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ABSTRACTS
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RECENT ADVANCES IN ENVIRONMENTAL POLLUTION CONTROL
IN LATIN AMERICA AND THE CARIBBEAN

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Significant advances have been made in Latin America and the Caribbean countries over the last few years in preserving and improving the quality of the physical environment.

The arousing of public awareness of environmental problems, the promulgation of specific laws and regulations and the creation of new agencies and strengthening of already existing ones have made it possible in many countries to accelerate the assessment of environmental pollution and to initiate control programs. The establishment of the Pan American Air Pollution Sampling Network has led to the creation of air quality monitoring programs in 14 countries.

Several universities have devoted considerable attention to the environmental sciences by establishing new disciplines and offering new courses in their curricula. There has been a remarkable increase in short courses, seminars, and symposia on environmental matters. Research is increasing, and significant changes may be observed in attitudes to and kinds of environmental research. The creation and strengthening of technologic, sanitary engineering and occupational health centers have made it possible to improve the institutional capacity for environmental research in a number of countries. Research has been carried out on the effects of atmospheric pollutants, sewage and industrial waste, treatment processes, methods of controlling water pollution, and urban solid wastes.

If the countries of Latin America and the Caribbean are to continue and expand present relatively small number of programs and initiate others

on the required scale, special attention will have to be paid over the next few years to training enough environmental specialists and developing a suitable technology. This can only be achieved through effective and well-designed training and research programs.

PAHO's experience makes it clear that environmental pollution control courses once of interest only to sanitary engineers should henceforward be designed to meet the needs of other interested professionals as well. The need for training technical personnel will also be felt. Bibliographic, applied, and pure research will expand the knowledge and technology required for environmental protection programs. Latin American and Caribbean countries will have to devise and apply low-cost, capital-saving, labor-intensive technologies to solve many of their air, water, and soil pollution problems.

ECONOMIC AND SOCIAL ASPECTS OF ENVIRONMENTAL POLLUTION

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Environmental conditions in most countries have been steadily deteriorating in recent years, during which public authorities have lost precious time in creating new agencies to deal with the problem. Each new agency created has given rise to a new program full of promise and hope, but such programs have not succeeded in overcoming other influencing economic and social pressures. As a result, the problem of environmental pollution continues to be one of the greatest challenges to human civilization today.

At a high-level symposium such as this we should reflect on the following question: Have we put the problem of environmental pollution into proper focus? Technologically, it has been quite apparent that scientists and technicians are increasing their efforts in the fight against pollution. Numerous positive results have been achieved, notably in techniques of treating drinking and waste waters. Also significant has been the population's growing awareness of the dangerous effects of pollution; in some cases the intensive popularization of technical information about the problem has created almost a psychosis about disease and other dangers to health.

From the economic and social viewpoint, however, we believe that a reappraisal in depth should be made to check the adequacy of the bases on which pollution control programs have rested up to now.

The present paper is an attempt to contribute our experience on the subject, highlighting various points that seem worthy of more extensive thought and research.

Need for better strategic focus

This point seems to be implicit in the very names used by most public agencies to characterize legislation and related measures: "Laws and programs for pollution control." That is, many countries have created mechanisms that are almost exclusively corrective in nature.

In consequence, research and operating programs pursue a course of action that is almost always behind events, and the result is ever increasing polluttional burdens. The economic and social costs to overcome the damage already done end up being considered too high in the face of developmental priorities and are thus postponed.

Need for making "environmental development" one of government's priority goals

It is perhaps not an exaggeration to say that our society, in gradually undertaking economic development, is turning away ever more from the concept of the citizen as the central goal of the entire system of governmental planning.

The engineering profession in particular has deviated significantly from its basic goal, which was originally defined as the "control and economic use of the forces and resources of nature to advance human welfare." This profession has fragmented itself into tiny specialties absorbed in the "technology and undertakings that allow the use of natural resources with ever more efficient economic return." The need for doctrinal reappraisal might thus be expressed as follows:

a. An environmental or ecologic dimension must be created in which the goal of environmental development is as important as economic development.

b. This high-level political decision implies the creation of an executive agency with ministerial status to insure its successful functioning within the dynamic equilibrium from which governmental decisions result.

c. As a result of this policy, it will become possible to believe in the feasibility of preventive and corrective measures

intended to control the growing deterioration of the environment.

Need for institutional reorganization to achieve governmental environmental development goals

The political decision noted above should lead to necessary institutional reforms in each country to effect its realization, such as:

- a. Definition of long- and short-term governmental goals and programs, together with the required strategies for action and technical, economic, financial, and social support.
- b. Creation of executive agencies and other institutional resources, including appropriate legislation.
- c. Adaptation of university teaching and research to train personnel and solve technical, economic, financial, and social problems.

Need for adequate use of existing know-how

History teaches that over the course of decades we often rediscover old truths and give new names to old things.

It seems useful today to think about the real meaning of a great number of new terms. Up to a point they represent activities that were fairly well developed in the past but fell into disuse because of excessive economic fragmentation, and that are now recurring with new political shadings. For example:

- a. "Environmental protection" versus "environmental sanitation"
- b. "Environmental engineering" versus "sanitary or public health engineering"
- c. "Quality of life" versus "health" (WHO concept of 1946).

Need for defining and developing realistic programs

Reemphasizing Shatuck's teachings and considering the influences prevailing in today's world, it becomes important to define the fundamental

bases and policies for an action program.

In addition to what we have said above, it seems useful to consider the following points:

- a. The planning and execution of the aforementioned governmental programs must be carried out by teams composed of different professions.
- b. Engineers with a knowledge of environmental sanitation must assume a technologic position in such teams.
- c. The institutionalization of this governmental policy requires the competent contribution of jurists and political authorities.
- d. Action plans should emphasize preventive measures and critically establish the priority of works and services.
- e. Among high-priority goals in Latin American countries, special attention should be given to the economic factors that now chaotically influence the growth of cities and location of industries.
- f. In defining international financing policy, it would be well to examine the suitability of giving priority to the provision of resources for the implementation of the governmental action policy noted above.

HEALTH ASPECTS OF ENVIRONMENTAL POLLUTION

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Studies of man in his environment present an exciting challenge. In the past, man's battle with the environment has been concerned primarily with the infectious diseases, and exposure to noninfectious agents generally occurred in only a few occupations. With the advent of modern science and technology, the exposure of the general population to noninfectious substances increased. Today, man is exposed to a host of possibly harmful substances such as synthetic organic chemicals and various intermediate industrial compounds through air and water pollution, pesticides, radiation, food, drugs, and cosmetics. Occupationally exposed groups usually consist of health adult, whereas those at risk in the general population include the young and old, persons with temporary or permanent physiologic alterations, and those with acute or chronic diseases.

Thus, protection of the general population poses problems somewhat different from those of occupational health and industrial hygiene. Rational environmental controls should be based on sound health intelligence. Adequate health information can best be obtained by coordinating the efforts of epidemiologic, clinical, and laboratory research. Optimal planning for environmental health research would use the special contributions of all three kinds of research, while acknowledging their biologic interrelationships. Failure to consider and integrate each approach would result in wasteful and probably inadequate research. Health research goals must be related to regulatory needs by providing precise dose-response information. Specific environmental studies will often require adequate monitoring of several media such as air, water, dustfall, and diet to obtain dose estimates. Careful thought must also be given

to selection of appropriate biologic response variables.

The Pan American Health Organization's member nations have broad and varied environments that create different problems in different countries. PAHO can help its member countries in formulating short-and long-term environmental health goals. A survey of the present and projected pollution problems in PAHO countries, coupled with minimal duplication of commonly accepted research findings, would provide the information required to develop and set priorities for specific scientific studies.

ENVIRONMENT AND HUMAN HEALTH

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(Will be distributed later)

ENVIRONMENTAL HEALTH CRITERIA

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The formulation of environmental health criteria is an extraordinarily complex but highly important undertaking for national and international health authorities. Work on this problem was given impetus at the United Nations conference on environmental problems at Stockholm in June 1972, and thereafter the World Health Organization sponsored scientific meetings to promote activities in this area. Particular attention has been given to setting permissible exposure standards, which must take into account exposure pathways and environmental transformations, bases for exposure limits, the nature and significance of biologic responses, interactions involving synergistic and antagonistic effects of pollutants, dose-effect relationships, and the problem of "no adverse effect" levels.

WHO has defined priorities for the formulation and review of environmental health criteria for the period 1973-76. These priorities include the preparation of new criteria documents (e.g., for nitrogen oxides, nitrates, nitrites, and nitrosamines, manganese, polychlorinated biphenyls, and noise and vibration); review, extension, and evaluation of existing WHO documents in this field (on cadmium, lead, mercury, and photochemical oxidants and reactive hydrocarbons); and review and assessment of national criteria on a number of heavy metals.

The work and problems involved in these activities will be covered briefly, with particular attention to the difficulties surrounding the concept of "no adverse effect" levels.

EARLY WARNING SYSTEMS COVERING CHANGES IN HEALTH STATUS

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A long-range goal of the World and Pan American Health Organizations is to develop a comprehensive health information service so that member countries and other appropriate authorities may exchange information on health matters of global concern. An important part of this exchange will be warnings of actual and potential adverse changes of health status in populations for which WHO and PAHO are responsible.

An operational definition of "early warning" is the capability of knowing as soon as possible that a significant change in a population's health status has occurred or that conditions or trends are occurring which might lead to such a change in a population's status, and transmission of such information to appropriate authorities on a need-to-know basis.

"Early" is conveniently interpreted as being synonymous with "as soon as possible." For epidemic emergencies this implies immediate action. For many adverse changes in the environment, "early warning" means bringing to the attention of appropriate authorities the full facts that have been developed for their careful consideration in planning medium or long-range corrective action. Warning of actual adverse changes implies the need for prompt corrective steps using established control measures. Warning of potential adverse changes implies the need for an alert mechanism to investigate the seriousness of impending health problems.

WHO and PAHO are now carrying on a number of warning activities as defined above, e.g., the monitoring of drugs, a number of communicable diseases, and certain natural disasters and other emergencies. We are

being increasingly called upon to improve and expand the functions encompassed in the above definition; for example, with respect to adverse health effects induced by environmental factors.

HUMAN ECOLOGY AND HEALTH
(Review and Proposal for a Regional Center)

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In October 1971 the PAHO Directing Council urged Member Countries in Resolution XXXI to strengthen their capabilities to cope with health problems related to the changing human environment, and requested the Director to explore means for the establishment of a Center for Human Ecology and Health Sciences. Discussions were initiated with various technical and governmental groups and opinions were sought from individual experts. Tentative proposals were developed, reviewed, and modified during these discussions.

The problem was seen to involve the following considerations:

1. There is no doubt that the variety and degree of environmental stresses influencing man as a consequence of technologic development are threatening our health and way of life.
2. The environmental, physiologic, and social forces involved are extremely complex.
3. Overhasty action, without thorough examination of all possibilities, may result in undesirable repercussions.
4. The information available about the complexities and the consequences of any particular situation is sometimes incomplete or fragmented and often confusing.
5. It is dangerous to confine attention to the factors that are most apparent in a particular situation. A much wider view needs to be taken, with adequate consideration of all forces that may come into play. What is needed is an integrated or ecologic approach.
6. A formal systems approach can assist analysis and prediction in some special cases, but it is not sufficient for most situations.

7. Group analysis by various experts, working with those who have a major stake in the solution, is a necessary development for enlightened handling of many environmental problems.

A Center for Human Ecology and Health Sciences would provide a mechanism to focus on the development of adequate understanding of the complex interrelated phenomena underlying the human body's reactions to the increasingly wide range of environmental hazards--biologic, chemicals, and physical.

To accomplish its tasks the Center will include a wide range of competence in such fields as environmental toxicology, environmental physiology, bioengineering, molecular biology and cytology, epidemiology, biomathematics, human ecology, analytical methods, and supportive services in pathology, computing, and information handling.

Further, the Center will collaborate closely with PAHO's existing network of centers, and in particular it will complement the physical sciences and engineering activities of the Pan American Center for Engineering and Environmental Sciences in Lima as a resource in the biological sciences and medicine.

The objectives of the Center have been listed as:

1. Develop biomedical and epidemiologic methodology to identify, define, and monitor health problems of environmental origin.
2. Advise governments on programs and actions to minimize the adverse effects of the environment on health.
3. Conduct and support training of environmental health specialists.
4. Conduct, support, and promote research.
5. Provide information for global assessment of health problems of environmental origin.

Development is expected to proceed along five semisequential lines:

1. Development of a technical information base.
2. Identification of major environmental problems.
3. Provision of advisory and consultative services.

4. Participation in training of environmental health personnel.
5. Organization and conduct of applied research.

Briefly, the Center will develop and maintain an overview of the Member Countries' needs and activities in the field, foster close liaison with universities, scientists, and research organization, and supplement governmental research and training efforts in specific aspects relevant to the overall environmental health problems through personal cooperation with individuals and institutions and through consultation.

Arrangements are being made to hold a seminar in September 1974 to better define these suggested objectives and program development ideas.