

**PAN AMERICAN HEALTH
ORGANIZATION**

**ADVISORY COMMITTEE
ON MEDICAL RESEARCH**

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FIRST MEETING

**18-22 JUNE 1962
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REPORT TO THE DIRECTOR

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PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
WORLD HEALTH ORGANIZATION

WASHINGTON, D.C.

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PAHO ADVISORY COMMITTEE ON MEDICAL RESEARCH

Report to the Director

1962

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Introduction

Dr. Abraham Horwitz, Director of the Pan American Sanitary Bureau, stated in his introductory remarks that the Organization "has decided to undertake the task of building up a long-range medical research program in the Americas, one of a truly international nature..." The PAHO Advisory Committee on Medical Research has been created, in order to "review the existing and proposed research program and make appropriate suggestions," and to "recommend the basis of a long-term research policy for present and future projects, to be approved by the Governing Bodies of the Pan American Health Organization."

From the 18th to the 22nd of June, 1962, the Committee examined the reviews of the research fields proposed by the Director with the advice of consultants and its general comments and suggestions make up the body of the present document. In addition, it has formulated some thoughts on policy as related to research, which are set forth in the following paragraphs.

The Committee understands that it is to deal with research, and with certain areas related thereto, such as training and education. It will not deal with the application of already available knowledge even when, as is often the case, the gap between knowledge and application is great. This should be the preoccupation of other bodies.

The Committee does not agree with the usual distinction between "fundamental" and "applied" science. It feels that all genuine good quality research is fundamental in so far as it contributes to the more complete understanding of the multi-faceted aspects of complex

problems. This is particularly so when dealing with man, who is the central object of our concern.

Fundamental science is not distinguished by the use per se of mathematical, physical, or chemical methods to a problem, but rather by the relevance of the research to an intellectually and practically satisfactory solution of the problem at hand.

The immediate goal of the support of research in Latin America is to solve problems related to health in a manner which will promote human welfare. To this end, general areas of research have been examined in these sessions, and a preliminary attempt has been made to establish priorities. The long range goal is to promote the upgrading of the community in its most human aspects through the cultivation of science. Indeed, science, if understood properly, and as a form of culture, is a means of eventually providing for the whole community an objective awareness of the proper context of man; it gives a holistic view of the universe, in keeping with man's intellectual nature; it should eventually provide a basis for mutual understanding; and it is in any case a proper basis on which to build education. Regardless of the individual programs which are undertaken by PAHO, and regardless of the practical results which are obtained, and which cannot be predicted because of the essential gamble involved in all research, the objective of upgrading the community will be attained -- provided the men who are put in charge of those programs are carefully selected for their scientific and human qualities.

A long range policy in scientific development must have as its first and foremost basis the detection of young scientific

talent, its encouragement, and its promotion through fellowships and other means. All efforts should be made to identify the best existing research centers in order to strengthen and supplement their research, and to encourage them to foster their own programs of study at the post-graduate level. It is essential to arrange for the education of the young trainees within the framework of these centers, so that travelling abroad will be necessary only in exceptional cases. The research and teaching centers should be backed up by means of fellowships and by providing equipment and expenses for the trainees.

It is obvious that planning of the research will have to be done and priorities established. "Genuine planning is an attempt, not arbitrarily to displace reality, but to clarify it and to grasp firmly all the elements necessary to bring the geographic and economic facts in harmony with human purposes." To the extent to which research is a collective enterprise, requiring the contribution of public funds, it must be planned in a general way. But it must be remembered that research is in the last instance an essentially individual undertaking, subject to all the fluctuations, hesitations and indeed anxieties of the unknown and that extreme regimentation and rigidity must be avoided if happy and fruitful results are to be expected.

The bases for the establishment of priorities are several. The research project must be relevant to the field of health and it must somehow promise dividends in terms of new and significant knowledge and of increased human welfare. It is rarely possible

to obtain an accurate idea of the economic importance of the problem to be studied, because of lack of data in this area. Since this important criterion can rarely be used, research on diseases with a high morbidity and mortality would tend to have a high priority. The sine qua non condition for support is that there be competent individuals in centers with adequate facilities to carry on the project. It is also important that the research project does not duplicate other research underway. An element of preference should be given to those programs which are peculiarly significant for Latin America or to those which involve international cooperation. Finally, even if several of the above conditions are not fulfilled, the Committee feels that a project might be considered if its support will bring about a favorable effect on the research potential of the country, by planting a seed in an otherwise sterile area.

1. Past and Current Research Activities of PAHO and WHO

The Committee heard with great interest statements regarding the past and present activities in research of WHO, PAHO, and the international aspects of the programs of the National Institutes of Health of the U.S. Public Health Service. The Committee recognizes that the volume and effectiveness of research performed under the WHO and PAHO programs are considerably greater than was generally realized, even before specifically designated research programs had been adopted.

However, since the adoption of research as a policy by WHO,

radical changes had taken place which required a fresh orientation regarding the policy determining the programs to be supported by PAHO. Furthermore, the expanded programs of international assistance for research by other organizations, especially the NIH, demanded the most careful scrutiny to ensure that unnecessary duplication was avoided.

The Committee considers that the PAHO has the same responsibility for problems facing the Americas as the WHO has on a world basis, to foster research which is the life blood of progress. It welcomes the proposals presented to this Advisory Committee and its comments in the body of the report are made in full consciousness of the need for coordination of the activities of the two organizations in the sphere of research.

2. Research Training in the Medical and Health Sciences

Reference to this most important subject has already been made in the Introduction. The Committee notes that the problems of medical education had been considered by another Committee convened by PAHO and that a program in this field had been formulated. The immediate problem of training medical practitioners, which is made evident from the figures in Document RES 1/4,* should in no way interfere with the imperative necessity of stimulating and developing research activities in the medical schools, which should be carried out pari passu with the formation of physicians

* "Needs in Research Training and Medical Education in Latin America" prepared for the first meeting of this Advisory Committee.

to give medical care to the public. Research is inseparable from teaching.

It is recognized that many factors of a socio-economic nature in the Latin American background often make difficult the setting up of good quality research. In spite of adverse factors, however, good research has been and continues to be done in Latin America, and it is highly desirable that it be strongly encouraged through all possible means. In addition to the results obtained from practical applications of research findings, research serves most useful purposes by helping to stabilize the staff, increasing the degree of excellence of the institutions, and by providing the best means towards their long range upgrading.

The Committee recognizes that in some Latin American countries a primary deficiency in developing the research potential is the relative lack of opportunity for stable careers in research. Unless these are available with suitable salaries and research opportunities, it will not be easy to attract the best men into research, since they would have no difficulty in achieving a successful career in almost any other area they choose. As a preliminary to establishing such stability, the Committee strongly recommends that each country carry out, by means of the establishment of a National Research Council, or by some other means, a radical study of the programs in the health and related sciences, so as to identify where research activities should and could be stimulated and career appointments be made to advantage. It is recommended that PAHO support these studies by offering the services of consultants.

It is the strong belief of this Committee that the single most important handicap to the advance of research in the medical and other health sciences in Latin America lies in the existing shortage of trained specialists at all levels. For this reason, any program to develop research in Latin America must have as its fundamental and most important objective a training program to improve and increase the current potential of trained manpower in the research field. A solution to this problem will be of the greatest value in contributing to the advance of research in all fields of medicine as well as in the related fields of public and environmental health, dental health, veterinary medicine and others. It is recommended that PAHO give the highest priority to exploring means of support for a program of graduate education and specialist training for research in health sciences, including provision for the continued full-time support of the trainees in research careers. While the Committee recognizes that at the present time it is not feasible to designate a specific order of magnitude for the program, it must be conceived on a bold scale and must include provision for long term support, if it is to have the impact on the research potential of the hemisphere which the Committee envisages.

An important part of the work of the National Research Councils should be to seek for opportunities for research and research training in places which are at present not being used for the purpose. An example of this are the social security hospitals which could readily be brought into affiliation with universities

and, as a result, not only ensure better medical care in the hospitals, through the availability of the best consultants and the pick of the medical graduates, but would also provide almost unlimited opportunities for research on the major disease problems of the country. The essential factor in this proposal is the affiliation of these hospitals with the research and teaching potential of universities. A logical outcome of this would be the creation of additional research posts at very little additional cost.

In order to encourage research in general in the medical schools, funds should be made available for worthwhile programs undertaken by competent individuals, account being taken of this Committee's recommendations for the individual broad subjects examined in this report. The development of graduate training centers, both in the universities and in special institutes outside of universities, and associated with them, should be strongly encouraged. Full-time positions in research and teaching are highly desirable, particularly in the basic sciences. The possibility of training biologists, chemists and physicists to serve as investigators and teachers in the medical schools should be strongly considered. In this connection, the Committee emphasizes that modern research demands the participation of highly trained scientists in a wide variety of disciplines of the physical and biological sciences, medical training alone often being insufficient. Finally research in the methodology of medical teaching should receive strong support.

3. Environmental Health

The Committee wishes to emphasize that the threats to health posed by the environment are local, being influenced by geographic and demographic factors. Furthermore they change rapidly in character, because of changes in technology and because of population movements. Hence, it can be anticipated that the existing knowledge of environmental health will not be sufficient to solve the problems in Latin America, because this knowledge was developed for the conditions prevailing in Western Europe and North America. Indeed it is known that the certain kinds of knowledge which apply to certain parts of Europe do not apply to certain parts of North America. For example, the toxic components of air pollution in London, Paris or Berlin are totally different in chemical composition from the air pollutants characteristics of the Los Angeles or Arizona type of smog.

In view of this high degree of local specificity of environmental hazards, and of the rapidity with which these hazards will change as Latin America becomes increasingly industrialized, the only solution is to create in each region a research center devoted to the study of the special environmental problems of the region. Needless to say, the very complexity of the problems involved demands the participation, and therefore the training, of scientists with various kinds of skill.

Granted the existence of problems peculiar to each region, the fact remains, nevertheless, that there exists a number of other problems of sanitation which are common to all regions of the world and concerning which there is available a large body

of systematic knowledge.

In developing economical solutions for these well known and identifiable problems of environmental sanitation, it will be advisable to provide in each country sanitary engineering experimental institutes where existing technological knowledge can be adapted to meet local needs. While this type of institute may not have as its primary purpose the conduct of research as defined in the terms of reference of this Committee, its functional purpose will serve important environmental health needs.

The Committee concurs with the views set forth in the Consultant's report that these experimental stations should be developed in each country where the problems of application research, adaptation of known principles, and the training of technological personnel can be fostered and that such stations should be associated with technical institutions offering technological programs.

Problems which involve more basic research and which are peculiar to Latin American conditions exist and can be expected to develop in such areas as industrial wastes, industrial hygiene, garbage and refuse disposal, air pollution, water sewage, and food technology.

The Committee notes that the report on environmental health places emphasis on applied rather than basic research and that some priorities of such research might well follow those established by the PAHO/WHO program priorities. This is to say that logically application research might begin on such programs as water and sewerage.

The necessity of exploring anthropological approaches, human

behavior, and mechanisms of mass education to accept new ideas and to change existing habit patterns is as necessary in treating problems associated with the environment as they are to all public health activities and warrant emphasis in any consideration of application research. The Committee strongly recommends that support should be given to studies of this nature (See also Maternal and Child Health below).

It is appropriate to state that, although the Committee considers it highly desirable that the training centers proposed in Document RES 1/1 * should be established by the countries concerned assisted by the Organization, provision should be made under the research budget for support of research training of future research workers and the faculty of these institutes on problems which will certainly arise, even though they may not yet have been clearly defined. This would help to attract faculty of the quality desired. The Committee believes that the nature of the research which might well be undertaken in these centers should be the subject of further study by the Organization and a report on this would be welcomed at the next meeting of the Committee.

The Committee agrees that the health aspects of housing demands the attention of the Organization and that collaboration with the Inter-American Housing and Planning Center should be developed.

The Committee emphasizes that, while the provision of pure water and sewage disposal are the most urgent environmental needs,

* "Report of the Consultant on Environmental Health" prepared for the first meeting of this Advisory Committee.

studies of other means of transmission of intestinal diseases and their control should not be neglected.

In the special area of occupational health the information provided to the Committee was apparently mainly related to one country, Chile, because of the establishment in Santiago of the Inter-American Institute of Occupational Health financed by the U.N. Special Fund, the Chilean government and the University of Chile. Most of the problems mentioned apply as well to other Latin American countries. The Committee would appreciate more information on industrial health problems in other countries at its next session.

4. Dental Health

The Committee notes that, out of 17 dental schools which were surveyed (none from Argentina), 10 have no research whatever; in 4, only isolated individuals did research; 1 had a definite research program but no individual funds assigned to it; and only 2 had definite programs with individual funds. This is not an unusual pattern in many parts of the world. The Committee takes note, however, that in Argentina there is a long and active tradition of good quality research in dental problems, specially fluorosis, caries prevention, nutrition and pathology as related to dental health. Training of research workers in this field and stimulation of a research attitude seems to the Committee to be the primary need in most places. It appears that this could not be accomplished on a short term basis, but support of selected worthwhile research

programs in competent hands where such can be found, might be one way of catalyzing the process.

Within dental health research, it would seem that the following priorities should be considered:

- a. Training of research workers
- b. Epidemiologic research (see Document RES 1/5)*
- c. Research on preventive methods
- d. Research destined to increase the efficiency of coverage of dental service programs.

5. Maternal and Child Health

The Committee notes the stimulating views expressed in Document RES 1/7** with which it is in general agreement. The subject is given a high priority.

However the opinion is expressed that it should not be too readily assumed that increased growth as indicated by the rate of increase of height and weight in children is necessarily synonymous with improved health. It is agreed that growth measured in these terms may be a valuable indicator where gastro-intestinal infections and malnutrition are rife, as in many of the Latin American countries, but current knowledge does not justify extrapolation to areas such as the United States where such conditions are relatively rare. The biggest babies are not necessarily the best babies.

* "Research Needs in Dental Public Health in Latin America" prepared for the first meeting of this Advisory Committee.

* * "Toward a Research Policy in Maternal and Child Health in Latin America" prepared for the first meeting of this Committee.

The proposals submitted may be classed under three main headings:

a. Studies of mortality, morbidity and growth as indices of improvement in the health status of populations. The Committee considers that these are essential parts in the evaluation of any attempt to improve health, with the proviso mentioned above regarding the interpretation of growth as an index of health.

b. Studies of methods of accelerating cultural changes favorable to health. The Committee strongly urges that such studies should be developed, pointing out that their applicability would extend far beyond the field of Maternal and Child Health. The Committee expresses the view that it would welcome more specific proposals for research on this subject at its next meeting and recommends that the Organization should seek the appropriate advice from sociologists, anthropologists, psychologists, educators and others. The Committee points out the similarity of this need to that expressed in the section on environmental health.

c. Comparative studies of health services. The Committee feels that this is a much needed area of research which has been too often neglected. The application of epidemiological techniques to the study of the functioning and effectiveness of health services has not only been shown to be practical but may be the only way in which an objective evaluation of the real

value of services, which are often both empirical and costly, can be made. This type of research also has a much wider field of application than that in maternal and child health.

The last two items might perhaps be better classified as research in public health practice.

The Committee expresses its concern over the possibly serious effects of the changing pattern of breast-feeding in many areas of Latin America. It strongly recommends studies of this problem.

6. Nutrition

The Committee congratulates the consultants upon the high quality of their report. Because of this and because there is general agreement with the proposals, few comments are necessary. It is recommended that, in the general PAHO program, research related to nutritional problems should receive the highest priority. Because of the great importance of these studies and the limitation of available funds, however, a tentative list of priorities within the nutrition field is established, as follows:

- a. Malnutrition in infants and young children with special emphasis on the effects of protein and/or caloric deficiency on patterns of growth and development
- b. Anemias
- c. Endemic goiter
- d. Nutrition and infection

At this time, the Committee does not wish to establish priorities for individual specific research projects as set forth in the report leaving such a decision to the Organization, if and when funds become available. The Committee would like to emphasize again the need to avoid duplication of research already being undertaken or planned under the WHO program.

7. Chagas Disease

The distinction and the size of the group of consultants constituting the Advisory Group on Research in Chagas Disease gives great authority to Document RES 1/15. * The widespread occurrence of Chagas disease throughout Latin America, its exclusive distribution in this continent, its discovery and early classical description by a South American worker, its economic and social importance, and the many areas of ignorance of the factors involved make research in this field one of the highest priorities in the mind of this Committee. To this may be added the legitimately proprietary feeling which Latin American workers derive from the almost exclusively continental contributions to its knowledge.

The Committee refers to the consultants' document for a list of priorities and for their justification as follows:

- a. Perfection and standardization of diagnostic procedures, primarily because of their importance in evaluating the magnitude of the problem

* "Report of the Advisory Group on Research in Chagas Disease" prepared for the first meeting of this Advisory Committee.

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- b. A broad survey designed to evaluate the true extent and magnitude of the problem
- c. Ecology of vectors with a view to more radical control
- d. Chemotherapy, since to date no therapeutic agent has been found to be really effective against this protozooosis
- e. Prophylaxis, mainly envisaging:
 - perfection of methods of applying insecticides, chiefly designed to discover more economical techniques
 - discovery of active substances to combat T. cruzi in blood in vitro
- f. Basic research on correct identification of trypanosomes similar to T. cruzi and on the nutrition, metabolism, and immunological behavior of this parasite

To the above list of priorities the Committee would like to add research on the pathogenesis of the disease, which is implied in the body of the document, but not explicitly stated.

The Committee would like to insist very specially on the following:

- a. The establishment of centers responsible for producing and controlling antigens for laboratory diagnosis as a means of furthering research
- b. The promotion of centers to maintain strains of trypanosomes under known conditions and facilitating

their exchange, also for the purpose of furthering research

- c. Specifically supporting the centers of excellence already engaged in research on the various aspects of the disease

The Committee would like to emphasize ~~sapropos~~ of Chagas disease -- but it is a view which could be applied to almost any of the pathological processes considered in this session -- that an awareness of the immense range and broad aspects of the problem should be cultivated by workers in this field. A broad front of attack should be maintained to encourage the many and diverse views of the problem -- all of them complementary, none of them more "basic" or "fundamental" than the others. Whereas "molecular" or "biochemical and biophysical" considerations should certainly be encouraged, they should not necessarily be thought of as constituting more profound or important contributions than those dealing with original clinical or epidemiological observations or than those which consider the more complex social, anthropological or behavioristic aspects of the field.

8. Malaria

The central problem for research in malaria seems to be that of insecticide resistance in the mosquito vectors. This may be due to ecological characteristics of the insect which make for a reduced exposure to the insecticide as it is routinely employed; or it may be due to the acquisition of resistance in the mosquito through mutation of certain biochemical traits.

In the first instance, study of the ecological habits of the vector is indicated, such as was practiced widely in the pre-DDT era. Research on new malaria control measures, in addition to field studies, should be actively pursued.

A study of the biochemical and genetic mechanisms of resistance is indicated, but it is pointed out that this type of work is at present competently being carried out on a large scale under the WHO research program. Certain aspects of this type of fundamental research might provide, however, an interesting challenge for Latin American workers with talent for basic research and a desire to apply it to questions related to public health problems.

Other suggestions for research may be found in the list prepared by the WHO Scientific Group on Malaria Research that met in Geneva on 23 - 27 November 1959 (Document MHO/PA/6.60). The Committee emphasizes that the PAHO research program should be considered within the wider framework of the WHO malaria research program.

9. Schistosomiasis

Schistosomiasis is a disease resulting from the intimate contact between man and the river. It requires for its maintenance a rather complex chain of interdependent biological events, the rupture of any one of which would lead to its suppression. Its incidence is basically limited to three countries in Latin America and to a few islands, and its epidemiologic spread conditioned by the presence of the intermediate host and the human migrations and set-

tlements in certain valleys. It provides numerous areas for research, both with potential practical applications and with possibilities for research training and stimulation at all levels of fundamental knowledge. It is therefore an excellent subject for research support.

It may be added that schistosomiasis is possibly the only helminthiasis which is on the increase, and that its economic implications are enormous, if the data from the Philippines (where it is said to cause \$6.6 million/year loss, more than malaria) can be extrapolated to other areas of the world. Even though much work on the physiology and biochemistry of the worm has been performed, especially by E. Bueding and his group, much remains to be done. A satisfactory and effective chemotherapeutic agent has not been found; nor has a good molluscicide. There is no clear-cut way of judging whether a given infection is active or not, but it is generally agreed that subjects with a better state of nutrition fare better clinically and possibly "resist" better the infection.

Bearing in mind the above facts, and based upon the excellent and complete review presented by the consultants, it would appear that the highest priority for research should be given to this disease, at least in those countries where it is prevalent. The priorities for research areas within this field are as follows:

Research on the Molluscan Intermediate Hosts

- a. The preparation of a guide for the neotropical planorbids for use by public health workers involved in survey work and control programs of

schistosomiasis in the Americas

- b. Distribution of intermediate hosts and potential intermediate hosts with special reference to Brazil
- c. Additional studies on the biology and chemistry of the aquatic environment to determine the factors conducive to snail harborage
- d. Further evaluation of the role of Australorbis tenagophilus in transmission of the disease
- e. The genetic and physiologic constitution of various strains of molluscan intermediate hosts in relation to their susceptibility to schistosome infection

Research on the Control of the Molluscan Intermediate Hosts

- a. Intensive effort to develop more efficient and cheaper molluscicides
- b. New formulations of known effective molluscicides with synergists, spreading or emulsifying agents or other physical and chemical mechanisms to provide for more effective distribution and to promote residual activity
- c. Biochemical and physiological studies to determine the mode of action of molluscicides
- d. Research on more reliable methods for the automatic dispensing of molluscicides
- e. Development of effective tests for the detection of low dilutions of molluscicides

Research on the Parasite

- a. Development of in vitro axenic cultures of Schistosoma mansoni to determine basic physiological and biochemical patterns, knowledge which would be of value in the development of new drugs aimed at destroying the parasite or inhibiting the egg laying capacity of the female
- b. The significance of lower animal reservoirs in the transmission of the disease and their possible influence on control schemes.

Research Relating to the Human Host

- a. Development of more effective and safer drugs without appreciable side effects for treatment of human schistosomiasis
- b. Further studies on the mode of action of schistosomicidal drugs
- c. Additional studies on the fluorescent antibody technique for the diagnosis of schistosomiasis and evaluation of its usefulness in epidemiological surveys
- d. Studies on immune mechanisms in the human host
- e. Carefully controlled group studies in a highly endemic area in which control measures are not operative to determine the effect of fortified diets on the symptomatology of the disease and the egg output of the female worms

- f. Group studies to establish clinical gradient standards for schistosomiasis in the Americas to serve as a base line for determining the economic impact of the disease on the individual and the community

It may be noted in passing that the greatest care should be exercised in modifying the milieu wherein the intermediate host lives. The effect of poisonous substances on the ecology of the streams and the possible consequences of the removal of the snail should be carefully assessed before applying the findings of research in these directions.

10. Leprosy Research in Latin America

The presentation of the documentation on this subject leaves no doubt that there is an urgent need to encourage research on this enormous subject, because of its economic and public health importance, the ignorance which persists on many of the essential features of the disease and the distressing but true fact that it is exceedingly difficult to attract research workers into this field. It is pointed out that for decades leprosy had, as it were, "inherited" the advances made in the study of tuberculosis, but that relatively little had been done in research on leprosy in its own right. This situation was clearly wrong and, further, with the enormous reduction in human tuberculosis throughout the world there is a real danger that even this indirect contribution to the understanding of leprosy will decrease. Much of past research on leprosy has been directed to the clinical field and far too little to the lab-

boratory and epidemiological aspects of the disease. There appears to be a grave deficiency of laboratory workers at the present time.

Throughout its considerations this Committee has been most careful to examine the possibility that the research proposed might duplicate research being undertaken elsewhere. However in this field this does not arise, owing to the very small number of competent scientists working on the subject. The Committee therefore recommends that support of research on leprosy by the Organization largely be determined by the known competence of the few investigators studying the disease rather than by detailed examination of specific projects. In this way the investigators would be given greater freedom to follow possible clues to advances than if they were supported only for a specific investigation.

A very high priority is given to this subject.

11. Plague in the Americas

The Committee expresses its appreciation for the remarkably complete documentation provided and the excellent presentation. These provided a unique review of the existing situation in the hemisphere and an outline of research plans for studies in Perú and Venezuela. It is recommended that on completion of the report on plague for other areas in the Americas, the document should be published. In addition, it was indicated in the presentation that there were reports that sylvatic plague may have spread through to the northern part of Bolivia and might invade the rodent population in the Amazon basin. It was stated that the actual situation was far from clear but if it were confirmed

the possible consequences might become serious. Flooding in this area during the rainy season would provide an ideal situation for spread of the infection among wild rodents which would then be likely to transmit it to man either indirectly through domestic rodents or directly by invasion of villages. It was proposed that verification of these reports by a mobile international team comprising a mammalogist, an entomologist and an ecologist should be undertaken. If they should be confirmed, a plague organization on a regional basis should be set up with the aim of stimulating research, improving reporting, encouraging early recognition of the disease and providing prompt treatment. It was further recommended that investigations should be undertaken on the best rodenticides and insecticides to use in order to prevent familial aggregations of cases so frequently observed in Peru¹ and to a lesser extent in Venezuela.

The Committee believes that the ecological and epidemiological studies outlined in Document RES 1/13 * are sound and should be supported, subject to the availability of funds. However, the highest priority should be given to the problem of the definition of the real situation in northern Bolivia. The Committee believes that early steps should be taken to do this, and that the team should then study the situation in the other countries with a view to identifying the best area for further research.

The Committee also stresses the need for improved awareness on the part of physicians of the possibility of plague as a clinical diagnosis in all countries with sylvatic foci. This is particular-

* "Plague in the Americas" prepared for the first meeting of this Advisory Committee.

ly important in view of the great reduction of mortality following early treatment. It recommends that the PAHO should ensure that, in relevant areas, ministries of health, medical societies, hospitals and medical schools are aware of the importance of this fact.

12. Arthropod-borne Virus Diseases in Latin America

The Committee expresses its appreciation for the excellent report provided by the Secretariat and Consultants. It is in full agreement that research is urgently needed in this field, even though it is clear that at the present time the toll in human morbidity caused by these infections is not known. It is believed that this would prove to be considerably higher than is generally thought. However apart from the specific results of research on this subject, the Committee feels that this is one of the most valuable areas for the development of research competence, and certainly one of the best for demonstrating the importance of the ecological approach to medical research. The Committee wishes to stress here what could with equal justification have been stressed in almost any other section of this report, that the "orthodox" division of research into basic and applied is most misleading. No one aspect is more basic than another. All are complementary aspects of the approach to the study of life and those factors, including disease, which imperil it. This comprehensive view of research referred to as the ecological approach demands that consideration should be given to the relationship of the total organism under study to its total environment, the "total" organism including the biochemical, immunological, and other processes by

which it lives, and the "total" environment comprising the biological, physical, and behavioral influences with which it must compete and to which it must adapt if it is to survive.

The arthropod-borne virus diseases are especially good examples of this, since not only man, but also insect vectors and animal hosts are involved in their ecology. Man, whose interests are axiomatically the major concern of the Committee, is the least important of the three if one hopes to understand how to prevent human disease induced by these viruses. The investigation must start with the ecology of the virus, its vectors and its natural animal reservoirs. It is partly for this reason that the Committee recommends a high priority for the program proposed.

The Committee is aware that a world-wide program of research on this subject was being developed by the World Health Organization and that the Rockefeller Foundation was participating closely in this through its international virus research program. The Committee is pleased to note that the PAHO program is being conceived as a part of the WHO program. It supports the proposal of a reference center in Latin America as an integral part of the world network of centers being developed by WHO.

All the proposals for research are considered excellent and should be supported, subject to the availability of funds. However there is one unique opportunity to which the highest priority should be given. This arises from the proposed movement of large populations into the Amazon basin. Past experience elsewhere, such as the high focal incidence of Russian spring-summer encephalitis among settlers opening up new areas in Siberia, and

recently the epidemic of Mayaro fever in Japanese settlers in Uruma, Bolivia, stresses the urgent need for ecological studies before such population movements are made. Furthermore man's own interference with the environment of the settled area profoundly disturbs its ecology and hence the prevailing disease pattern. This applies to all types of disease including those which are arthropod-borne. The study of this matter is considered so urgent and so difficult that the Committee recommends convening a special advisory group to design and supervise these studies. The group should include experts with a thorough understanding of ecology.

The Committee notes that this was the first proposal for research in the field of virus diseases. It agrees with the selection but expresses the view that at its next session it would welcome proposals for research on respiratory virus diseases which are suspected as contributing largely to the considerable mortality and morbidity from these diseases in Latin America.

13. Zoonoses: Problems and Research Needs in Latin America

The documentation and the presentation to the Committee on this subject provided a comprehensive review of this most important field. The Committee notes that it stressed the weakness that results from the "fragmentation" of medical and related sciences into sections that are actually part of a whole but are treated as if they are separate. The Committee recognizes that in many countries of the world including some Latin American

countries the veterinary profession is not given its deserved recognition and is also seriously underpaid.

Where this exists, it is the direct result of the failure of governments to appreciate the enormous contribution that veterinarians can make in the economic and hygienic field in all countries but specially in those countries in which stock raising is important. For instance, in Argentina, the situation with regard to foot-and-mouth disease is threatening. The Committee notes with satisfaction the measures now being taken to deal with this problem. The savings of losses of livestock, normally regarded as inevitable, that are possible through the employment of well-trained veterinarians equipped with modern techniques are many tens or a hundredfold greater than the cost of supporting the veterinary service. It is urged that the attention of the governments of member states be drawn to this fact and to the urgent need for further research, especially in foot-and-mouth disease.

The Committee strongly supports research in this subject not only because of its economic importance but also because animal populations, both domestic and wild, play a major role in the ecology of many human diseases.

The areas in which research should be concentrated include the following:

- a. Training of future leaders in research and program planning
- b. Collection of data -- especially on the socio-economic impact of these diseases -- which might convince governments of the

economic advantages of supporting veterinary programs and the veterinary profession

c. Public health application of the known facts about zoonoses

d. Fellowships

Three further areas are, however, singled out for special emphasis. The first is the need for the provision of standard antigens and sera which could be used in surveys of the distribution both in animals and man of a number of zoonoses.

The second is the development of a system whereby the potency of various veterinary vaccines could be assured by regular testing. The Committee wishes to emphasize most strongly that with all biological products, no matter how experienced the producer, regular testing is essential and that the failure of individual batches to pass the test carries no scientific stigma. It urges that not only in this field but also in the field of human vaccines the fullest advantage should be taken of the testing services offered by the PAHO.

The third proposal is concerned with the establishment in the Pan American Zoonoses Center in Argentina of a reference serum bank -- similar to the WHO World Reference Serum Bank at Yale University -- in which collections of animal and human sera would be developed. The Committee agrees that this would be an invaluable augmentation of the WHO program.

14. Radiation

Ionizing radiation can be looked at both as an object of study in reference to its effects on living systems and as a tool for research in many fields. With regard to the first concept, it would seem that, within the framework and philosophy of this Committee, the proposed research in the document under consideration should have a low priority. Thus, for example, the number of inhabitants in the high background monazite areas of Brazil is too small, the background too inconstant, and the variables too many to make the study worthwhile.

With regard to the use of radiation as a tool for research, on the other hand, it would seem that there are many promising areas in the field of tropical health. A judgment as to priority in these different areas would seem to depend upon the importance of such areas and their relevance to the objectives of PAHO. Thus, for example, the study of iron absorption and loss through various routes, being related to nutritional problems, would be given the highest priority. Similarly, the use of ionizing radiation to modify the sexual physiology and the biotic potential of certain vectors, especially the reduviid bugs, would fall in an area of very high priority. The study of hydatid cysts by means of external scanning of the liver following injection of an appropriate isotope would certainly have a high priority.

The value of radioisotope technology as a stimulant to the development of scientific endeavor and the need for supporting already functioning competent groups could also provide a basis for a high priority choice.

An effort to spread knowledge of these useful techniques by means of properly conducted courses should certainly be continued

and deserves support.

15. Health Economics and Medical Care

The economic aspects of health and medical care are poorly understood because of lack of research in this area. It is probable that, with better administration, 20 to 30 per cent more patients could be taken care of in the available beds, and hence in the long run the answer to the paucity of beds is not necessarily to build more hospitals, but to perform fundamental research into the how's and why's of such a situation.

In addition, research into medical care and its economic aspects would help tie up health with the general growth and development of a country, and establish the basis for a general body of doctrines related thereto. This type of research fits in very well with the present timely interest in the rational planning of many aspects of social and economic development in the hemisphere.

Throughout its deliberations, the Committee notes the lack of proper studies which would permit it to evaluate the economic impact of the various studies proposed, and thus to base the priorities on a surer footing. This, among other considerations, has made the Committee keenly aware of the importance of the field of research described in Documents 1/3 and 1/17.*

For all of these reasons and because of the immediate and long range returns to be expected from this type of research, this Committee does not hesitate to place it at a very high priority level on par with biological and medical research.

* "Research Needs on the Economics of Health and Medical Care in Latin America" (RES 1/3) and "Research Needs in Medical Care" (RES 1/17) prepared for the first meeting of this Committee.

CONCLUSION

The Committee is informed of the steps which will be taken towards the implementation of the program. These include the presentation of this report to the Pan American Sanitary Conference for its consideration in August of this year. Programs selected according to the guide-lines on priority given by the Committee will then be prepared in a form suitable for submission to appropriate fund-granting agencies. Clearly in the eyes of the Committee adequate funding of this program is vital.

In this connection the Committee wishes to urge that because of the essential importance of research for the more rapid development of the countries of Latin America, serious consideration should be given by the Governing Bodies of the Organization to the support of research in its regular budget.

The Committee wishes to congratulate the Director, the Secretariat, the Staff, and the many experts involved, for the very high standards of scientific excellence attained at this meeting. It wishes to re-emphasize the need for continuing on the same high standards the plans for the development of the program and recommends that the necessary budgetary provisions be made for this purpose. The Committee notes a request from the Secretariat for suggestions and advice on appropriate research subjects, to be supported by the Organization, for consideration at the next meeting of the Committee, tentatively scheduled for June 17-21, 1963.