The
PAN AMERICAN
SANITARY BUREAU

PRESENTS

The
PAN AMERICAN
FOOT AND MOUTH
DISEASE CENTER

ANNUAL REPORT

1952
The Pan American Foot and Mouth Disease Center began in 1951 as a Technical Cooperation Project of the Organization of American States. Planning of the Center, an international service, was done by the Pan American Sanitary Bureau, in collaboration with the Inter-American Institute of Agricultural Sciences. Operation of the Center is a responsibility of the Bureau.

The Center is located in the outskirts of Rio de Janeiro, Brazil, on a site and in buildings donated, together with utilities and a proportion of the labor costs, by the Brazilian Government. Major financial support is provided by the Organization of American States, but in addition, collaboration in specific parts of the technical and training phases of the Center’s program, is received from the Food and Agriculture Organization and the U. S. Department of Agriculture.

The work of the Center is devoted to training of national laboratory and field staffs responsible for the control of foot and mouth disease in the Americas; to diagnostic services including identification of the virus; and to field consultations in control and prevention techniques. Through research and liaison with other centers throughout the world, the Pan American Center maintains an intimate knowledge of new aspects of foot-and-mouth disease and its control.

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THE PAN AMERICAN SANITARY BUREAU

PRESENTS THE

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OF THE

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Regional Office of the

World Health Organization

1801 New Hampshire Avenue, N. W.

Washington 6, D. C., U. S. A.
To the Member States of the Pan American Sanitary Organization

The Pan American Sanitary Bureau has the honor of presenting a descriptive report of the activities and of the services rendered during 1952 by the Pan American Foot and Mouth Disease Center, which is a project operated by the Bureau as a participating agency in the Program of Technical Cooperation of the Organization of American States.

Respectfully yours,

FRED L. SOPER
Director
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I. INTRODUCTION

The year 1952 has seen not only the rapid development of the Center as an operating agency but also its recognition as an active participant in the fight against foot and mouth disease in this hemisphere. Experience has convinced authorities of many countries that international action is fundamental to the control and eventual eradication of this dread disease. Individual countries have put forth their maximum effort—often to little avail—because foot and mouth disease respects no national boundaries; outbreaks sweep across countries leaving in their wake enormous losses in animal products, with vital effect on food supplies and endangering the economy of each country through which they pass.

In establishing the Pan American Foot and Mouth Disease Center, the Americas have taken positive action in the international approach to the problem of foot and mouth disease. In fact, such centers are now being considered for other regional land masses of the world in order to study the situation in relation to geographical and ecological factors; to determine the types of virus and their distribution; and to develop a composite picture of the disease as it affects the area as a whole. Upon these factors depend the development of the measures to be adopted within each individual country.

Through training and technical assistance in the field, the Pan American Center has two main objectives: (1) to assist countries in the Americas at present free from the disease to remain free, and (2) to assist the affected countries to control and eventually eradicate the disease. In addition, special diagnostic services and basic research complete the Center's operational objectives. The development and operation of the Center are directed toward such ends. It will be some months before the Center's full potential is reached but, as will be
seen from this report, rapid progress has already been made and much has been accomplished.

At the beginning of the year the Center consisted of but one building, which was even then in the process of being adapted for laboratory work. By the end of the year adequate temporary facilities were obtained and the construction of a permanent building was about to begin. In addition, the Agreement officially authorizing the establishment of the Center in Brazil was ratified by the Brazilian Congress.

Concurrent with the structural development, a steady increase in personnel has enabled the Center to make available an ever increasing range of services to participating countries. By the end of the year it was possible to anticipate the time when full service would be available.

II. OPERATIONAL FACILITIES

Permanent Quarters

While the building program was not started in 1952, following the ratification of the Agreement, the Center was advised that the Ministry of Agriculture would allocate Cr$2,000,000 to initiate the program in 1953. These funds are to be used for the construction of isolation stables for experimental work on cattle and other large animals. Such stables, together with the temporary laboratory units, will provide the Center with adequate operational facilities until such time as the permanent structures are finished.

The types of units needed and the formal plans for eventual facilities were fully discussed in the 1951 Annual Report, and since then no changes have been made.

Temporary Quarters

The laboratory and office building at São Bento, placed at the disposal of the Center by the Ministry of Agriculture, was used during the year for limited operations. As equipment became available it was installed in three laboratory rooms on the ground floor. The remainder of the rooms on this floor have been used to house small animals (guinea pigs and mice); for storage and for maintenance work. The four rooms on the upper floor were used as offices for the staff.

It soon became apparent that these facilities were entirely inadequate and representations were made to the Ministry of Agriculture
requesting the allocation of additional space in accordance with the interim agreement. Toward the end of the year the Minister arranged for the transfer of the National Plant Pathology Station to another location. The remainder of the buildings at São Bento was then made available to the Center. These buildings comprise, in addition to the main administration unit already occupied, a laboratory building consisting of eight rooms; a large metal building for storage, workshops, etc.; garages; and smaller service units. Contracts were made for the adaptation of the additional facilities at the expense of the Ministry of Agriculture.

Staff

International Staff:

Director
Chief of Laboratories
Epizootiologist
Serologist

Virologist
Training Officer
Laboratory Technician
Administrative Officer

Local Staff (totalling 24) are composed of:

Laboratory technicians
Laboratory aides
Secretarial and clerical
Maintenance and labor staff

Equipment and Supplies

The procurement, shipping and customs-clearance of equipment and supplies were among the greatest problems faced by the Center. Much of the basic equipment was very difficult to obtain owing to a world shortage. Many delays were consequently experienced and these, together with the delays due to shipping and customs clearance, slowed up the Center's operations considerably. However, by the middle of the year sufficient equipment and supplies had been assembled to permit such operations as the limited space would allow. Some heavy equipment such as ultracentrifuges, freeze-drying apparatus, freezer and incubator units could not be installed due to lack of space and an inadequate supply of electrical current. By the end of the year, both space and electricity problems were solved in some measure, and it was anticipated that early in 1953 all available equipment would be brought into use.
Laboratory Animals

Considerable progress was made in setting up breeding colonies for small laboratory animals. As a result of recent research developments, guinea pigs, rabbits and mice are playing an increasingly important part in foot and mouth disease work. These developments have been followed very closely by the Center, since they may offer a means whereby the cost of experimentation may be enormously reduced and the investigation of many phases of the disease simplified.

Guinea pigs:—By the end of the year the breeding colony consisted of 276 animals. All of these were derived from the basic stock of adult animals obtained from the National Institutes of Health of the United States. Some difficulty, due to disease, was experienced initially in establishing the colony, but this was later overcome, and the colony has provided 114 animals for experimental purposes. A total of 613 animals were obtained from other sources.

Mice:—A breeding colony of white mice was established with stock obtained from the Instituto Oswaldo Cruz in Rio de Janeiro. This colony has increased rapidly to a year-end stock of 3,279 animals. In addition, 4,589 mice have been used for laboratory work.

Rabbits:—All rabbits used for experimental purposes during 1952 were purchased locally as needed.

Cattle:—It was not possible to obtain, during 1952, a permanent source of cattle for experimental purposes. The selection, adaptation and supervision of suitable breeding farms or areas, present many difficulties. Plans were made to engage the cooperation of various national agencies in this procurement during 1953. In the meantime, limited numbers of susceptible cattle were procured from a farm (near the city of Rio) which is unusually well isolated and has remained free from foot and mouth disease for many years.

III. OPERATIONS

General

As originally envisaged, the Center has four basic functions: (a) training; (b) laboratory diagnosis; (c) consultative field services; (d) research. All these services were initiated or maintained during 1952.
Training

No formal training courses were conducted during 1952, but technical orientation was provided to visitors from many countries. In addition, one trainee was accepted from Paraguay to study the laboratory diagnosis of the disease and typing of the virus. This trainee, winner of a 5-months' fellowship from the Institute of Inter-American Affairs, was expected to return to Paraguay in January 1953 to take charge of the foot and mouth disease vaccine production unit.

In December, as a result of the allocation of additional laboratory space, it was possible to plan for the first formal training course; a 2-months' course to begin about April 1, 1953.

The preparation of public information and education materials was continued. In addition to the illustrated booklet depicting the story of an epizootic of foot and mouth disease, work continued on the adaptation of a 16 mm. colored film "Outbreak" for use in Spanish speaking countries. A detailed manual covering all aspects of prevention and control was drafted, and completion date set for training purposes early in 1953.

Laboratory Diagnosis

This phase of the Center's work is undoubtedly of great importance since the types of virus and their distribution in the Americas must be determined before an effective control program can be carried out. The laboratory diagnosis conducted during the year was performed on 104 field specimens from three different countries.

A stock of hyperimmune sera for foot and mouth disease (types "O", "A" and "C") and vesicular stomatitis (New Jersey strain) has been prepared in guinea pigs. These sera are used in making laboratory diagnoses by the complement fixation test and are available for distribution to participating countries on request.

Hyperimmune sera for laboratory use were sent to Argentina and Costa Rica.

Field Services

The Center was requested to advise the National Foot and Mouth Disease Commission of Brazil on the planning of a nation-wide control program, and the basic part of this work has been accomplished.
Staff members of the Center made initial visits to Costa Rica, Cuba, the Dominican Republic, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama and Trinidad to discuss the ways in which the services of the Center can be used to assist these countries in preventing the entrance of foot and mouth disease. The proposed training course for April 1953 was designed to provide each country of Central America and the Caribbean with one person qualified to advise the Government on its foot and mouth disease program.

Visits were made also to Argentina, Colombia, Chile, Peru, Paraguay, Uruguay and Venezuela to survey the foot and mouth disease control facilities and activities. Much valuable information was obtained which will be used as a basis in planning the training courses, to be held late in 1953, designed for countries affected by the disease. The Center has supplied most of these countries with technical guidance on various aspects of foot and mouth disease.

A second visit was made to Ecuador to follow up the prevention program which the Government is developing. Here, too, advisory services were provided.

Research

Use of suckling mice:—In view of the outstanding importance of the British work on adaptation of foot and mouth disease virus to suckling mice, primary consideration was given to the confirmation and application of this work. Its great significance lies in the fact that the use of suckling mice or other small laboratory animals would affect a tremendous reduction in the cost of laboratory investigations and also make possible many types of investigations which hitherto have been impractical.

As a result of the research it is expected that the suckling mouse may be of great value in diagnosis and particularly in determining the type of foot and mouth disease virus in infective material. Before a definite statement can be made in this regard, further studies must be conducted to show that the results obtained in suckling mice and cattle are comparable. If this is proven, then one litter of mice could take the place of each bovine in typing tests.

Serum neutralization and protection tests using mice:—The practicability of using suckling mice for serum neutralization and protection tests to detect the presence of antibodies for foot and
mouth disease in the serum of cattle was also investigated. The objectives were to obtain a simple method of surveying a large number of animals to determine previous infection with the disease, and of measuring the degree and type of immunity in individual animals. The results obtained to date are very satisfactory, although further investigations will be necessary before the test can be brought into regular use.

**Virus propagation in suckling rabbits:**—In view of the early success achieved in the mouse adaptation experiments, investigations were extended to suckling rabbits with the object of obtaining a new source of tissue for vaccine production. Present methods of vaccine production are both difficult and costly due to the need for using live susceptible cattle, or normal bovine tongue tissue, to provide the material from which the vaccine is made. The rabbit was selected because of its short gestation period, stage of development and size at birth, since it thus provides a cheap and abundant source of tissue.

Two batches of vaccine were prepared, by the Schmidt-Waldmann technique, using tissue from suckling rabbits which had succumbed to the infection. The virus had been passed from rabbit to rabbit five times in both instances. Sterility and innocuity tests on each batching were satisfactory but tests for ability to confer immunity in cattle gave disappointing results. Only with the second batch of vaccine was there any indication of increased resistance and this was with a very large dose. However, it may be that virus from many more serial passages in rabbits will give better results and thusly experiments will continue.

**Adaptation of foot and mouth virus to adult mice:**—Medical research has shown that cortisone, a hormone preparation, has the power of making adult mice susceptible to Coxsackie disease (a virus infection of man). Since foot and mouth disease virus and Coxsackie virus appear to produce similar symptoms and lesions in suckling mice, it seemed possible that cortisone might have a similar effect with respect to foot and mouth disease virus in adult mice.

Several experiments were conducted in which adult mice were inoculated with cortisone, followed 1½ hours later by an injection of virus. In most cases the mouse sickened and died. When material from these mice was passed into other mice, again with cortisone, the
infection was reproduced. This process was repeated a number of times and with each passage a shortening of the incubation period and an increase in intensity of the disease were observed.

After seven passages it was found that the virus had become so adapted that adult mice could be infected without previous inoculation with cortisone. Material from the tenth passage was injected into a susceptible calf and it developed a typical foot and mouth disease infection. This work indicated that the virus type had not changed even though it had become adapted to adult mice.

Chick embryos studies:—Towards the end of the year work was started on the adaptation of foot and mouth disease virus to embryonated chicken eggs. The objectives of this work also were to obtain a new source of tissue for vaccine production, and to produce a modification in the virus that would allow it to be used directly for immunization, a technique which was developed for yellow fever vaccine.

Type "O" virus has been found, according to German workers, to be infective for eggs but initially it could not be passed directly from egg to egg. However, by passing it from egg to mouse to egg alternately, some degree of adaptation was obtained and after 12 such passages it was found possible to pass the virus directly from egg to egg for several consecutive passages. This work is being continued.

Serological studies:—The use of the complement fixation test to determine the presence of antibodies in bovine serum was also investigated. A modified technique, developed by two Italian workers, failed to produce satisfactory results in this laboratory. Further studies will be followed.

IV. INTERNATIONAL RELATIONS

Member Governments

The unanimous support and cooperation of all the participating countries has continued. In every country visited, technicians from the Center have received the fullest cooperation from all interested agencies and it was strikingly apparent that the Center's task is of tremendous importance, not only to the livestock industry but also to the general economy of nations in the Western Hemisphere.
International Agencies

During the year the Director of the Center participated in a meeting in Copenhagen, Denmark, of many of the world's experts on foot and mouth disease. The meeting was convened by the International Office of Epizootics to discuss the present methods of immunization against the disease.

As a result of the 1951 Regional Consultative Meeting on Foot and Mouth Disease in Panama, FAO made an agreement with the Government of Panama, providing for two technicians to coordinate the preventive programs of the Central American and Caribbean countries. One technician arrived in Panama early in 1952 and a second was scheduled to take up his duties there in January 1953. Both technicians spent some time at the Center prior to pursuing their duties.

Members of the Center's staff attended the II Inter-American Conference on Livestock Production in Baurú, State of São Paulo, Brazil, 8–15 December 1952, and participated in the discussions on foot and mouth disease. It was apparent, from these discussions, that all countries in the Americas are keenly interested in this problem and the development of an international program.

V. CONCLUSION

The year 1952 has been another development year for the Pan American Foot and Mouth Disease Center. Equipment, facilities and staff have been established and organized into an operational unit. As the services of the Center were developed and the countries availed themselves of them, an approach was made toward hemispheric attack on this highly infective and costly disease. The countries of the Americas, through their international Center, have provided themselves with efficient and effective facilities, for personnel training and disease combat, of a type not obtainable otherwise.