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AN OUTLINE OF WHO ACTIVITY IN THE FIELD OF AIR POLLUTION

by

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Early work by WHO

WHO activity in the field of air pollution started in 1955 when the WHO Regional Committee for Europe recognized it as a serious problem and concluded that a combined effort by the countries of Europe was required for its solution. The recommendations of that Committee led to the Conference on Public Health Aspects of Air Pollution convened by WHO in Milan in November 1957. Twenty-one European countries participated in this first meeting of its kind in Europe. Observers also attended from the United States, the European Coal and Steel Community and the Organization for European Economic Cooperation. The Conference considered the sanitary engineering problems involved in the prevention of air pollution as well as the public health and administrative aspects.

Many of the participants confirmed, by striking examples of ill effects on man, animals and plants, that air pollution was a serious and difficult problem in their countries, and one that was rapidly getting worse. Although lack of conclusive proof of a direct relationship between air pollution and deleterious effects on human health and well-being was considered a serious handicap to effective action, the Conference was satisfied that there was sufficient information available to press for immediate control measures.

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Immediately following the Milan Conference, the first meeting of an Expert Committee devoted to air pollution was convened in Geneva in November 1957. Thus, states the report of this meeting, "the World Health Organization recognizing its responsibility in the matter of air pollution as a threat to the health and well-being of peoples throughout the world, took its first steps to marshal the facts and to suggest procedures by which preventive and remedial action may be taken by its member countries before serious harm is done to the health of their people".

The Expert Committee discussed the nature and causes of the problem, methods for measuring pollutants in the ambient air, the effects of air pollution and the need for prevention and control measures. The effects of air pollution were divided into four categories, namely (1) effects upon human health, (2) effects upon animals, (3) effects upon vegetation and (4) economic and sociological effects. However, it was the primary concern of the Committee to consider the relationship of air pollution to human health.

That Expert Committee made many specific recommendations relative to (1) standardization, (2) research, (3) collection and dissemination of information, (4) administration and legislation, (5) training, (6) education of the public, and (7) publication of a monograph. The last recommendation led to the publication in 1961 of WHO Monograph No.46, entitled "Air Pollution", a 432-page reference consisting of 14 chapters, contributed by experts from 7 countries.*

In 1959, the WHO Regional Office for Europe started a study to determine methods for relating non-specific disease states with air pollution. From this it became clear that there was a widespread but rather uncoordinated interest in the epidemiology of air pollution, and some preliminary conclusions were drawn from an international symposium held at Copenhagen in December 1960.

The Eighth European Seminar for Sanitary Engineers was also entirely devoted to the subject of air pollution. This meeting, which took place at Brussels in October 1962, provided a forum for the exchange of information

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* Publications in this series appear in English and French, and occasionally also in Russian and Spanish.

on technical and administrative measures for the prevention, evaluation and abatement of air pollution for the participants of the nineteen countries represented. On the basis of specially prepared documentation, the Seminar identified the main air pollution problems in Europe and their causes, reviewed programmes and control measures enforced in European countries, methodology for surveys and pollutant measurement procedures, and legislative and administrative control measures.

Activities since 1963

The lack of general agreement on fundamental principles on which to base maximum permissible air pollution levels was discussed at another meeting which also dealt with the rationale for air quality criteria. In reviewing the situation as regards standards for air quality, it became apparent that although several governments had adopted such standards, they varied widely because they had been based on different guides and criteria. Though no guide or criterion was formulated, certain important principles were agreed upon, and the criteria adopted by some countries to assess air quality, as it relates to human health, property and the environment in general, were reviewed. The role of epidemiological and aerometric surveys in the development of guides to air quality and the role of effects such as damage to vegetation, soiling of surfaces and visibility reduction were also considered.

In 1963 a second Expert Committee on air pollution was convened by WHO. This Committee reviewed the report of the afore-mentioned meeting on air quality criteria and guides, endorsed its general approach to the subject and, in particular, the principles and definitions of criteria and guides to air quality, i.e.

> Criteria for guides to air quality are the tests which permit the determination of the nature and magnitude of the effects of air pollution on man and his environment;
>
> Guides to air quality are sets of concentrations and exposure times that are associated with specific effects of varying degrees of air pollution on man, animals, vegetation and on the environment in general.

The Committee felt that internationally agreed guides to air quality were desirable and should be set up as soon as feasible. It stressed that pollution of the air by biologically harmful substances resulting from man's activities should be avoided to the maximum extent possible. Concerning emission standards, the Committee stated that "international standardization of emissions of pollutants is virtually unattainable and the prescription of such standards must be left to the discretion of individual governments or local administrative authorities".

In reviewing progress made in air pollution control, the Committee noted that a number of countries had in the last few years passed new legislation, that technical means for control had advanced, that methods for monitoring atmospheric pollutants, especially stack emissions, had improved, that heating installations in urban districts were being operated more efficiently, and that town planning, improved traffic regulations and meteorological warning systems had all tended to keep down air pollution in the last years.

The Committee noted the need for controlling automobile and diesel exhaust gases as well as the pollution caused by the combustion of coal. It was recognized that international collaboration was desirable for the resolution of air pollution problems associated with motor vehicles, the elimination of sulfur dioxide from flue gases, and meteorological conditions, to investigate the loss of working hours from ill-health caused by air pollution, to elaborate methods for treating or burning coal in developing countries and to disseminate information on air pollution control.

The Committee made specific recommendations on research, on research coordination, co-operative studies on the epidemiological effects of air pollution and commended the WHO practice of awarding fellowships for laboratory and field work. Further study was recommended on internationally acceptable guides for air quality, and it was proposed that a glossary of terms used in air pollution control work be prepared.

The many recommendations of this Committee led among other things to a series of scientific group meetings and, although these scientific groups discussed various facets of environmental pollution, air pollution received considerable attention.

Methods and procedures were discussed for providing a scientific basis for regulations to prevent long-term effects on health from air and water pollutants. Long-term effects were defined as the effects of accumulation and storage of pollutants; the delayed or insidious effects of relatively high concentrations of pollutants, the contributory or accelerating role of pollutants in the development of chronic diseases, in aging and life-shortening; the irreversible, prolonged or repeated impairment in important body functions; changes producedin immunology or other body defences, and in the transmissible genetic material of the body. The long-term effects of air pollutants inhaled into the respiratory system received special attention, the most important long-term effect being the presumed correlation between pollution and chronic non-specific lung disease.

The principal purposes of air pollution measurement were defined: to make a preliminary assessment of pollution problems, to identify sources of pollution, to estimate health effects, to assess air pollution in relation to weather, to evaluate the effects of control measures, to guide economic planning and development. Measurements were also vital for the development of air quality criteria and guides.

In reviewing analytical methods, the importance of simple, sensitive and especially specific methods was emphasized. While apparatus for some of the new analytical procedures was expensive, savings in manpower and the resulting improved specificity and sensitivity in measurements might justify the high cost of certain new equipment. In this connexion, WHO was recommended to publish monographs presenting reliable methods for the measurement of individual pollutantsthought to be important for public health. Such monographs are now in preparation, while a guide to the selection of methods for measuring air pollutants (the first draft of which was presented to one of the scientific groups) is now in press.

Bearing in mind the recommendations of the 1963 Expert Committee and of the various scientific groups concerning motor vehicles exhausts, a report on the public health aspects of air pollution from diesel vehicles was published in 1967. This dealt with fuels and their combustion products, the effects of incomplete combustion, the differences between petrol and diesel engines; it compared petrol and diesel engines as regards their air-polluting tendencies, and explained the health implications of diesel engine emissions and how to prevent such emissions. The Expert Committee on air pollution organized by WHO in 1968, on the other hand, considered in detail urban air pollutants emitted by motor vehicles, and reviewed methods for sampling and analysing these pollutants, their health effects, their effects on the environment, and guides to air quality, as well as control methods and their efficiency.

The Inter-Regional Seminar on Air Pollution Control 1967

Training in techniques to combat special health problems has always been a tenet of the Organization's programme. Air pollution control is no exception. A recent example of a group-training activity was the Inter-Regional Seminar on Air Pollution Control, convened by WHO in collaboration with the Government of the USSR in Moscow and Volgograd in 1967. Five WHO Regions were represented at this Seminar which covered: general and organizational problems, meteorological problems in air pollution control, criteria and guides to air quality, air pollution surveys and methods of measurement, health effects of air pollution, and air pollution control technology. A report on this Seminar has been prepared for distribution to all participants and other interested persons and institutions.

The WHO International Reference Centre on Air Pollution

As part of its research programme, at the end of 1967 WHO established an International Reference Centre on Air Pollution, and a number of regional and national reference centres and collaborating laboratories are now being designated to form, together, a world network of institutions. The functions of the IRC are to advise on research results regarding the health effects of air

pollution, on the organization of air pollution surveys, on the identification and measurement of air pollutants and on control methods. It will provide consultant services on research and technical problems, it will carry out research on behalf of WHO, coordinate research and evaluate the results obtained by the collaborating laboratories and national institutions, and advise WHO on new research needs. With the assistance of collaborating laboratories and national institutions, it will elaborate methods for identifying and measuring air pollutants and organize and coordinate inter-laboratory comparisons on the use of such methods. It will train individual specialists and organize international, regional and national training courses in air pollution control.

As a first task, the IRC has undertaken a critical review of a number of methods for measuring air pollutants.

WHO Regional Programmes

As already mentioned, the Regional Office for Europe began a detailed study on the health effects of the problem in 1959; in 1962 the Eighth European Seminar for Sanitary Engineers was devoted entirely to control methods and technology, while another European symposium on the health effects of air pollution took place in November 1968, which reviewed and discussed the trend of air pollution in Europe, methods for sampling and assessing the extent of pollution, the health effects and the establishment of guides and criteria for ambient air quality standards.

In the Region of the Americas, work on air pollution started relatively recently. While much valuable research and practical control work has been done in the USA, as to constitute a model of its kind, the problem is just emerging in Latin America. Thus at a meeting of the Directing Council of the Pan-American Health Organization in 1965, a resolution was unanimously approved recommending Ministries of Health to take up the problem and requesting the PAHO to grant technical assistance in this field. Shortly afterwards, a plan was drawn up for monitoring air pollution in urban areas throughout the Region. This surveillance network is now in operation, linking ten large cities spread over nine countries. In the meantime, some air pollution research

work had been conducted by the Institute of Occupational Health and Air Pollution Research at Santiago de Chile, an establishment created by the UNDP/SF and for which WHO had been the Executing Agency.

This Seminar has in fact been planned to look into the serious air pollution problems that are becoming manifest in the Eastern Mediterranean Region.

As for the South-East Asian Region, some work on air pollution has been conducted since the inception of the Central Public Health Engineering Research Institute, another UNDP/SF establishment for which WHO was Executing Agency. This side of the Institute's work will increase in importance now that air pollution problems are starting to cause concern in India and other countries of the Region.

Technical Assistance to member countries

Assistance to individual Member Governments is a traditional function of WHO and in the field of air pollution the Organization has since 1960 provided such assistance to a number of countries including: in the European Region - to Turkey, Hungary and Yugoslavia; in the Eastern Mediterranean Region - to Kuwait, Iran, Cyprus, Lebanon and Israel; in the Americas - to Argentina, Brazil and Chile, and in WPRO - to Japan and Taiwan.

Collaboration with other agencies

As in other facets of its programme, WHO has for some ten years been collaborating with various international bodies in the matter of air pollution - with the Specialized Agencies and their regional commissions, with other intergovernmental organizations and with a number of non-governmental organizations concerned with specific technical aspects of the air pollution problem.

In 1965 WHO presented a report to the ECOSOC on environmental pollution - a report that had been prepared in cooperation with ILO, UN FAO, UNESCO, WMO and IAEA. A further study on the question was requested by the Council, and this was prepared and presented to the 1967 Session of the UN Advisory Committee on Science and Technology and to the 1968 sessions of

the ECOSOC. It is to be noted that at these sessions a resolution was unanimously approved by the Council calling upon the UN to convene an international conference on problems of pollution of the human environment.

Another cogent instance of WHO collaboration with other UN agencies is its work with WMO, in particular with the working group on atmospheric pollution and atmospheric chemistry of the WMO Commission on Atmospheric Sciences; the first meeting of this group, in fact, endorsed the WHO recommended units for expressing the results of air pollution measurements. WHO co-sponsored with the WMO the Symposium on Urban Climates and Building Climatology, held in Brussels in October 1968.

WHO, together with the UN and the FAO, participated in the UNESCO Conference on Resources of the Biosphere (Paris, September 1968) and presented a paper on problems of the deterioration of the environment (air, water and soil).

WHO participates regularly in the work of various groups and meetings concerned with air pollution organized by the IAEA, the Economic Commission for Europe, and the Economic Commission for Asia and the Far East.

WHO has constant and continual contacts with the OECD. In 1964 WHO also provided considerable assistance to the Council of Europe in planning and organizing a European Conference on Air Pollution.

The International Union of Pure and Applied Chemistry and the International Union of Local Authorities are the non-governmental organizations most directly concerned with air pollution, and the IUPAC in particular has been represented at WHO expert committees and scientific groups. WHO is also in contact with various international unions and associations (e.g. the International Union of Air Pollution Prevention Associations, the National Society for Clean Air of the United Kingdom, and the Air Pollution Control Association of the USA, etc.).

In the course of the next five years, the Environmental Pollution Unit will concentrate on the following aspects of its long-term programme:

i. systematic investigations into and compilation of data on environmental pollution in selected countries by consultants and through technical meetings, designed to identify common problems and the type of WHO assistance needed;

ii. the establishment and development of international, regional and national reference centres and collaborating laboratories in environmental pollution (air pollution, environmental radioactivity, water quality);

iii. establishment and development of applied research institutes (such as the Central Public Health Engineering Research Institute, Nagpur, India) in other WHO Regions (particularly Africa) to serve as centres for applied research and development, as focal points for operational activity or consulting services, for country-wide dissemination of technical information on environmental health, and for specialized training;

iv. establishment and development at Headquarters of an information service on work in environmental pollution carried out by Governments of Member States and other national and international organizations.

More specifically in the field of air pollution the Unit will be concerned with:

a. setting up tentative criteria and guides to air quality;

b. promoting and conducting studies into the effects of air pollution on human health and the environment, and on epidemiological methods of investigation;

c. preparing guides to the selection of suitable methods of assessing and controlling air pollution, and assisting in applying such methods.

WHO PUBLICATIONS ON ENVIRONMENTAL POLLUTION (AIR, WATER AND RADIOACTIVE POLLUTION) RESULTING FROM OR DIRECTLY RELATED TO ENVIRONMENTAL POLLUTION PROGRAMMES OF HEADQUARTERS OR REGIONAL OFFICES

Environmental Pollution

1. Environmental Pollution: warning by Director-General of WHO (1965) WHO Chron., 19, 414

2. Jebb, W.H.H. (editor) (1968) Research into Environmental Pollution (in press)

3. Izmerov, N.F. (1967) WHO and environmental health, WHO Chron., 21, 336

Water Pollution

4. Spaander, P. (1954) The control of swimming pools in the Netherlands. Bull. Wld Hlth Org., 10, 267

5. Buchan, S. and Key, A. (1956) Pollution of Ground Water in Europe. Bull. Wld Hlth Org., 14, 949

6. Key, A. (1956) Pollution of surface waters in Europe. Bull. Wld Hlth Org. 14, 845

7. Makkonen, O.A.P. (1956) Wastes from paper and pulp mills, Bull. Wld Hlth Org., 14, 1079

8. Meinck, F. (1956) Le Problème des eaux usées industrielles nuisibles à la santé. Bull. Wld Hlth Org., 14, 1061

9. Swaroop, S. (1956) Estimation of bacterial density of water samples. Methods of attaining international comparability. Bull. Wld Hlth Org., 14. 1089

10. Baars, J.K. (1957) Travel of pollution and purification, en route, in sandy soils. Bull. Wld Hlth Org., 16, 727

11. Krul, W.F.J.M. (1957) Sanitary engineering and water economy in Europe. Bull. Wld. Hlth Org., 16, 707

12. Hill, G. (1959) ethods of water-flow measurement applicable to Simulium control, Bull. Wld Hlth Org., 21, 201

13. Townend, C.B. (1959) The economics of the disposal of sewage and trade effluents. Bull. Wld Hlth Org., 20, 535

14. Christ, W., Fischenhof, H., Klassen, C.W., McNaughton, Sir George, Manner, E.J., Nagibina, T. and Petrik, . (1962) Aspects of water pollution control. Wld Hlth Org. Publ. Hlth pap., No.13

15. Key, A. (1962) ater pollution in Europe: Some recent information. Bull. Wld Hlth Org., 26, 537

16. Litvinov, N. (1962) ater pollution in the USSR and in other Eastern European countries, Bull. ld Hlth Org., 26, 439

17. Bick, H. (1963) A review of Central European methods for the biological estimation of water pollution levels, Bull. Wld Hlth Org.,29, 401

18. Water pollution (1963) WHO Chron. 17, 62

19. Bransby-Williams, .R. (1965) Effects of pollution on the susceptibility to larvicides of Culex pipiens fatigans, Bull. Wld Hlth Org., 33, 735

20. Foliguet, J.M., Schwatzbrod, L. and Gandin, O.G. (1966) La pollution virale des eaux usées de surface et d'alimentation. Bull. Wld Hlth Org., 35, 737

21. World Health Organization, Expert Committee on Water Pollution Control (1966). Report, Wld Hlth techn. Rep. Ser., 318

22. The growing menace of water pollution (1966) WHO Chron., 20, 95

23. Control of water pollution. A survey of existing legislation (1966) Int. Dig. Hlth Legis., 17, 629

24. Warner, Richard, E. (1967) Bio-assays for Microchemical environmental contaminants. With special reference to water supplies, Bull. Wld Hlth Org., 36, 181

25. Control of Water pollution. (Legislation on water pollution control) (1967) WHO Chron., 21, 111

26. World Health Organization, Expert Committee on Water Pollution Control in Developing Countries (1968), Report, Wld Hlth Techn. Rep. Ser. (in press)

27. Brisou, Jean (1968) La pollution microbienne, virale et parasitaire des eaux littorales et ses conséquences pour la santé publique. Bull. Wld Hlth Org. 38, 79

Air Pollution

28. World Health Organization (1958) Air Pollution. Fifth report of the Expert Committee on Environmental Sanitation, Wld Hlth Org. techn. Rep. Ser., No.157

29. Air Pollution: A menace to public health. (1958) WHO Chron., 12, 14

30. Barker, K, et al (1961) Air Pollution, Geneva (World Health Organization: Monograph Series, No.46)

31. Lawther, P.J., Martin, A.E. and Wilkins, E.T. (1962) Epidemiology of air pollution. Report on a Symposium, Wld Hlth Org. Publ. Hlth Pap., No.15

32. Air Pollution in Europe (1962) WHO Chron., 16, 413

33. Petrilli, F.L. (1962) Methods of measuring sulfur dioxide, dustfall and suspended matter and their use in the study of air pollution in Italy. Bull. Wld Hlth Org., 26, 495

34. Air Pollution. A survey of existing legislation (1963). Int. Dig. Hlth Legis., 14, 187

35. Health Legislation: Air pollution (1963) WHO Chron., 17, 423

36. World Health Organization, Expert Committee on Atmospheric Pollutants (1964), Report, Geneva, Wld Hlth Org. techn. Rep. Ser., 271

37. Controlling air quality (1964) HO Chron. 18, 220

38. Ellison, J. McK. (1965) The nature of air pollution and the methods available for measuring it. Bull. Wld Hlth Org., 32, 399

39. Ellison, J. McK. (1965) The particles in town air, Bull. Wld Hlth Org., 32, 411

40. Kettner, Helmut (1965) The removal of sulfur dioxide from flue gases. Bull. Wld Hlth Org., 32, 421

41. Rjasanov, V.A. (1965) Criteria and methods for establishing maximum permissible concentration of air pollution, Bull. Wld Hlth Org., 32, 389

42. Middleton, John T. and Darley, Ellis, F. (1966) Plant damage: an indicator of the presence and distribution of air pollution. Bull. Wld Hlth Org., 34, 427

43. The diesel engine and atmospheric pollution (1967) WHO Chron. 21, 201

44. Katz, M. (1968) Guide to the selection of methods for measuring air pollutants (in press)

45. Motor vehicles and Urban air Pollution. Report of an Expert Committee (in preparation)

Radioactive Pollution

46. Kenny, A.W. (1956) The Safe disposal of radioactive wastes. Bull. Wld Hlth Org., 14, 1007

47. Kenny, A.W. (1962) Sanitary Engineering aspects of nuclear energy developments. Bull. Wld Hlth Org., 26, 475

48. World Health Organization (1968) Routine surveillance for radionuclides in air and water. Report of a Technical Meeting. Wld Hlth techn. Rep. Ser. (in press)