

World Health Organization

Technical Report Series

No. 10

**EXPERT COMMITTEE ON
ENVIRONMENTAL SANITATION**

Report on the First Session

Geneva, 12-17 September 1949

	Page
1. Environmental sanitation in the world today	5
2. General objectives	10
3. Ways and means of improving the world situation	11
4. WHO programme for environmental sanitation	24
5. Relation to regional problems	31
6. The place of environmental sanitation work in WHO	31
7. Future meetings	31
8. Recapitulation of main recommendations	32
9. Acknowledgements	33

WORLD HEALTH ORGANIZATION

PALAIS DES NATIONS

GENEVA

MAY 1950

FIRST IMPRESSION, MAY 1950
SECOND IMPRESSION, JULY 1956

EXPERT COMMITTEE ON ENVIRONMENTAL SANITATION

First Session

Members :

Professor R. De León, Dean, Engineering School, Central University of Venezuela, Caracas, Venezuela

Professor G. Macdonald, Director, Ross Institute of Tropical Hygiene, London School of Hygiene and Tropical Medicine, London, United Kingdom

Professor M. Petrik, Professor of Public Health Engineering, Institute of Hygiene, Zagreb, Yugoslavia (*Rapporteur*)

Professor V. Puntoni, Professor of Hygiene, University of Rome, Italy

Professor K. Subrahmanyam, Professor of Sanitary Engineering, All-India Institute of Hygiene and Public Health, Calcutta, India (*Vice-Chairman*)

Professor A. Wolman, Professor of Sanitary Engineering, Johns Hopkins University, Baltimore, Md., USA (*Chairman*)

Observer :

Dr R. P. Burden, Sanitary Engineer, Paris Office, International Health Division, Rockefeller Foundation, Paris, France

Secretary :

S. Pincus, Chief, Environmental Sanitation Section, WHO

The report on the first session of this committee was originally issued in mimeographed form as document WHO/ENV. SAN./3, 30 September 1949.

COMMENTS BY THE EXECUTIVE BOARD

The Executive Board, at its fifth session, examined the report of the first meeting of the Expert Committee on Environmental Sanitation.

The Executive Board authorizes the publication of this report and draws attention to its comments on certain aspects of this report.

The Executive Board draws the attention of governments and national administrations to the fact that this report gives the findings of an expert committee and does not necessarily represent the established policy of the World Health Organization.

Following a study of the context of this report, the Executive Board considers that the committee has covered the wide field of environmental sanitation and has produced, in its first meeting, a large amount of information which will be most useful to WHO in the development of its programmes in this particular field.

In general, however, the members of the Board consider that undue emphasis has been placed on the engineering aspect of the problem rather than on the sanitation viewpoint. In this connexion, the progress made in the USA and the United Kingdom over the past years has been stressed, whereas the Board feels that this progress has not been confined to those two countries alone.

In the very important matter of the training of sanitation personnel, the Board feels that special emphasis should have been laid in the report on the necessity for the integration of their training with that of public-health doctors and other related medical personnel.

The Board feels that the recommendations contained in the report are largely applicable to those parts of the world which have developed a high level of sanitary control and thinks that fuller consideration should have been given to the question of rural sanitation, which is frequently a problem of grave importance in underdeveloped areas.

In addition, the Board is of the opinion that the nomenclature used in describing sanitation personnel does not have a universal acceptance and therefore requires clarification.

The Board also notes the omission of such items as noise control in large cities, research, and the safe use of compost.

The Board's comments on specific sections in the report have been listed as footnotes.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

EXPERT COMMITTEE ON ENVIRONMENTAL SANITATION

Report on the First Session¹

The Expert Committee on Environmental Sanitation held its first session in Geneva from 12 to 17 September 1949.

The session was opened by the Director-General of the World Health Organization, Dr Brock Chisholm.

At its first meeting, the committee unanimously elected Professor A. Wolman as chairman, Professor K. Subrahmanyam as vice-chairman, and Professor M. Petrik as rapporteur.

The First World Health Assembly had recommended that an expert committee should be established to act as an expert advisory body on the subject of environmental sanitation to the World Health Organization.² The Executive Board at its third session decided that an Expert Committee on Environmental Sanitation with a membership of nine should meet during 1949.³

1. Environmental Sanitation in the World Today

1.1 By the term "environmental sanitation", the committee 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:

¹ The Executive Board, at its fifth session, adopted the following resolution:

The Executive Board

(1) NOTES the report of the Expert Committee on Environmental Sanitation on its first session; and

(2) AUTHORIZES its publication;

Taking into account the recommendations of the expert committee in considering relevant items on its agenda,

(3) TRANSMITS the present report to the Third World Health Assembly; and

(4) POINTS OUT that recommendations of expert committees which concern WHO policy and operations remain recommendations unless and until they are implemented by the Executive Board or the World Health Assembly in adopting and putting into action the annual programme of WHO.

² *Off. Rec. World Hlth Org.* 13, 308.

³ *Off. Rec. World Hlth Org.* 17, 13.

- (a) methods for the disposal of excreta, sewage, and community wastes to ensure they are adequate and safe ;
- (b) water-supplies, to ensure that they are pure and wholesome ;
- (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 ;
- (d) milk and other food supplies, to ensure that they are safe (the question of their nutritive quality being excluded from consideration) ;
- (e) personal habits of cleanliness and of good public taste in relation to disease ;
- (f) arthropod, rodent, mollusc, or other alternative hosts of human disease ;
- (g) atmospheric conditions, to ensure that the external atmosphere is free from deleterious elements and that the internal conditions of workshops, houses, etc. are suitable for the occupations undertaken in them ;
- (h) factories, workshops, dwellings, streets, and the general environment, to ensure freedom from risk to health whether mechanical, chemical, or biological, and to provide the best working and living conditions.

1.2 The diseases which are primarily due to lack of these provisions include :

- (a) infections commonly acquired or transmitted by the alimentary route, especially the enteric group, the dysenteries, and epidemic diarrhoeas, cholera, non-pulmonary tuberculosis, and some helminth diseases ;
- (b) infections commonly acquired by the respiratory route, especially pulmonary tuberculosis, pneumococcal infections, and many virus infections, the transmission of which may, at times, be associated with housing conditions ;
- (c) infections commonly acquired by surface contamination, especially yaws and bejel, trachoma, ophthalmia, and leprosy, diseases which are particularly associated with certain housing conditions, overcrowding, and lack of public appreciation of sanitation ; and other infections, such as hookworm disease, caused by pollution of the soil ;
- (d) infections transmitted through the agency of an alternative host ; the committee recognizes that different ones assume major importance in different places but considers that the following are of widespread and major importance : malaria, yellow fever, leishmaniasis, bilharziasis, plague, and epidemic typhus.

1.3 The committee excludes from special consideration :

(a) malaria, tuberculosis, and treponematoses, on the grounds that they are adequately handled by other sections of WHO,

(b) leprosy, on the grounds that, although it is primarily due to poor environmental conditions, there are better prospects of its eradication by means other than environmental control, and

(c) nutrition, despite its inclusion as an aspect of environmental sanitation in Article 2 (i) of the WHO Constitution, on the grounds that it is more appropriately considered as a separate subject, and is being handled by another section of WHO.

1.4 The committee wishes to emphasize :

(a) the short time since the first emergence of environmental sanitation as a science, its total history being little more than a hundred years ;

(b) the great advances made in certain countries during that time, giving as an example the disappearance from many parts of Great Britain and the USA of major epidemics of the common alimentary infections ;

(c) the fact that this progress was made despite the lack of any previous knowledge or experience of sanitary engineering, much of it in ignorance of the crudest scientific data on the transmission of disease, and without great popular support or demand ;

(d) the fact that this progress has been confined to a few countries containing only a small part of the world's population (even in these it is still not complete throughout their entire extent or in all ways), and that the great majority of the world's population is still exposed to conditions which have not greatly altered during the century.

1.5 In all countries the problems of sanitation must be considered against a background of the social structure of the community and particularly in relation to the following special groups :

(a) urban communities ;

(b) village communities ;

(c) scattered rural communities not collected into villages ;

(d) specialized industrial communities, especially when rapidly growing and distinct from normal urban groups ;

(e) new colonies, as of migrants, refugees, and labour forces engaged in public works.

1.6 The committee is of the opinion that the advantage of sanitation can be brought to all these communities, none being excluded on the grounds

of its small size. It wishes to draw special attention to the needs of the last three groups, and particularly to the necessity of ensuring that any new settlement of either migrants or industrial workers is preceded and accompanied by adequate arrangements for proper housing and other environmental sanitation.

1.7 In the most advanced countries, the sanitation of urban and village communities is often of a high standard, though there are several examples of ways in which improvement could be effected, particularly in housing. Even in these countries, scattered rural communities often receive little sanitary provision and have a real need for more attention than in the past. As these countries are, on the whole, well organized into communal groups, the problems of rapidly growing industrial and migrant communities are not usually great.

1.8 In those countries which contain the majority of the world's population and which may be considered less advanced in environmental sanitation, the general condition is that

(a) In most urban communities

(i) Provision is made for the disposal of excreta but, in many cases, the methods employed are not safe from the standpoint of health. Several defects are often to be found in methods for the conveyance of excreta, but the most obvious ones are usually in its ultimate disposal. The committee recognizes the agricultural advantage to be gained from the use of nitrogenous matter on the soil, and the fact that water-carried sewage can be safely used for the fertilization of certain crops such as fodder. It also recognizes that, in some cases when water is permanently scarce, the re-use of adequately treated effluent is a necessary adjunct to the total water economy. It is disturbed, however, by the continued and even active encouragement of sewage and garbage disposal methods which are unsafe, such as the large-scale use of fresh night-soil for compost manufacture, which often involves grave risks in the carriage of excreta, the use of possibly infective matter on edible crops, and the promotion of grave fly nuisances. The hazards of surface-water pollution by sewage effluents are also often ignored. The committee considers that safety alone should be the primary consideration in the disposal of excreta and sewage.

(ii) Water is usually supplied and is often, but not always, of a pure and wholesome character. Common defects are: inadequate provision for purification, diversity of procedures for sampling and examining water, inadequate sampling by the water authorities and public-health authorities, with insufficient attention to unsatisfactory reports, the installation of supply systems which permit pollution en route to the consumer, and such faults as the parallel provision of pure and

impure water. To these must be added understandable difficulties in securing broad improvement at the present time, owing to such factors as difficulty in the supply of both materials and equipment, such as piping, cement, and gaseous chlorine.

(iii) Though there are some good housing areas in most towns, almost all contain large slum areas of a character likely to encourage the spread of disease and to degrade rather than to improve the character of the occupants. Such slums, common in all parts of the world, are often particularly associated with rapid urbanization and industrial development and with major migratory movements.

(iv) There is little effort to encourage personal cleanliness and discrimination.

As a general rule diseases carried by alternative hosts, such as the rat, the mosquito, and the louse, are kept under sufficient control to prevent major epidemic outbreaks.

(b) In many village communities, all the elements of communal sanitation are missing, except that steps are commonly taken to bring flagrant epidemics to an end.

(c) In most scattered rural communities, all items of environmental hygiene, except those provided by the initiative of individual inhabitants, are missing. The committee recognizes special difficulties in the assistance of these groups, and especially in the provision of safe systems of sewage disposal.

1.9 In the backward countries, the gains from advances in knowledge of environmental hygiene have been largely limited to :

(a) partial reduction of the effects of certain epidemic diseases ;

(b) prevention of the major ill-results of rapid urbanization, such as an increase of the death-rate till it exceeds the birth-rate, a state in which the population is maintained only by immigration—which was common in some towns in the nineteenth century.

Little positive benefit has accrued to the general population whose conditions of life have remained largely unchanged for a century. Many avoidable infections remain a general menace and one, cholera, which is due to insanitary conditions, continues as a steady threat of major calamity to large parts of the world.

1.10 The committee recognizes that there are many causes for slow and unsatisfactory development, prominent among which are :

(a) lack of public conscience and of popular knowledge of the causation, transmission, and control of disease ;

- (b) lack of adequate national government sanitary organizations;
- (c) lack of adequately trained technical staff;
- (d) unsuitable, or ill developed, systems for the financing of public sanitary works, and
- (e) inadequate distribution of technical information.

1.11 The committee recognizes that sanitary advance is possible only with the popular support and voluntary co-operation of the people, which in many cases will be difficult to secure owing to public ignorance, and that the co-operation of educational organizations such as UNESCO should be sought in instituting sanitary advances. It considers also that advantage could be taken in other parts of the environmental sanitation programme of the popular enthusiasm engendered by rapidly operating improvements such as malaria control and the provision of water supplies in areas of great scarcity.

1.12 The committee considers that the knowledge and experience gained in the last hundred years can be applied to backward countries in such a way as to secure their improvement in a very limited time. It considers, however, that the following factors are essential:

- (a) the development of sound national sanitary organizations;
- (b) provision of adequate numbers of well-trained technical staff;
- (c) education of the people;
- (d) promotion of research into many problems.

1.13 The committee is fully aware of doubts which have been expressed on the wisdom of policies which might aggravate population problems. It strongly repudiates any suggestion that sanitary improvement of any sort should be delayed for this reason, considers that every person is entitled to the greatest chances of development and healthy survival which can be offered to him, and recognizes that, by the creation of FAO and UNESCO, the United Nations will concern itself with the broader issues involved in population pressures.

2. General Objectives

The committee considers that the general objectives of WHO in controlling the diseases due to insanitary environments should be:

- (a) complete international control of the major pandemic diseases, particularly cholera, plague, and epidemic typhus;
- (b) general control of all the major endemic and epidemic diseases in this group;

(c) the encouragement of sanitary measures of all types with the object of promoting general well-being as well as mere limitation of disease.

It is clear that these general objectives are attainable only by multiple, combined attacks of different professional groups, in which environmental sanitation is an important element.

3. Ways and Means of Improving the World Situation

3.1 *Strengthening of governmental organizations*

Environmental sanitation programmes depend ultimately upon governmental or public action. Even in advanced countries where the public may be presumed to take a keen interest in implementing such programmes, governmental initiative has not only been found useful, but very often it has been necessary for arousing the public to action. In the less advanced countries, where public consciousness and the resources of local self-governing units, such as municipalities, are not so widely developed, governmental initiative and help are much more necessary to accelerate progress.

This committee is therefore of the opinion that the highest priority should be accorded to the strengthening of governmental agencies specifically charged with the responsibility for initiating, promoting, and persisting in environmental sanitation by direct and indirect participation and influence.

As environmental sanitation involves the application of so many engineering techniques, it is necessary to establish professional sanitary engineering units at a suitably high level in governments to take charge of this function and influence policies. In the absence of such a unit, the necessary emphasis on the control of the environment for the health objective is likely to be lost. This has been seen in some organizations set up by certain governments for the control of communicable diseases such as cholera, plague, malaria, etc., where the case for control of the environment is lost for want of a sanitary engineer to indicate the engineering implications and possible solutions.

In the absence of a strong professional sanitary engineering unit, at a suitably high level in government, its functions are divided among many other organizations, such as the public-health department, the public-works department, the housing department, the local self-government department, labour department, industries department, etc. This division results not only in loss of emphasis on the health objective, but in lack of co-ordination and sometimes even in unintentional working at cross purposes by the various agencies, as each agency may work in isolation from others.

The committee is of the opinion that a strong governmental organization for sanitary engineering has immense potentialities for service, if it works in close co-ordination with other health organizations and in close touch with the public-works organization. It will focus attention on environmental sanitation at the opportune time and place in government and public activities, and influence government and public bodies to adopt a continuous and persistent policy. It will also perform the most useful function of watching the expenditure of government funds and grants for public-health engineering projects, thereby ensuring that money is spent most usefully. Where funds and resources are limited, the public-health engineering organization can indicate priorities. Further, in those countries where municipalities, local boards, and rural and urban councils are not in a position to obtain independently for themselves technical advice and services, the governmental organization for public-health engineering can render these services free or at nominal cost. The public-health engineering departments in many governments have been rendering such service for years.⁴

The committee is of the opinion that the specific organization for public-health engineering should be composed of people specially trained for their functions. Key posts at least should be held only by such engineers. It is desirable to constitute the organization in such a manner that the public-health engineer will be able to co-operate without loss of professional status, sacrifice of ambition, or compromise with professional freedom. The committee is of the opinion that, subject to the above, the organization can be best fitted into what would correspond to a health ministry in the national administration. It is a promising method of securing the health objective by co-ordination of efforts on a national scale.

The exact pattern of the public-health engineering unit will, and should, no doubt vary from country to country according to its political, professional, and social traditions, the magnitude of its problems and programmes, and its enthusiasm and awareness. To cite a few examples of many, there is an American pattern where the bureau of sanitary engineering is part and parcel of the health organization, but its main function is to watch with a critical eye environmental sanitation works carried out by other agencies, such as the works department or the practising professional agencies. There is the British pattern in which the responsibility for health, including the environment, is shouldered by the medical health officer, assisted within his department only by non-engineering technical staff. At the highest level of the Ministry of Health, however, engineering participation is afforded within the department. There is a pattern in India where the public-health engineering department has to be strong

⁴ The Executive Board pointed out that the implications of this and the preceding paragraph are not applicable in many countries of the world and considered that the policy indicated therein should not be generally encouraged.

enough to take up design, construction, and operation of public-health engineering works and to influence activities of all but the major municipalities by professional inspection and advice, and recommendations for grants-in-aid, etc.

Whatever may be the pattern that is evolved in each country, the committee desires to emphasize the urgent need for a strong professional engineering organization placed at a suitably high level in government, so as to be in a position to co-ordinate its activities with other health activities in the country, and to influence policy.

3.2 *Training of professional personnel*

3.2.1 The committee recognizes the great advances in the state of the world's health resulting from control of segments of the environment by the activities of qualified engineers. Early work, generally by civil engineers, in water supply, sewage, and disposal of wastes, leads to the appreciation of the necessity of a knowledge of chemical and biological subjects. The resulting broadening of background stimulates the interest and activities of engineers in extending environmental sanitation as well as increasing the effectiveness of co-operative efforts with other health workers.

More recent specialization by qualified mechanical and chemical engineers has led to similar success in an attack upon the industrial environment and the physical surroundings of the individual and the community.

The committee feels that it should be emphasized that continued progress and the institution of new programmes can best be effected by the development of graduate engineers with specialized training related to public health.

3.2.2 In most countries of the world, workers professionally equipped to develop environmental control programmes are in scarce supply or non-existent, and such a situation is not restricted to undeveloped or underdeveloped countries. In any WHO programme of training, services should be made available to all countries. The addition of experts in sanitary engineering to the health administrations of countries with well developed general health programmes can yield immediate benefits to the particular country as well as increase the general fund of knowledge for all countries. However, the committee recognizes that in less developed countries the quantitative benefits to health will be far greater.

3.2.3 Discussion of the present status of sanitary engineering education brought out the increasing recognition such training is receiving in many countries and regions. In many places where some of the educational services have evolved in separate departments, there is growing realization that centralization of services and training is a prerequisite of further progress.

3.2.4 The committee recognizes that the wide divergencies in environmental conditions, educational facilities, and resources existing in regions and countries will require varied programmes of practice and to some extent in training. Nevertheless, the fundamental requirements are known and should serve as goals for the establishment of new educational departments. The modifications of practice can best be effected by highly trained specialists. However, training within the area of future work should speed development, strengthen professional prestige, and increase training opportunities.

3.2.5 The committee noted that the practice of professional sanitary engineering requires the highest skill in applying fundamental disciplines and emphasized the need for supervised practice of new entrants in the immediate period following academic training.

3.2.6 The committee noted the benefits that have accrued to the furthering of environmental hygiene by the inclusion of such training in the disciplines of other professions whose work is related to the physical environment. Examples of such professions are architecture, other fields of engineering, and medicine. Extension of such training is strongly urged.

3.2.7 The committee discussed the question of the training of ancillary workers in sanitation. It was agreed that such training should not precede the establishment of professional sanitary engineering training in new areas. Where such personnel exists in advance of professional sanitary engineers, integration of their activities with the newly established professional group should be effected. Continued demands should not be made upon workers trained for other responsibilities.

3.2.8 The committee has observed over the years the deterioration of excellent structural facilities for water, sewage, and refuse treatment through the failure to provide competent operators. This unfortunate situation prevails in every country of the world. Short terms of instruction for operators under the supervision of professional workers offer an excellent means of correcting these continuing lapses. The stimulation of such efforts is strongly recommended.

3.2.9 The committee adopted the following resolution on professional training :

The Expert Committee on Environmental Sanitation

RECOMMENDS

that WHO give high priority to the training of sanitation experts by providing or aiding in the provision of :

(a) fellowships for study for teachers of sanitary engineering and sanitary engineers working within the national health structure ;

- (b) teaching materials and laboratory equipment for schools or institutes of regional or national significance, where specialized training in sanitary engineering is given ;
- (c) facilities for regional or international conferences on sanitary engineering education and research ;
- (d) advice and assistance in the establishment or extension of sanitary engineering teaching ;
- (e) facilities in proposed WHO demonstration areas for teaching and training in environmental sanitation ;
- (f) travel grants for senior personnel engaged in sanitary engineering teaching to observe foreign training centres.

3.3 *International standards in environmental sanitation*

The committee feels that WHO could be very helpful in promoting the adoption of standard methods of laboratory analyses of water, sewage, milk, and chemicals used and useful in sanitation practice. The development of an internationally acceptable standard technique and language for laboratory procedures should be initiated, so that workers anywhere could exchange and interpret laboratory procedures and data in sanitation on a common basis.

As a second effort, early consideration should be given to international standards for evaluating the bacterial, chemical, and physical qualities of water, food, air, and wastes, and the application of such universally acceptable criteria to the aids which might be provided to many countries at an early date.

The committee is of the opinion that the time is not ripe for the preparation either of standard specifications for materials or of a manual of standard practice.

3.3.1 *International certification of sanitary facilities and control at sea-ports, airports and land frontiers open to international traffic.* Although the committee is aware of the work performed by existing international agencies in protecting ports against pestilential diseases, it feels that additional work is desirable.

The increase of international traffic today, both in numbers of persons and in speed of travel, in conjunction with other factors, has stressed the fact that quarantine measures at the ports of entry should no longer continue as the primary method for preventing spread of disease from one country to another.

The maintenance of proper sanitary conditions at these ports is now recognized as one of the strongest defence measures to prevent the outbreak or spread of transmissible diseases in international traffic. To lessen the spread of diseases to travellers and from one country to another, there should be a highly efficient control of environmental conditions at the international ports, which should include provision of safe water, pure food and milk supplies served under sanitary conditions, freedom from insects, vermin, or parasites capable of transmitting disease, and general sanitation of a high order.

The committee recommends that WHO consider the possibilities of developing a procedure for the international certification of sea- and airports of international importance as to the adequacy of the sanitary facilities and general sanitary conditions. Such a procedure may well be based on an international agreement on acceptable standards and supervisory measures.⁵

3.3.2 Sanitation of common carriers. Common carriers, such as railroads, vessels, aircraft, or motor-buses can become significant factors in the spread of disease if water and food supplies, insect and vermin control, excreta disposal, and general sanitary conditions are not properly maintained. It is the opinion of the committee that the sanitation of the conveyances of the common carriers within a country should be supervised by the national health-authority, although the immediate inspection and control of the water and food supplies and other sanitary factors may well be carried out by regional or local health units, if the latter are adequately organized and staffed.

WHO should collect information on methods of organization and the procedures used in the supervision of sanitation of common carriers when this work has been carried on and distribute such information to national health-departments.

3.3.3 International agreements on control of pollution of waterways. In the limitation or reduction of the pollution of waterways flowing across boundaries of states or of subdivisions having some local autonomy within a nation, a most effective primary step is to obtain acceptance by authorities in the areas concerned of an agreement covering a particular waterway, setting forth the limiting conditions for discharge of wastes or polluting matter.

⁵ The Executive Board considered that, in view of the complex nature of the problem of international certification generally, the question of international certification of sea- and airports should be left to the consideration of the Expert Committee on International Epidemiology and Quarantine, within whose province it rightly falls.

A similar procedure may be adopted for the control of pollution in a waterway which involves two or more nations. WHO should be ready to promote the consideration by nations of such agreements to cover international waterways when, for reasons of public health, comfort, fisheries protection, and other desiderata of a water programme, pollution of the waterway should be controlled. WHO should in the near future provide in its staff experts familiar with the technical, legal, and administrative aspects of systems now in operation within countries for the control of pollution of waterways.

3.4 *Housing, town- and country-planning*

Vast populations in many countries exist in the most rudimentary and temporary shelters with less than elementary facilities for healthy living. In addition, large numbers live in overcrowded, dilapidated dwellings, which should have been condemned long ago as human habitations. Much was done by the Health Organization of the League of Nations in focusing international attention upon housing. This active interest in housing has been renewed by commissions of the Economic and Social Council of the United Nations. The committee has noted in particular the report on housing, town- and country-planning made to the Secretary-General of the United Nations by the Economic and Social Council⁶ in which many aspects of the housing problem are discussed and proposals for extensive development and publication of housing standards are taken up for special study.

The committee points out that lack of full understanding or complete acceptance of reasonable hygienic standards cannot justify delay in amelioration of housing conditions which cause ill-health and increased mortality as well as frequent epidemic outbreaks. The basic hygienic principles of safe drinking water, proper excreta disposal, and reasonable sanitary conditions about a dwelling are well known and recognized by officials and others concerned with housing projects throughout the world. The housing problem is primarily an economic one. Money, materials, and labour, together with an active governmental leadership, are the primary ingredients necessary to placing this programme in the forefront of the nations' reconstruction efforts, where it belongs.

Every household should be provided with its own sanitary facilities and whenever possible with its own water supply, communal sanitation systems being strongly discouraged.

It is accordingly the opinion of the committee that WHO, as well as the United Nations and its specialized agencies, might well emphasize

⁶ UN document E/1343

most strongly this aspect of the primary need for housing, leaving in secondary place the development of international statistical or standardization studies.

The committee has noted that the First World Health Assembly authorized the setting-up in WHO of a small panel of corresponding experts on housing and town-planning.⁷ This panel of experts can be of value in making recommendations on the hygienic requirements for housing, methods and procedures for evaluating housing conditions, and for recording progress made within a country. In addition, such a panel could be of distinct help in providing an outline of the public-health principles and the administrative procedures which should be included in an effective public-health supervision of town- and country-planning. For example, every town plan or land subdivision project for housing must require approval of the health administration.

The committee has noted that the Social Commission has recommended and the Economic and Social Council has approved a meeting of experts "to consider technical questions relating to housing and town-planning for the lower income groups in the humid tropics". WHO has been asked to be represented and in addition to suggest names of experts to be appointed by the Secretary-General of the United Nations for the meeting, which is scheduled to be held in the second half of 1950 in Africa. The committee is of the opinion that, with reference to the hygienic aspects of these housing problems, experts would be of particular value in providing experience, in the light of local conditions:

(1) in the methods for providing safe water and excreta disposal, suitable plumbing, kitchen equipment, refuse disposal, suppression of insects; and

(2) in the methods for securing the most satisfactory ventilation, cooling, lighting, and interior airing in buildings for the tropics.

3.5 Occupational hygiene⁸

The control of factories and other environments referred to in paragraph 1.1 (h) is an important aspect of environmental sanitation. The groups of workers exposed to risk include not only factory workers but also those working on the land, in the forest, in houses, in public transport, and many other places, in each of which the protection of normal people and of specially susceptible groups such as pregnant or lactating women must be considered.

⁷ See *Off. Rec. World Hlth Org.* 13, 133, 308.

⁸ The Executive Board recommended that this section be referred to the Joint ILO/WHO Committee on Occupational Hygiene.

The risks to which they may be exposed include :

- (a) the effects of harmful or irritant dusts, gases, or vapours ;
- (b) injuries from physical causes, such as coarse trauma, and by other factors such as noise, vibration, excessive heat, cold, humidity, radiation, or abnormal atmospheric pressures ;
- (c) occupational infections and infestations such as anthrax, undulant fever, tetanus, and hookworm disease ;
- (d) bad illumination ;
- (e) bad ventilation ;
- (f) overcrowding ;
- (g) excessive fatigue, in which matter young workers and women should be considered as special groups.

The committee is of the opinion that WHO should bring to the attention of governments the importance of an effective programme for engineering control of environmental factors in occupational hygiene, and that when sending consultants in sanitation on missions, provision should be made for this aspect.

The committee has noted with satisfaction that the Executive Board has authorized joint activities with ILO⁹ in certain phases of occupational hygiene, in particular the two joint committees, one on the hygiene of seafarers and a second on occupational hygiene. It also notes that, at the request of ILO, a statement is being prepared by WHO relating to health problems of migratory workers which will be considered in the pending revision of the International Convention on Migrant Workers.

3.6 *Reduction of accidental injuries*¹⁰

Deaths and injuries resulting from accidents are in the forefront of the ills that cripple and shorten the lives of people. As to this cause of death and disability, the so-called more advanced countries are probably in no better condition than the less developed countries. What the former may have gained in reducing the accidents from the uncontrolled forces of nature has been offset by the injuries and fatalities resulting from increased mechanization.

The study of accidents and their causes and the development of broad programmes for their reduction logically have a place among the activities of public-health departments.

⁹ *Off. Rec. World Hlth Org.* 14, 13, 23 ; 17, 13

¹⁰ The Executive Board recommended that this section be referred to the Joint ILO/WHO Committee on Occupational Hygiene.

It is the judgment of this committee that WHO should collect information and review studies which have been made of the environmental, psychological, and other factors primarily involved in causing accidents. The measures taken in some countries for the participation of health agencies in programmes for the prevention of accidents should be made available to governments. WHO should be prepared in the future to stimulate experiments and demonstrations with official health departments in one or two areas on programmes calculated to reduce accidents.

3.7 Methods of developing and financing sanitation projects in countries at different stages of development

The importance of government initiative has been stressed in section 3.1.

The methods of approach that governments will have to adopt to improve environmental sanitation in their respective countries will, of course, vary. Each country will have its urban, rural, and industrial problems, and in some cases problems of resettlement of masses of population. The relative importance of these will vary in different countries. Again, considering the vital statistics of each country, there may be certain diseases the control of which may be a problem of the utmost urgency in certain regions, whereas in others the same disease may be of minor importance. Malaria, plague, cholera, and bilharziasis are pertinent examples.

There may be other major problems besides health facing a country, and schemes for environmental sanitation will have to be studied in the perspective of other pressing national questions. However, it is not unnatural to expect that, in the absence of a balanced plan and an organization as outlined in section 3.1, the less developed countries may relegate environmental sanitation entirely to the background. The committee feels that every national administration should evolve its own 5-year or other convenient programme of environmental sanitation suited to its needs and adjusted to its material, technical, and financial resources, utilizing the public-health engineering organization that it may have, or with the aid of expert assistance from WHO if necessary. The survey and programme may be based on broad data and should be capable of adjustment in the light of experience. Priorities should be formulated for the various items of the programme.

While the urgency of other problems of national rehabilitation in a country may be a reason for slowing down a sustained programme of environmental sanitation, it cannot at any time justify a complete cessation of efforts to improve environmental sanitation.

When a programme is drawn up for a country, the cost of the projects sometimes appears bewilderingly high. However, the expenditure need not be incurred all at once but can be spread over many years. If the projects

are carefully worked out, the bulk of the expenditure can be a means of providing employment for the people and can be incurred within the country in the production of local materials by local labour. The committee is of the opinion that such expenditure should be treated as productive capital expenditure and should be financed out of long-term loans that may be floated in the country. Many governments try to earmark a portion of their revenues for such capital works and find themselves handicapped.

When environmental sanitation works have to be carried out, it is only reasonable for governments to place the financial burden at least more heavily, if not entirely, on the community that benefits most from them. Thus, municipalities have to bear the major share of the cost of waterworks, sewage works, etc. serving their individual areas. In the less developed countries, the municipal revenue per capita is often inadequate to maintain even elementary services, apart from the question of undertaking capital works. For instance, this is the case in the smaller municipalities of India, where the revenue per capita is said to vary from \$1 to \$2 per annum. The committee is of the opinion that governments should investigate ways and means of strengthening the constitutional and financial resources of local bodies to enable them to discharge their obligations in environmental sanitation more satisfactorily and meet certain minimum standards.

In the case of some environmental sanitation works, such as at pilgrim centres, sanatoria, or in centres of national or international importance, the benefits of which are likely to be felt outside the immediate geographical limits of the community served, the State may shoulder the major responsibility, technically and financially, for environmental sanitation. It may employ some indirect taxation to recoup the expenditure.

In the case of rural populations, particularly of a scattered nature, the State may have to shoulder the entire responsibility, particularly in the less developed countries.

In the case of predominantly industrial populations, the committee is of the opinion that the responsibility for environmental sanitation should be borne primarily by industry and shared, if necessary, by the government.¹¹

In the implementation of programmes of environmental sanitation, including housing, national administrations in certain countries find themselves handicapped by lack of materials, personnel, and money. The committee is of the opinion that WHO should play an important part in using its influence, particularly with the International Bank for Reconstruction and Development, to promote the financing of sanitation projects

¹¹ The Executive Board is not in agreement with the opinion expressed in this paragraph.

in those countries which ask for assistance. WHO can help to procure materials, equipment, or capital goods and help to establish factories for production of essential materials such as pipe, cement, pumps, chlorine, disinfection apparatus, DDT, etc., in those countries where there is urgency for implementation of public-health engineering and housing projects. If such countries apply for help, they deserve to be treated with sympathy and consideration. Every kind of assistance should be made liberally available to them on a repayment basis through the good offices of WHO and other related international organizations.¹²

WHO must make clear very early in its sanitation efforts that it is frequently cheaper to provide adequate and safe public water-supply and sewerage facilities than to perpetuate individual private, costly, and dangerous springs, wells, cisterns, cesspools, and septic tanks. Both health officers and sanitary engineers on occasion lose sight of this important fact. This concept, however, can be applied only when ingenious, but orthodox, fiscal procedures and the use of local materials are carefully explored and adopted. The prevailing rates of interest payment are often more important features of fiscal programmes than are the amounts of capital investment. Excessive interest rates are common in many undeveloped countries, where private risks may be very high. The pooling of loans, supported by more favourable governmental reservoirs of funds, may result in lower interest rates. These and other valid fiscal approaches need early study, recording, and dissemination in countries requiring public facilities. Successful practices developed in financing, and they are numerous in many countries, should be the subject of a special monograph for wide distribution. The experience in China, in Indonesia, in the USA, in countries of Latin America, and elsewhere gives important examples of this method of approach.

The Environmental Sanitation Section of WHO should develop early in its activities a compilation of financial procedures already successfully applied in many parts of the world. The committee will lend assistance to the staff in such an effort.¹³

3.8 *Education of the public*

3.8.1 Under education of the public, the committee understands not only the spreading of elementary knowledge on matters pertaining to environmental sanitation, but even more the formation of such habits

¹² The Executive Board feels that the political and economic implications of this statement are beyond the scope of the Organization at the present time.

¹³ The Executive Board expressed some doubt as to the desirability of the Environmental Sanitation Section of WHO setting itself up as a co-ordinating agent for information of this nature.

among the population in general as will lead to total or partial elimination of those ways of transmitting diseases which result mainly from the behaviour of the people in relation to their environment.

While it is desirable that such knowledge be spread and such habits be formed among the masses of the people, it is especially necessary to implant them into people active in certain trades not requiring specialized training or an officially recognized qualification. Such people are employed in the production, handling, transportation, preparation, and distribution of food and drinking water, and in trades dealing with large masses of people in confined spaces, such as railways, theatres, etc.

The committee is fully aware of the fact that in most countries efforts are being made to spread elementary knowledge of sanitation, but it regrets that they are directed often only to adults who have already fixed habits—good or bad—and less often to the forming of proper habits among the more malleable children. While children are taught the principles of good social behaviour, in many countries insufficient efforts are made to effect the adoption of proper hygienic habits as an essential part of good social behaviour.

Persons handling food, drinking water, and waste matter, or employed in trades which include handling large masses of people confined in relatively small rooms, such as means of transport, recreational localities, etc., usually lack a proper basic knowledge of hygiene, especially if no official qualification is required for exercising their particular trade.

The committee feels that it would essentially advance environmental sanitation, while not neglecting the education of the general public in the usual ways, if

(a) stress were laid upon the inculcation of proper hygienic habits into the children, beginning at the earliest age and continuing until the child leaves school;

(b) the necessary elementary knowledge were required from persons employed in handling food, drinking water, waste matter, and large congregations of people, and from religious and charitable institutions.

3.8.2 As to the basic steps, the committee recommends as first efforts :

(a) proper extensive and obligatory education in hygiene for elementary schoolteachers, masters, personnel of kindergartens, and others ;

(b) provision of an educative and sanitary environment in schools ;

(c) suitable officially recognized qualifications of employees in trades mentioned above in elements of hygiene, connected with their respective trades ;

(d) education of the general public.

3.8.3 As to suitable means for effecting the above, the committee recommends:

(a) setting-up of standards or of scope of education in environmental sanitation for children, personnel in elementary schools and pre-school institutions, and persons employed in the trades mentioned above;

(b) preparation of suitable literature adapted to the special needs of occupations mentioned;

(c) preparation of suitable films, visual matter, and other educational aids, on topics relating to environmental sanitation. Since most countries could not produce such films of the necessary technical standard, such production could be carried out with much benefit by WHO or under its auspices.

The committee is aware that techniques of education must vary greatly in communities at different stages of development and in different types of society. It therefore wishes to point out the need to encourage experiments in the methods of education and notes with pleasure the development of a Health Education Section in WHO, which is working in conjunction with UNESCO.

4. WHO Programme for Environmental Sanitation

4.1 *Co-ordination of environmental sanitation programme with other WHO activities*

It should be evident from what has hitherto been said that the sanitation of the environment is literally the foundation upon which a sound public-health structure must be built. Without such a firm foundation, the super-structure will be costly, weak, and insubstantial. It should be equally clear that unless all constituents of this foundation are firmly designed and in equilibrium, the structure will still totter. In the discussion of the attack on pandemic diseases this relationship between sanitation and other WHO efforts is specified, but with much of the additional work of WHO the same strong ties should exist. The profound effect of sanitation upon infant mortality is being impressively demonstrated in Egypt and in Texas, USA, by the simple expedient of fly control. The worldwide significance of milk control in infant and maternal health need not be laboured.

The influence of WHO upon governments rests, in part at least, upon the example which WHO itself sets in many of its current assignments, where the environmentalist should be in current and constant participation. The listing in detail of such assignments is perhaps unnecessary, but they range from the activities of maternal and child health, through the pandemic diseases, the respiratory diseases, and even, as already indicated, to

certain aspects of the control of yaws. Engineering participation in many of these programmes, within WHO design and implementation, is far easier to accomplish in theory than in the longer efforts with individual countries. Constructive proposals for the integration of environmental sanitation activities with other WHO activities are made in later paragraphs. (See Sections 4.3 and 4.4.)

4.2 *Co-operation with United Nations, specialized agencies, and non-governmental organizations*

All that has been said in the immediately preceding paragraphs applies with equal force to the co-operative activities of WHO with other agencies. It is difficult to isolate an activity in this category which would not profit substantially by sanitary engineering advice, whether it be agricultural or industrial in character. Even the venereal-disease-control programme on the Rhine waterway might be logically extended to embrace improvements in the sanitary facilities and work conditions on water transports.

Persons widely experienced in underdeveloped countries are convinced that an essential preliminary for any future economic development whether public or private, in an undeveloped country, is for its government to provide public services and public works, such as public-health services, schools, water supplies, and roads. These are essential forerunners of industrial and agricultural development. Usually the processes are reversed in favour of grandiose operations resting upon very shaky foundations. WHO has an opportunity to exercise a sound leadership in orienting not only its own activities, but also those of parallel agencies, in the direction of first things first.

The committee is cognizant of the programmes in which WHO is co-operating with the United Nations and its specialized agencies and feels that the importance of environmental sanitation should be borne in mind in these current as well as future co-operative programmes.

The committee views with pleasure the action of the Executive Board in granting official relationship to the Inter-American Association of Sanitary Engineering.¹⁴

4.3 *Control of pandemic diseases*

4.3.1 The committee considers that certain important measures for the control of some of the pestilential diseases, particularly plague, cholera, and epidemic typhus, fall within its terms of reference. It notes that, under Article 2 (g) of the WHO Constitution, the functions of WHO include

¹⁴ *Off. Rec. World Hlth Org.* 14, 40

the stimulation and advancement of work to eradicate epidemic, endemic, and other diseases. It also notes that a study-group on cholera has been appointed and has issued a report¹⁵ which was submitted to and studied by the Expert Committee on International Epidemic Control of the WHO Interim Commission. The chairman of this committee has reported¹⁶ an opinion that quarantine measures are palliatives and a recommendation that a delimitation of and an attack on endemic foci should be made with the technical help of WHO if needed. The committee further notes that the full report of the Expert Committee on International Epidemic Control is not available.

The committee considers, despite this inevitable overlapping of terms of reference, that its own functions include the preparation of practical recommendations on the implementation of the constitutional obligation and the recommendations made by the chairman of the Expert Committee on International Epidemic Control.

4.3.2 The committee considers that experiments should, in the first case, be made in the development of techniques for the eradication of cholera. It selects this disease for the following reasons :

(a) its epidemic and pandemic potential makes it particularly suitable for international action ;

(b) the past history of the disease suggests that eradication may be possible ;

(c) in the life-history of the causative organism, no resistant phase is known (such as the chronic carrier state in enteric infections, which makes recrudescence over long periods almost inevitable) which would contribute to its survival despite eradication measures ;

(d) the bacteriological and epidemiological evidence available concerning it, though not complete, appears to the committee to provide an adequate basis for the start of an eradication experiment.

4.3.3 An experiment of this form must be carried out at the wish of, and as the responsibility of, a national government, but WHO should encourage its initiation and should participate to the full extent of its powers, particularly by :

(a) training of senior staff ;

(b) provision, if necessary, of technical staff ;

(c) assistance in the provision of laboratory or other services required.

¹⁵ *Off. Rec. World Hlth Org.* 11, 15

¹⁶ *Off. Rec. World Hlth Org.* 11, 21

4.3.4 The schemes should be specifically regarded as experimental, for the development of techniques applicable to other endemic foci, rather than as merely an attempt to eradicate the disease from one area, and should be undertaken with the advice of all WHO agencies concerned in the subject. It should be undertaken in a truly endemic area as defined and delimited, for example under the joint sponsorship of the Indian Research Fund Association and WHO.

4.3.5 The organization to be encouraged for the purpose should be under the general direction of an individual with a knowledge of the sanitary aspects of engineering as well as the medical aspects of the disease. It should include, or be closely associated with, units or organizations specially concerned with sanitary engineering, particularly in the provision of pure water, the disposal of sewage under rural and urban conditions, and the prevention of fly prevalence, as well as with the bacteriological, chemotherapeutic, and executive agencies which would clearly be needed.

4.3.6 Although proposing first an experiment in cholera, the committee does not exclude similar experiments on other diseases and will encourage any which seem appropriate and practicable.

4.4 *Demonstration areas and teams*

The committee notes that the formation of demonstration teams is an accepted part of WHO programmes. It considers that teams dealing with environmental sanitation are needed and could be a means to rapid progress. They should have two separate functions, the relative emphasis on which should vary in different cases; they are

(a) the demonstration of accepted sanitation procedures not previously extensively practised in the country concerned, or for the practice of which initial field training of all grades of staff is necessary. This function might be exercised in relation to general sanitary improvement or to special measures such as the control of milk supplies, or rodents;

(b) the development of new methods, such as sanitation systems suited to scattered rural communities.

The staff of teams should vary according to circumstances, but in all cases they should include as leaders either a medical officer or a sanitary engineer, supported where necessary by other professional staff and usually with an administrative field officer. Unskilled staff, and where possible semiskilled or skilled staff other than the leader, should be supplied by the country concerned.

Teams should be sent only on the request of governments and when the necessary facilities have been assured. Important criteria in acceding to requests should be :

(a) agreement by the country to continue and extend the work, to utilize the demonstration team as a training mechanism, and to provide staff for at least one parallel team to work with the WHO team ;

(b) the absence of ability on the country's part to start a project of the type concerned, due to lack of trained staff or other reasons ;

(c) the need to undertake experimental work for the benefit of the country concerned and of other countries ;

(d) the possibility of economic or social development following sanitary improvement ;

(e) the probability that work will not be used for political ends or impeded by political influences.

Special consideration should be given to countries in a precarious sanitary condition, and to areas which act as a focus from which infective disease is disseminated.

As far as possible, teams should work in close co-operation with other United Nations or WHO agencies, and particularly in association with WHO malaria-control teams and UNESCO. When it seems appropriate their work could be combined with that of WHO groups such as malaria-control teams.

The committee considered it very desirable that one team should work in close association with the projected FAO/WHO scheme for combined agricultural development and malaria control¹⁷ with the object that at least one of the areas chosen for development should act as a general demonstration of all aspects of sanitary improvement as well as malaria control, in addition to agricultural development. It recognizes that other agencies such as UNESCO might co-operate in work of this nature to produce an example of general rural construction.

The staff of teams should be instructed to collect data on all aspects of sanitation and health in the area of work, to extend the work if appropriate and approved of by the government to other sanitary matters not covered in the original assignment, and to make such scientific enquiries on this subject as might be necessary.

The committee recommends that WHO should be prepared to despatch one or more teams as soon as possible and should inform governments which might be concerned of its willingness to help by their provision.

¹⁷ *Off. Rec. World Hlth Org.* 21, 29

4.5 *Research and investigation*

Many technical problems in sanitation still remain unsolved, or else the solutions applied in the western world are inapplicable to other sectors of the world. Both laboratory and field studies in many parts of the world, on problems peculiar to such areas, should be stimulated. For example, in many parts of the world, the disposal of human excreta requires special study for the prevention of hookworm, bilharziasis, amoebic dysentery, and like diseases. Newer and cheaper procedures for the disinfection of water, particularly in small tanks or other containers, for the pasteurization of milk, and for rodent control are fertile fields for increased research under the stimulation of a sanitation section in WHO. There is an urgent need for the development of improved methods of disposal of excreta for scattered rural areas, and this problem should be given early priority for study. Such research undertakings, of course, are to be carried on primarily in the individual countries, with such consultation with WHO-assigned personnel as each situation may indicate.

4.6 *Panel of corresponding members for Environmental Sanitation Section*

The subject of environmental sanitation includes so very many topics, and the circumstances as to sanitation and control activities in different parts of the world are so varied, that it is inconceivable that a small number of persons, no matter how well qualified or how widely experienced, can provide the coverage that the WHO section should have available in this field.

The committee recommends that a panel of corresponding members for the Environmental Sanitation Section should be established at an early date. This panel should include from many nations one or more experts active in and aware of sanitation programmes under way in the different countries of the world. These experts could be called upon by the WHO staff and the Expert Committee on Environmental Sanitation for up-to-date information as to present status and recent progress of sanitation in their countries, and for opinions and comments on any proposed activities of WHO in environmental sanitation.

4.7 *Distribution of technical literature*

The committee carefully considered the important influence which the distribution of information and literature may have on the advancement of its subject and the ways in which WHO can help in this. It came to the conclusion that WHO should render assistance by the distribution of:

(a) abstracts of papers and reports, either originally prepared or produced by other agencies;

(b) selected bibliographies ;

(c) publications of WHO, and other United Nations agencies, which refer to relevant subjects.

4.8 *Maintenance of reference file of important sanitary surveys and investigations at WHO headquarters*

The committee desires to point out the great importance of having available to the WHO staff and other public-health specialists the reports and findings of major sanitary surveys and investigations which may have been made in recent years in different parts of the world.

Findings of previous sanitary investigations are of special value in the briefing of personnel who are to operate in the environmental sanitation field. Failure to have available the data collected from previous surveys may result in a considerable duplication with consequent waste of funds and unnecessary burden to local authorities who have to provide again the data already furnished. Often extensive delays in pursuing the newer investigations may ensue. These reports of sanitary investigations should prove, in most cases, to be of considerable value in the preparation of WHO programmes of activities in the countries covered by such reports.

The committee recommends that WHO make special provision for securing, indexing, and maintaining a current file of reports of the more important sanitary investigations and surveys carried out in any part of the world.

Reports of studies not more than ten to twenty years old should be particularly retained for reference.

It is further recommended that WHO, in seeking to collect as complete a file as possible, should request from various national governments and international and non-governmental agencies copies of such reports, whether published or not, which may be given to the Organization for its files.

4.9 *Technical assistance programme and the less developed countries*

It is apparent to most observers that one of the most fertile fields of activity in connexion with the proposed United Nations technical assistance programme to the less developed countries lies in environmental sanitation and its allied public works. The committee urges fullest use of the detailed services of this committee of experts at all times, in conjunction with the WHO Environmental Sanitation Section staff, to forward as rapidly and completely as possible the implementation of this programme. Sanitary works will remain as permanent useful monuments to the success of that effort.

5. Relation to Regional Problems

Although each region has its peculiar necessities for adapting general principles of sanitation to specific local scenes, it is still true that the general basic concepts are universal. It would be unfortunate, therefore, if each region developed a series of expert committees on sanitation, conflicting perhaps both in purposes and in recommendations. From the standpoint of cost and of simplicity of programme, the general findings of one central expert committee with corresponding members in the regions should be made universally available. These findings may then be adapted to regional needs through local consultant services. The multiplication of expert committees in any one major field of activity is a luxury WHO can ill afford.

6. Place of Environmental Sanitation Work in WHO

The committee points out that the real focus of imagination and stimulation for worldwide activity in sanitation should rest in the central organization of WHO. To be effective, such a section on environmental sanitation must be manned by experienced, enthusiastic and competent engineers and collateral experts. The chief of such a section must combine the fine qualities of the negotiator with an equally fine technical competence. His position must be such that by virtue of official status his voice will be consistently heard and his advice sought in policy formulation and in programme planning and execution.

Such a person, and such a staff, cannot be found if the level of operations in WHO should be organizationally so low that both spirit and action are broken by long and laborious efforts to reach the hierarchy of policy and programme-making. One most effective way to doom the programme of environmental sanitation which we propose is to relegate its implementation to a minor position on the organization chart.

The committee wishes to emphasize the importance of securing a corresponding integration of sanitary engineering into the regional organizations as well.

7. Future Meetings

The committee recommends that the next meeting be held in approximately another year, unless the speed with which its recommendations are implemented justify an earlier session. In the interim, however, the individual members of the committee will be on call for emergency advice and current consultation.

8. Recapitulation of Main Recommendations

The committee recommends that the general objectives of WHO in combating diseases due to insanitary environment should be to make a co-ordinated attack for :

- (1) Complete international control of the major pandemic diseases, particularly cholera, plague, and epidemic typhus.
- (2) General control of all the major endemic and epidemic diseases.
- (3) Encouragement of sanitary measures of all types with the object of promoting general well-being as well as limitation of disease.

The committee specifically recommends that :

- (1) WHO promote the immediate organization of professional engineering participation in governmental health activities at a suitably high level in government. (Section 3.1.)
- (2) WHO should give high priority to the training of sanitation experts. (Section 3.2.)
- (3) National administrations should evolve balanced programmes and priorities in environmental sanitation and assess their financial implications, considering them as productive capital expenditure. Furthermore, WHO should play an important part in using its influence, particularly with the International Bank for Reconstruction and Development, to promote financing of sanitation projects in countries and securing of essential materials. (Section 3.7.)
- (4) WHO should set an example to governments, of co-ordination of environmental sanitation with other activities in its current assignments. (Section 4.1.)
- (5) In implementation of the recommendation regarding control of the major pandemic diseases, WHO should launch an experiment in environmental sanitation, in co-ordination with other agencies, for the eradication of cholera from an endemic area. (Section 4.3.)
- (6) WHO should organize demonstration teams in the field of environmental sanitation, and one of these teams should operate in conjunction with the proposed FAO/WHO scheme for agricultural development and malaria control. (Section 4.4.)

9. Acknowledgments

The committee wished to express its appreciation for the considerable assistance it has received in its deliberations from Dr R. P. Burden, Sanitary Engineer, International Health Division, Rockefeller Foundation, Mr J. W. Wright, Sanitary Engineer, Malaria Control Section of WHO, and from various members of the Secretariat of WHO. Mr S. Pincus has been invaluable in the preparatory work for, as well as in the development of, this report. We are particularly indebted to him. To Drs Biraud and Bonne we record further appreciation for unusually patient co-operation.

