a concerted manner. The objective of health services as a component of the over-all socio-economic development is the attainment by all people of physical, mental and social well-being. These health services pave the road for additional basic technical services so as to provide a balanced over-all programme of community development. The Committee recommends that public health authorities and those persons concerned with the establishment and maintenance of a healthful residential environment should be encouraged to assume an active and positive role and interest in governmental planning and in the execution of projects directed towards social and economic development.

7. TRAINING OF PUBLIC HEALTH AND OTHER TECHNICAL PERSONNEL

The Committee acknowledges that the supply of trained public health workers, or similar officials in the field of the hygiene of housing, is inadequate. It is suggested that educational institutions give added emphasis to the education and training of personnel who will concentrate their efforts in dealing with public health problems of the residential environment. These educational efforts should be directed at both the professional and the sub-professional levels. The Committee suggests that the training of professional personnel include the principles formulated during the United Nations Seminar on the Contribution of Building Research to Housing Programmes in Developing Countries, held in Humlebaek, Denmark, 14 May - 10 June 1961, which are as follows:
"Considering that architects and engineers were in general not trained to undertake research on various aspects of housing, it was recommended: to

(a) include special courses on housing in undergraduate training;
(b) provide post-graduate courses not only for architects and engineers but also for sociologists, economists and others concerned with housing;
(c) organize guest lecture courses by outside specialists in housing at undergraduate and post-graduate level, and
(d) arrange for fellowship training abroad of one year's duration for candidates who already receive basic training in their home countries." ¹

The Committee paid particular attention to the decision reached during the fourth session, in April 1960, of the Inter-Agency Working Group on Housing and Related Community Facilities, which agreed that after 1962 priority should be given to the long-range programme to educate the public in training technical and administrative personnel, to strengthen the research and demonstration and training activities of regional housing centres and to multiply pilot and demonstration projects. This proposal, together with the priority, was noted by the Economic and Social Council in its report to the fifteenth session of the United Nations General Assembly ² and by the Social Commission at its thirteenth session.³

The Committee felt that the breadth and depth of the training programmes of public health personnel should be enlarged, when practicable and possible, to provide training in the field of sanitation of the residential environment better to equip these persons to work more effectively in coping with present and future housing problems. It is suggested that the training of public health physicians and medical officers of health include the fundamentals of community planning. Some public health personnel, such as engineers and sanitarians, require increased knowledge about human physiology. Many public health specialists need additional training in sociology and economics in order that they may increase the potential of their contributions in solving the perplexing problems of housing and the residential environment.

The Committee suggests that consideration be given by public health and educational agencies to the development of short courses or refresher training programmes for professional people in public health planning and related disciplines to keep them abreast of the current problems con-

cerning housing and the residential environment, to share experiences, to co-ordinate activities and to stimulate these personnel to tackle new problems with greater vigour.

Special consideration is given to the potential existing in training personnel of all types in the regional housing centres sponsored by the United Nations Technical Assistance Programme, and the Committee suggests that initial studies be undertaken by those in authority to develop educational programmes at these establishments.

8. RESEARCH NEEDS

The Committee recognizes that progress in certain areas of the hygiene of housing requires the acquisition of additional knowledge, and the Committee therefore endorses a comprehensive programme of research to be conducted in universities and research facilities under the sponsorship of WHO, other specialized agencies of the United Nations individually or jointly with WHO, national housing organizations and research centres, non-governmental organizations (e.g., CJB), and by research-supporting philanthropic organizations. The Committee further suggests that national governments with official research facilities undertake additional studies related to methods of fulfilling the definition of human requirements of housing and the implementation of these requirements in practical housing and building methods and procedures. There is a need for both basic and applied research, not only in the principal field of hygiene of housing but also in the related fields of physiology, medicine and epidemiology; psychology, economics and sociology; engineering and architecture, etc.

8.1 Research on physiological requirements

(1) The Committee considers that special attention should be given to defining the minimum and the optimum standards of living space, room sizes, ceiling heights, etc., with particular reference to geography and climatic conditions, socio-economic factors and cultural patterns.

(2) Study should be conducted on the “isolation syndrome” which some persons experience when being housed for the first time in high structures.

(3) Research has been suggested into the public health significance of exposure over prolonged periods of time to small doses of toxic and irritant gases and fumes such as carbon monoxide, aldehydes and others that are found within the dwelling-unit and in urban areas, as well as certain insecticides.

(4) Studies should be conducted on the fundamental human requirements for housing as the basis for building standards. The observations
obtained from such undertakings should be analysed in connexion with existing building and housing practices to permit the development of a more rational standard of building and housing.

(5) Research is needed into the physiology of sleep, with special reference to those factors, such as (a) noise and (b) heat, which are capable of interrupting or disturbing rest.

(6) The total field of the physiological responses to noise and vibration is of great importance.

(7) It is suggested that studies be undertaken concerning the thermal environment in dwellings in subtropical and tropical areas, with particular reference to ceiling heights, means of ventilation, etc. Reference in these studies should be made to the economics of providing a suitable thermal environment by studying the comparative costs of reducing ceiling heights if mechanical ventilation is provided and so forth.

(8) The physiological requirements for artificial lighting in the residential environment is suggested as another area of research.

(9) The Committee commends to research organizations an intensive study of "human engineering" as related to the residential environment.

8.2 Epidemiological studies

(1) The Committee suggests that epidemiological studies be conducted with particular reference to the incidence of (a) communicable disease, (b) mental illness, and (c) home accidents, in relation to the residential environment.

(2) Research is needed to study the causes and prevention of accidental injury in the home and in the residential neighbourhood, such studies to be undertaken by architects, engineers and physicians in co-operation.

8.3 Social and family problems

(1) It is desirable to analyse the problems of mental sickness and neurosis associated with the dislocation of families and individuals who move to new towns or to major housing estates.

(2) Sociological and psychological investigations need to be conducted to determine the optimum amount of social interaction that should be afforded individuals residing in communities.

(3) Analyses are desired of the ways and means of educating and training persons from rural areas who migrate to urban areas in the ways of urban living and how they may adjust to the new environment.

(4) It is suggested that studies be undertaken to determine what motivates rural residents to migrate to urban areas, with particular reference
to health deficiencies in the rural environment that prompt the movements to the city.

(5) There is a need to undertake research in how "problem families" may be most suitably housed, not only for their own benefit but for the benefit of others.

(6) Special attention should be given to the design of housing and to the special needs of people of different cultural backgrounds.

8.4 Housing for special groups

Research is needed in the design, layout and arrangement of houses which are to be occupied by elderly persons and those who are physically handicapped.

8.5 Community facilities

Analysis of effective ways of providing community facilities and services such as water supply, sewage disposal, and water drainage is recommended.

8.6 Regional planning

An intensive study of the industries that do not possess any adverse public health characteristics should be undertaken so that they may be located in residential areas. This should alleviate some of the difficulties created by the centralization of all industry in certain areas and at the same time relieve some of the problems of movement of workers from home to work.

8.7 Special technical problems

(1) There is a fundamental need to develop appraisal or evaluation methods of housing quality.

(2) Special study is warranted of the means of providing a healthful residential environment in those parts of the world where the climatic conditions create special problems of housing, as, for example, hot, dry areas and arctic areas.

(3) Study is needed to develop more specific and precise indices of hygienic quality housing, with particular reference to the human requirements and to the factors which affect the health of the occupants and those living in the vicinity.

(4) Studies might be undertaken of the performance of indigenous building materials measured against the basic requirements suggested by the Committee.
8.8 Dissemination and exchange of information

(1) The Committee suggests that an inventory of research facilities be conducted in each country in order to analyse the research potential that currently exists for the study of problems related to public health aspects of housing.

(2) There is need for clearer knowledge about easier and less expensive ways of building houses which will fulfil the human requirements, have a useful durability and permit easy maintenance.

(3) In this connexion it is suggested that there be disseminated to research institutions an account of current research needs in order that these institutions can be advised of areas where they might undertake investigations. It is also suggested that, in return, the institutions be invited to supply information regarding their programmes of research.

(4) There is a need to standardize terminology used in connexion with the physical and psychological aspects of the residential environment in order to exchange observations and conclusions derived by research facilities in the various parts of the world.

9. SUGGESTIONS FOR FUTURE ACTION

The Committee recognizes that there exists an urgent need for concerted action on the part of many to assist in the orderly development of a healthful residential environment that fulfils human requirements and permits the attainment of a healthful life.

9.1 National committees on housing and health

The Committee recommends the establishment of national committees on housing and health in every member nation, with assistance by WHO when required. Such committees can be either official committees formed by the government or unofficial committees formed by a public health organization with concurrence by the national government. The purpose of these committees would be to ensure extensive and rational co-operation in the fields of planning and housing, both in the international and in the national sphere. These committees would provide a medium for obtaining co-ordination and co-operation between the various housing and health activities within each country and for the utilization and dissemination of the results of joint international work by modifying them logically to conform to regional characteristics, needs and desires. The Committee further recommends that, upon the establishment of national committees on housing and health in member nations, each national committee embark
upon a programme of analysing housing conditions in its country, planning ways and means of improving the quantity and quality of housing in co-operation with other governmental and non-governmental agencies existing in that country that have an interest in or expertise concerning housing and the residential environment. The Committee recommends also that WHO provide an over-all means to co-ordinate the scientific activities of these committees and to assist them, when so requested by interested governments, through the provision of consultation and technical guidance.

9.2 The establishment of programmes within central public health agencies

The Committee recommends that, in member nations that do not now have within the official public health agency a programme of activity directed at developing a comprehensive plan of action for improving the public health aspects of the residential environment, early steps be taken for the formation of such a programme.

9.3 National housing programmes

The establishment of a national housing agency in the governments of member nations to develop a comprehensive housing programme was defined by the Committee as being a means of increasing the quantity and quality of the housing stock of the nation, and the formation of such a comprehensive national housing programme is endorsed by the Committee. Public health administrations have a definite role and responsibility in the planning and execution of national housing programmes and should take an active part in the establishment and development of such programmes.

9.4 Collaboration with the United Nations, other specialized agencies and non-governmental organizations

The Committee acknowledges the activities of the Inter-Agency Working Group on Housing and Related Community Facilities and commends them for their past endeavours. It recommends that in the future the Inter-Agency Group place more emphasis upon those activities directed at defining the human requirements for the provision of a healthful house in a healthful residential environment. The Committee also recommends that the Inter-Agency Group seek from time to time the advice of groups of experts in order to keep abreast of current and special problems in housing and planning and to plan future concerted action in dealing with these. It is further recommended that WHO intensify its role in the programme of the regional research institutes studying problems of housing and health, and
that it collaborate actively with national and non-governmental housing and planning organizations in their scientific and technical activities.

9.5 Other activities

The Committee recommends that WHO should take all steps possible consistent with its Constitution and resources, and in line with established priorities in its total public health programme, to stimulate an awareness of the need for early action in the hygiene of housing and to assist Member States, upon their request, in establishing and developing programmes aimed at the improvement of the hygienic quality of housing and of the residential environment.

9.5.1 Promotional activities

(1) Surveys

Under section 1.3, "World housing conditions" (page 16), mention was made of the large numbers of dwellings in every nation which fail to meet desirable, even minimum, human requirements. Surveys designed to elicit the magnitude and technical characteristics of the problem are a prerequisite to intelligent and rational planning of public health departments and housing programmes. The Committee recommends that such surveys be carried out as early as possible in each Member State with WHO assistance, upon request.

(2) Seminars and conferences

These types of meetings, organized on a regional or inter-regional basis under the sponsorship of WHO, are often useful in stimulating government officials into needed action. Such meetings might be attended not only by public health officers, engineers and sanitarians, but also by responsible officials in the fields of housing, public works, town and regional planning, economics, finance, and public administration, as may be appropriate. The organization of similar meetings on a national scale, under the aegis of the national housing committees referred to in section 9.1 should also be strongly encouraged.

(3) Travelling seminars

Travelling seminars constitute another successful method used by WHO and other international bodies for stimulating and promoting new ideas among officials of member governments. In view of the fact that the essential public health characteristics of national housing programmes often vary from country to country, even within a country, and between climatic regions of the world, the Committee recommends that consideration be given by WHO to the organization from time to time of travelling seminars which would enable responsible public health
and housing officials of governments to review and discuss information and technical data on relevant problems in other countries. For the same reason, the view was expressed strongly that meetings of future Expert Committees on the Public Health Aspects of Housing might be held in different parts of the world.

(4) Education of the public

Housing programmes, like other basic environmental sanitation undertakings, depend much for their success upon an enlightened and co-operative public. In co-operation with housing and welfare authorities, health administrations should play their part in instituting and carrying out a programme of education of the population oriented towards better household living and towards the improvement of housing conditions that have a bearing on health. Such programmes should also aim at revealing the true nature of the hygienic status of the community's housing for the benefit of political leaders at national, regional and local levels, and of leaders of other interested agencies, both public and private.

(5) Collection and dissemination of information

The collection and dissemination by WHO of data concerning relevant research activities in the world have already been mentioned. The Committee believes also that by virtue of its position as an international organization WHO could play an extremely valuable role in collecting and disseminating information in respect of such activities as the administration and evaluation of public health programmes in the housing field. The Committee is of the opinion that such information would be particularly useful to health administrations in fast-developing countries.

9.5.2 Technical assistance activities

(1) Provision of technical advice and consultation

Following a pattern of activities already well established, WHO might consider the possibility of extending the scope of its present technical assistance activities to include, upon the request of interested governments, the provision of advice and consultation in the public health aspects of housing and the residential environment. The Committee is aware that much of the Organization's activities, especially those identified with public health administration and environmental sanitation, contribute directly to the success of national housing programmes wherever these exist. However, additional and more specific assistance is needed in many parts of the world if rapid improvement is to be achieved and if errors are to be avoided at the outset, especially in the case of large-scale housing schemes. Assistance might be given to public health and housing programmes through the provision of teams consisting of a public health administrator and a
sanitary engineer, both specially trained and experienced in the field of the public health aspects of housing. In other instances, individual experts in such fields as public health engineering, sociology and mental health, may be required. The duties of the international experts would include the establishment and demonstration of accepted administrative and technical procedures, surveys and evaluation of the hygienic quality of housing, the formulation of short- and long-range programmes in this field and the training of national public health and housing workers in such areas as the techniques applicable to the appraisal of housing quality. The feasibility of providing such assistance within the frame of the existing "broad programme" 1 in housing, building and planning should not be overlooked.

(2) Training

Measures should be taken to provide appropriate and thorough training in the public health aspects of housing for public health physicians and engineers, sanitarians, housing officials and inspectors, architects, etc. Training may include such measures as specialized short courses, technical meetings and in-service training, locally or abroad as the situation may dictate. Mention has already been made of the possible use of training facilities existing in regional housing centres for such purposes.

(3) Special investigations

Certain studies will require an extensive knowledge of local and regional climatic, socio-economic and cultural conditions. This will apply, for instance, to the preparation of housing quality appraisal techniques and to the design of a number of features of healthful housing. WHO, through its regional structure, is in an ideal position to stimulate and co-ordinate studies of this nature undertaken in several countries situated within the same geographic and climatic area and possessing other similar characteristics in the social, economic and cultural fields. Co-ordination and assistance by WHO would involve such activities as the collection and dissemination of specific technical information at the regional level between countries concerned, regional meetings and the exchange of workers engaged in such investigations.

9.6 Publications

The Expert Committee is aware of an existing dearth of factual, scientific and educational information available to teach knowledge about

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housing and the residential environment and to guide health administrations in their work in this field. It is recommended that WHO should undertake studies within this broad subject and that it should give consideration to the publication of monographs or public health papers dealing with housing and the residential environment. It is further recommended that special efforts be exerted to include in the technical and scientific publications of WHO scientific articles concerning housing and health.

It is recognized that there is little educational material available for the teaching both of schoolchildren and of the adult population in matters related to the maintenance of healthy homes and a sanitary residential environment. To fulfil this need, the Committee suggests that consideration be given to the development of these educational media, possibly in co-operation with UNESCO.

10. SUMMARY OF PRINCIPAL RECOMMENDATIONS

In summary, the Committee recommends that special consideration be given to the following:

(1) Re-evaluation of the objectives of existing housing programmes to ensure that they will fulfil human requirements for a healthful residential environment.

(2) Provision of separate, individual dwelling-units for each family or household, if so desired.

(3) The importance of town, village and regional planning as instruments in the creation of suitable settings for housing.

(4) Increased attention to the housing needs of special groups of people, e.g., residents of rural areas, the elderly and the handicapped.

(5) Education in greater depth and breadth of public health workers and others in the field of housing and health.

(6) Development of an organized, comprehensive programme of research in the public health aspects of housing.

The Committee specifically recommends that:

(1) Assistance be given to the developing countries to create healthful residential environments for their people (section 1.3.4).

(2) A potable and palatable water supply be provided in each dwelling-unit or in the courtyard where it is easily and readily accessible (section 2.4.1).

(3) Greater attention be paid to home safety and accident prevention (section 2.6).
(4) Public health personnel participate in town, village and regional planning (section 2.7).

(5) Master plans to guide the orderly development of the residential environment be created and periodically revised (section 2.8).

(6) "Housing codes" be enacted, if none exist, in the governmental jurisdictions that are responsible for housing and health (section 5.1.3).

(7) National committees of housing and health be formed (section 9.1).

(8) The leadership of WHO in matters involving housing and health be increased (sections 9.4-9.6).